



This electronic version (PDF) was scanned by the International Telecommunication Union (ITU) Library & Archives Service from an original paper document in the ITU Library & Archives collections.

La présente version électronique (PDF) a été numérisée par le Service de la bibliothèque et des archives de l'Union internationale des télécommunications (UIT) à partir d'un document papier original des collections de ce service.

Esta versión electrónica (PDF) ha sido escaneada por el Servicio de Biblioteca y Archivos de la Unión Internacional de Telecomunicaciones (UIT) a partir de un documento impreso original de las colecciones del Servicio de Biblioteca y Archivos de la UIT.

(ITU) نتاج تصوير بالمسح الضوئي أجراه قسم المكتبة والمحفوظات في الاتحاد الدولي للاتصالات (PDF) هذه النسخة الإلكترونية نقلاً من وثيقة ورقية أصلية ضمن الوثائق المتوفرة في قسم المكتبة والمحفوظات.

此电子版（PDF 版本）由国际电信联盟（ITU）图书馆和档案室利用存于该处的纸质文件扫描提供。

Настоящий электронный вариант (PDF) был подготовлен в библиотечно-архивной службе Международного союза электросвязи путем сканирования исходного документа в бумажной форме из библиотечно-архивной службы МСЭ.



**Documents of the World Administrative Radio Conference on the use of the geostationary-satellite orbit and the planning of the space services utilizing it (1st session)
(WARC ORB-85 (1)) (Geneva, 1985)**

To reduce download time, the ITU Library and Archives Service has divided the conference documents into sections.

- This PDF includes Document DT No. 1-95
- The complete set of conference documents includes Document No. 1-365, DL No. 1-60, DT No. 1-95

Note by the Secretary-General

DRAFT CONFERENCE STRUCTURE

FIRST SESSION OF THE WARC ON THE USE
OF THE GEOSTATIONARY SATELLITE ORBIT AND
THE PLANNING OF SPACE SERVICES UTILIZING IT
(Geneva, 1985)

The agenda of the Conference appears in Resolution No. 895 which was adopted by the Administrative Council at its 38th Session (Geneva, 1983). This Resolution is reproduced in the annex to Document No. 1 of the Conference.

Bearing in mind Nos. 464 to 479 inclusive of the International Telecommunication Convention, Nairobi, 1982, the following committees and working group of the Plenary with their terms of reference are suggested. These terms of reference have been drawn up within the framework of the Convention, the Conference Agenda and in the light of experience at previous conferences, after analysis of the replies from Administrations.

Committee 1 - Steering Committee

Terms of Reference :

To coordinate all matters connected with the smooth execution of work and to plan the order and number of meetings, avoiding overlapping wherever possible in view of the limited number of members of some delegations (Nos. 468 and 469 of the International Telecommunication Convention, Nairobi, 1982).

Committee 2 - Credentials Committee

Terms of Reference :

To verify the credentials of delegations and to report on its conclusions to the Plenary Meeting within the time specified by the latter (Nos. 390 and 471 of the International Telecommunication Convention, Nairobi, 1982).

./.



Committee 3 - Budget Control Committee

Terms of Reference :

1. To determine the organization and the facilities available to the delegates, to examine and approve the accounts of expenditure incurred throughout the duration of the First Session of the Conference and to report to the Plenary Meeting the estimated total expenditure of the First Session as well as the estimated costs entailed by the execution of the decisions of the Conference (Nos. 476 to 479 inclusive of the International Telecommunication Convention, Nairobi, 1982 and Nairobi Resolution No. 48).
2. Furthermore, to evaluate the financial impact of the Conference's decisions, in accordance with No. 627 and other relevant provisions of the International Telecommunication Convention, Nairobi, 1982 (item 5.4 of the Agenda).

Committee 4 - Technical Parameters and Criteria Committee

Terms of Reference :

1. To review from the technical point of view the situation prevailing in the bands allocated to space services on the basis of information communicated by administrations and the report prepared by the IFRB in accordance with Resolution No. 3 of WARC-79 (agenda item 2.1).
2. To establish the necessary technical parameters and criteria:
 - a) for the planning, including those for orbit and frequency assignments, of the space services and frequency bands identified as per item 2.2 of the agenda, taking into account the relevant technical aspects concerning the special geographical situation of particular countries (agenda item 2.3);
 - b) for identifying those bands for which sharing criteria between services (space or terrestrial) need to be developed during the intersessional period for consideration at the Second Session of the Conference (agenda item 2.6).
3. In order to meet the objectives of Resolution No. 505 of WARC-79, to consider the question in the light of experience gained by administrations and the results of CCIR studies and to make appropriate recommendations for the attention of the Second Session of the Conference (agenda item 4).

Committee 5 - Committee on Planning Principles and Criteria
and Regulatory and Administrative Procedures

Terms of Reference :

1. To review from the planning and regulatory points of view the situation prevailing in the bands allocated to space services on the basis of information communicated by administrations and the report prepared by the IFRB in accordance with Resolution No. 3 of WARC-79 (agenda item 2.1).
2. To decide, on the basis of proposals received from administrations, which space services and frequency bands should be planned (agenda item 2.2), taking into account any advice received from Committee 4.
3. To establish the principles and relevant criteria for the planning, including those for orbit and frequency assignments, of the space services and frequency bands identified as per item 2.2 of the agenda, taking into account the relevant technical aspects concerning the special geographical situation of particular countries (agenda item 2.3).
4. To consider other possible approaches that could meet the objectives of guaranteeing in practice, for all countries, equitable access to the geostationary-satellite orbit and the frequency bands allocated to the space services utilizing it (agenda item 2.5).
5. To establish, as necessary, guidelines for the regulatory procedures associated with:
 - a) the planning mentioned in agenda item 2.3 including that pertaining to space services and frequency bands which have been identified in accordance with item 2.2 of the agenda (agenda item 2.3);
 - b) space services and frequency bands which have not been identified in accordance with item 2.2 of the agenda (agenda item 2.4);
 - c) other possible approaches that could meet the objectives of guaranteeing in practice, for all countries, equitable access to the geostationary-satellite orbit and the frequency bands allocated to the space services utilizing it (agenda item 2.5).
6. To specify the form in which the requirements of administrations for the frequency bands indicated in agenda item 2.2 should be submitted to the Union, and to indicate the desirable date for this submission (agenda item 5.1).

./.

Committee 6 - Committee on Matters Relating to the Broadcasting-Satellite
Service in the 12 GHz Band

Terms of reference :

1. In order to meet the objectives of decides 2.3 of Resolution No. 1 of the Plenipotentiary Conference, Nairobi, 1982 and Resolution No. 504 of WARC-79, and subject to any advice which is sought from Committee 4:
 - a) to consider the relevant decisions of the Regional Administrative Radio Conference for the Planning of the Broadcasting-Satellite Service in Region 2 with a view to incorporating these decisions in the Radio Regulations, as appropriate, including the revision of the Radio Regulations only for these purposes as necessary (agenda item 6.1);
 - b) to prepare, as appropriate, for consideration by the Plenary appropriate final acts to achieve this objective (agenda item 6.2).
2. In order to meet the objectives of Resolution No. 8 of the Plenipotentiary Conference, Nairobi, 1982:
 - a) to select from among the frequency bands listed in resolves 1 of Resolution No. 101 of WARC-79 those bands for which frequency plans should be established for feeder links (agenda item 3.1);
 - b) to define the most suitable technical characteristics for the feeder links to broadcasting satellites, taking into consideration the CCIR studies pursuant to Resolution No. 101 and Recommendation No. 101 of WARC-79 and, if appropriate, taking account of the requirements of the space operation service for broadcasting satellites (agenda item 3.2);
 - c) to identify those bands, selected in accordance with item 3.1 of the agenda, for which sharing criteria between services (space or terrestrial) need to be developed during the inter-sessional period for consideration by the Second Session of the Conference (agenda item 3.3).

./.

Ad Hoc Working Group of the Plenary

Terms of Reference :

1. Based on the results of the work of Committees 4 and 5, and taking into account the advice of Committee 3, to specify the preparatory actions required to be completed before the commencement of the Second Session of the Conference (agenda item 5.2).
2. To recommend a draft agenda for the Second Session of the Conference for consideration by the Administrative Council (agenda item 5.3).

Committee 7 - Editorial Committee

Terms of Reference :

To perfect the form of the texts prepared in the various committees and Plenary working groups of the Conference, without altering the sense and, where appropriate, combining them with those parts of former texts which have not been altered, for submission to the Plenary Meeting (Nos. 473 and 474 of the International Telecommunication Convention, Nairobi, 1982).

NOTES :

In the relevant considerations in Committees 4 and 5 the Conference has available for information the Report of the CCIR Conference Preparatory Meeting (CPM).

Following initial consultations in preparation for the Conference it appears that the examination of questions concerning planning principles and criteria and regulatory and administrative procedures are closely related and it would seem preferable that these questions be treated in a single committee; but the Conference may wish, for the sake of convenience, to give guidance for the appointment of two sub-committees/working groups within Committee 5, a Planning Principles and Criteria Sub-Committee/Working Group (5A) and a Regulatory and Administrative Procedures Sub-Committee/Working Group (5B), with terms of reference as indicated in the Annex.

./.

ANNEX

Sub-Committee / Working Group 5A - Planning Principles and Criteria

Terms of Reference :

1. To review from the planning point of view the situation prevailing in the bands allocated to space services on the basis of information communicated by administrations and the report prepared by the IFRB in accordance with Resolution No. 3 of WARC-79 (agenda item 2.1).
2. To decide, on the basis of proposals received from administrations, which space services and frequency bands should be planned (agenda item 2.2), taking into account any advice received from Committee 4.
3. To establish the principles and relevant criteria for the planning, including those for orbit and frequency assignments, of the space services and frequency bands identified as per item 2.2 of the agenda, taking into account the relevant technical aspects concerning the special geographical situation of particular countries (agenda item 2.3).
4. To consider other possible approaches that could meet the objectives of guaranteeing in practice, for all countries, equitable access to the geostationary-satellite orbit and the frequency bands allocated to the space services utilizing it (agenda item 2.5).

Sub-Committee / Working Group 5B - Regulatory and Administrative Procedures

Terms of Reference :

1. To review from the regulatory point of view the situation prevailing in the bands allocated to space services on the basis of information communicated by administrations and the report prepared by the IFRB in accordance with Resolution No. 3 of WARC-79 (agenda item 2.1).
2. Taking into account the results of the work of Sub-Committee 5A, to establish, as necessary, guidelines for the regulatory procedures associated with:
 - a) the planning mentioned in agenda item 2.3 including that pertaining to space services and frequency bands which have been identified in accordance with item 2.2 of the agenda (agenda item 2.3);
 - b) space services and frequency bands which have not been identified in accordance with item 2.2 of the agenda (agenda item 2.4);
 - c) other possible approaches that could meet the objectives of guaranteeing in practice, for all countries, equitable access to the geostationary-satellite orbit and the frequency bands allocated to the space services utilizing it (agenda item 2.5).
3. To specify the form in which the requirements of administrations for the frequency bands indicated in agenda item 2.2 should be submitted to the Union, and to indicate the desirable date for this submission (agenda item 5.1).

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/2-E
7 August 1985

DRAFT

AGENDA

OF THE

FIRST PLENARY MEETING

Thursday, 8 August 1985, at 1430 hrs

(Room I)

Document No.

- | | |
|---|------|
| 1. Approval of the agenda | - |
| 2. Opening of the Conference | - |
| 3. Election of the Chairman of the Conference | - |
| 4. Election of the Vice-Chairmen of the Conference | - |
| 5. Address by the Secretary-General | - |
| 6. Conference Structure | DT/1 |
| 7. Election of the Chairmen and Vice-Chairmen of the Committees | - |
| 8. Composition of the Conference Secretariat | - |
| 9. Allocation of documents to Committees | DT/3 |
| 10. Participation requests submitted by international organizations | 43 |
| 11. Date by which the Credentials Committee must submit its conclusions | - |
| 12. Working hours of the meetings of the Conference | - |
| 13. Financial responsibilities of administrative conferences | 44 |
| 14. Other business | |

R.E. BUTLER
Secretary-General

SEANCE PLENIERE

PLENARY MEETING

SESION PLENARIA

Projet / Draft / Proyecto

Note du Secrétaire général / Note by the Secretary-General

Nota del Secretario General

ATTRIBUTION DES DOCUMENTS / ALLOCATION OF DOCUMENTS

ATRIBUCION DE LOS DOCUMENTOS

- | | |
|--|--|
| <u>Plenière / Plenary / Plenaria</u> | : 1, 4 + Add. 1 + Add. 2, 45, 48, 49 |
| C2 - <u>Pouvoirs</u> | : 2 |
| <u>Credentials</u> | |
| <u>Credenciales</u> | |
| C3 - <u>Budget</u> | : 18, 43, 44, 46, 47 |
| <u>Presupuesto</u> | |
| C4 - <u>Paramètres et critères</u> | : 3, 4 + Add.1 + Add. 2, 5, 8, 9, 10, 12, |
| <u>techniques</u> | 13, 17, 18, 19, 20, 21 + Corr. 1, 24, 25, |
| <u>Technical parameters and</u> | 26, 27, 28, 30, 31, 32, 33, 35, 36, 37, |
| <u>Criteria</u> | 39, 41, 42, 53, 54 |
| <u>Parámetros y criterios técnicos</u> | |
| C5 - <u>Critères et principes de</u> | : 3, 4 + Add.1 + Add. 2, 5, 7, 8, 9, 10, 11, |
| <u>planification et procédures</u> | 12, 17, 18, 19, 20, 21 + Corr. 1, 25, 26, |
| <u>règlementaires et</u> | 27, 28, 29, 30, 31, 33, 34, 35, 36, 37, |
| <u>administratives</u> | 38, 39, 41, 42, 53, 54 |
| <u>Planning Principles and Criteria</u> | |
| <u>and Regulatory and Administrative</u> | |
| <u>Procedures</u> | |
| <u>Principios y criterios de</u> | |
| <u>planificación y procedimientos</u> | |
| <u>reglamentarios y administrativos</u> | |
| C6 - <u>Questions relatives au service</u> | : 3, 5, 6, 7, 8, 9, 10, 14, 15, 16, 17, |
| <u>de radiodiffusion par satellite</u> | 18, 20, 22, 31, 33, 35, 37, 40, 48, 51, 52 |
| <u>dans la bande des 12 GHz</u> | |
| <u>Matters relating to the</u> | |
| <u>Broadcasting-Satellite Service</u> | |
| <u>in the 12 GHz Band</u> | |
| <u>Cuestiones relativas al Servicio</u> | |
| <u>de Radiodifusión por satélite en</u> | |
| <u>la banda de 12 GHz</u> | |
| <u>Groupe de travail Ad Hoc</u> | : 7, 9, 13, 18, 21, 22, 23, 24, 34, 42, 44 |
| <u>Ad Hoc Working Group</u> | 51 |
| <u>Grupo de Trabajo ad hoc</u> | |

R.E. BUTLER
Secrétaire général

Projet / Draft / Proyecto

Note du Secrétaire général / Note by the Secretary-General
Nota del Secretario GeneralATTRIBUTION DES DOCUMENTS / ALLOCATION OF DOCUMENTS
ATRIBUCION DE LOS DOCUMENTOS

<u>Plenièrre</u>	: 1, 4 + Add. 1 + Add. 2, 45, 48, 49
<u>Plenary</u>	
<u>Plenaria</u>	
C2 - <u>Pouvoirs</u>	: 2
<u>Credentials</u>	
<u>Credenciales</u>	
C3 - <u>Budget</u>	: 18, 43, 44, 46, 47
<u>Presupuesto</u>	
C4 - <u>Technique</u>	: 3, 4 + Add.1, 5, 8, 9, 10, 12, 13, 14, 15,
<u>Technical</u>	17, 18, 19, 20, 21 + Corr. 1, 24, 25, 26,
<u>Técnica</u>	27, 28, 30, 31, 32, 33, 35, 36, 37, 39,
	40, 41, 42, 52, 53, 54
C5 - <u>Planification / Réglementation</u>	: 3, 4 + Add.1, 5, 7, 8, 9, 10, 11, 12, 17,
<u>Planning / Regulatory</u>	18, 19, 20, 21 + Corr. 1, 22, 25, 26, 27,
<u>Planificación / Reglamentación</u>	28, 29, 30, 31, 33, 34, 35, 36, 37, 38,
	39, 40, 41, 42, 52, 53, 54
C6 - <u>Décisions de la Région 2</u>	: 3, 5, 6, 9, 16, 18, 33, 35, 37, 48, 51
<u>Region 2 Decisions</u>	
<u>Decisiones de la Región 2</u>	
<u>Groupe de travail Ad Hoc</u>	: 7, 9, 13, 18, 21, 22, 23, 24, 34, 42, 51
<u>Ad Hoc Working Group</u>	
<u>Grupo de Trabajo ad hoc</u>	

R.E. BUTLER
Secrétaire général

PROPOSAL FOR ORGANIZATION OF THE WORK OF COMMITTEE 6

Working Group 6A: Matters concerning the Final Acts for Region 2

1. In order to meet the objectives of decides 2.3 of Resolution No. 1 of the Plenipotentiary Conference, Nairobi, 1982 and Resolution No. 504 of WARC-79, and subject to any advice which is sought from Committee 4:

- a) to consider the relevant decisions of the Regional Administrative Radio Conference for the Planning of the Broadcasting-Satellite Service in Region 2, particularly the incompatibilities between regions and services;
- b) to consider and to resolve the incompatibilities between assignments in the Region 2 Plan and those in Appendix 30 to the Radio Regulations, as well as existing assignments in other services;
- c) to prepare, as appropriate, the texts of the necessary provisions to be incorporated in the Radio Regulations;

(Agenda item 6.1)

- d) to prepare, as appropriate, for consideration by the Plenary, appropriate Final Acts to achieve this objective (agenda item 6.2).

Working Group 6B: Feeder links for BC-SAT Regions 1 and 3

2. In order to meet the objectives of Resolution No. 8 of the Plenipotentiary Conference, Nairobi, 1982:

- a) to select from among the frequency bands listed in resolves 1 of Resolution No. 101 of WARC-79 those bands for which frequency plans should be established for feeder links (agenda item 3.1);
- b) to define the most suitable technical characteristics for the feeder links to broadcasting satellites, taking into consideration the CCIR studies pursuant to Resolution No. 101 and Recommendation No. 101 of WARC-79 and, if appropriate, taking account of the requirements of the space operation service for broadcasting satellites (agenda item 3.2);
- c) to identify those bands, selected in accordance with item 3.1 of the agenda, for which sharing criteria between services (space or terrestrial) need to be developed during the intersessional period for consideration by the Second Session of the Conference (agenda item 3.3).

Dr. M. MATSUSHITA
Chairman of Committee 6

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/5-E
9 August 1985
Original: English

WORKING GROUP 5B

Note from the Chairman

The flow charts annexed hereto are extracted from the IFRB Handbook on Radio Regulatory Procedures, and are provided as an aide-memoire.

S.M. CHALLO
Chairman of Working Group 5B

Annexes: 2

PART	CHAPTER	PAGE	REV.
V	2	6	

THE ADVANCE PUBLICATION PROCEDURE OF SECTION I
OF ARTICLE 11 OF THE RADIO REGULATIONS, APPLICABLE TO SPACE AND EARTH STATIONS
IN GEOSTATIONARY OR NON-GEOSTATIONARY SATELLITE NETWORKS (SEE NOTE 1)

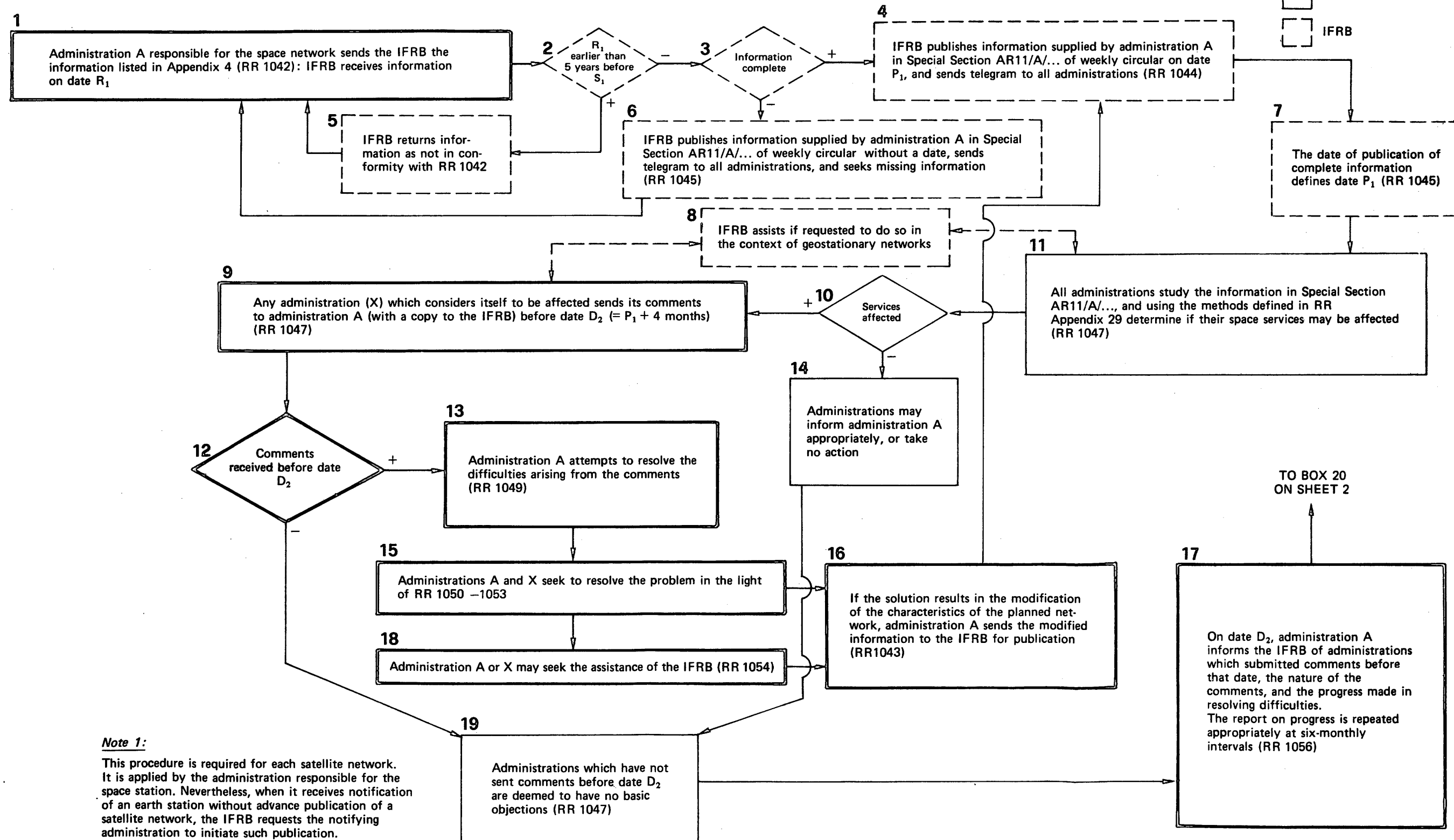
FLOWCHART No. AW
Sheet 1 of 2
ANNEX V.2.1
(See V.2.1)

THIS FLOWCHART IS ISSUED AS AN AID TO UNDERSTANDING AND DOES NOT FORM PART
OF THE RADIO REGULATIONS

S_1 = Proposed date on which assignment
is to be put into use.

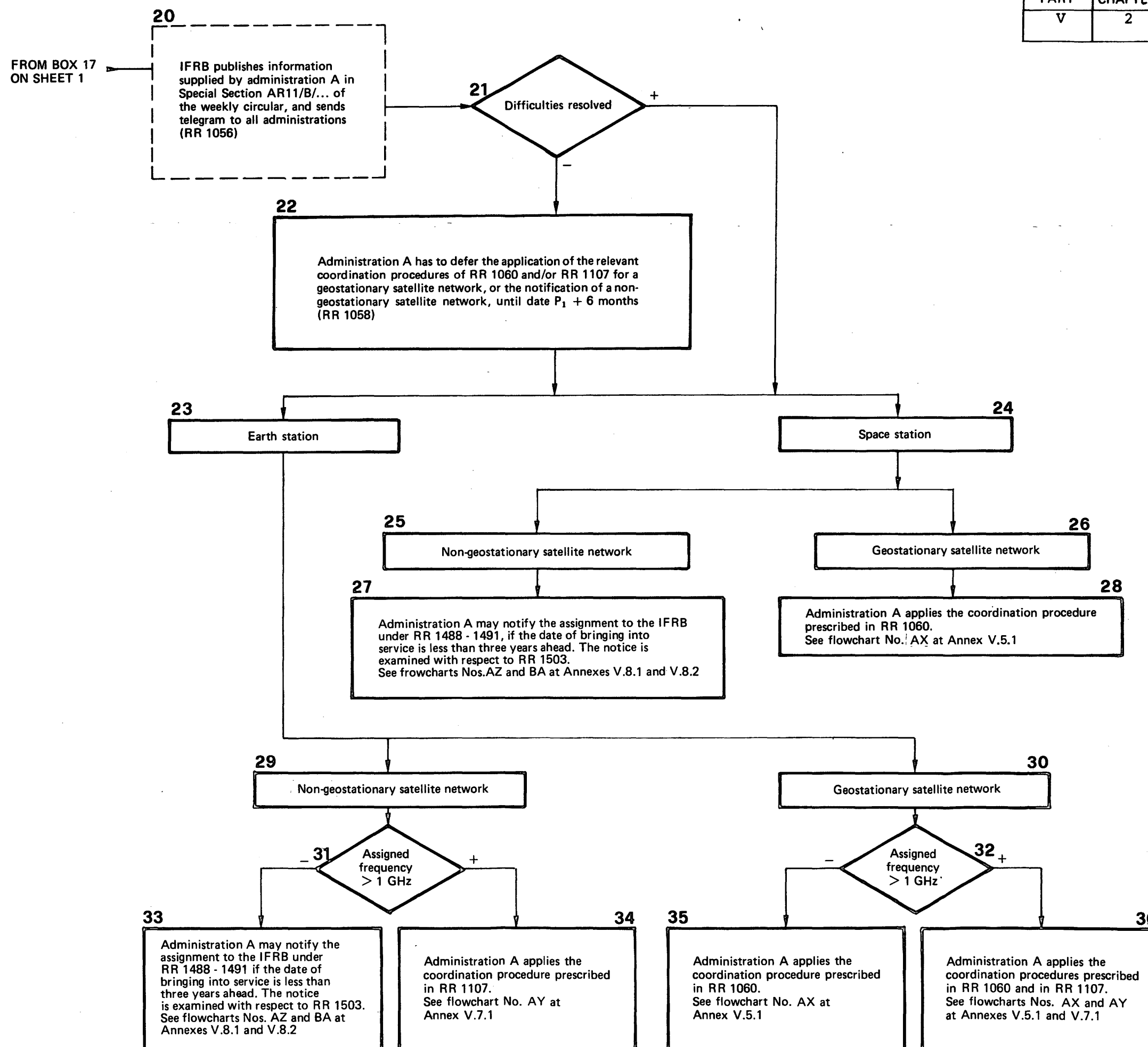
+ = Yes
- = No

Action by: ☐ Administration A
☐ Another administration
☐ IFRB



PART	CHAPTER	PAGE	REV.
V	2	7	

FLOWCHART No. AW
Sheet 2 of 2
ANNEX V.2.1
(cont.)



PART	CHAPTER	PAGE	REV.
V	5	16	




THIS FLOWCHART IS ISSUED AS AN AID TO UNDERSTANDING AND DOES NOT FORM PART OF THE RADIO REGULATIONS

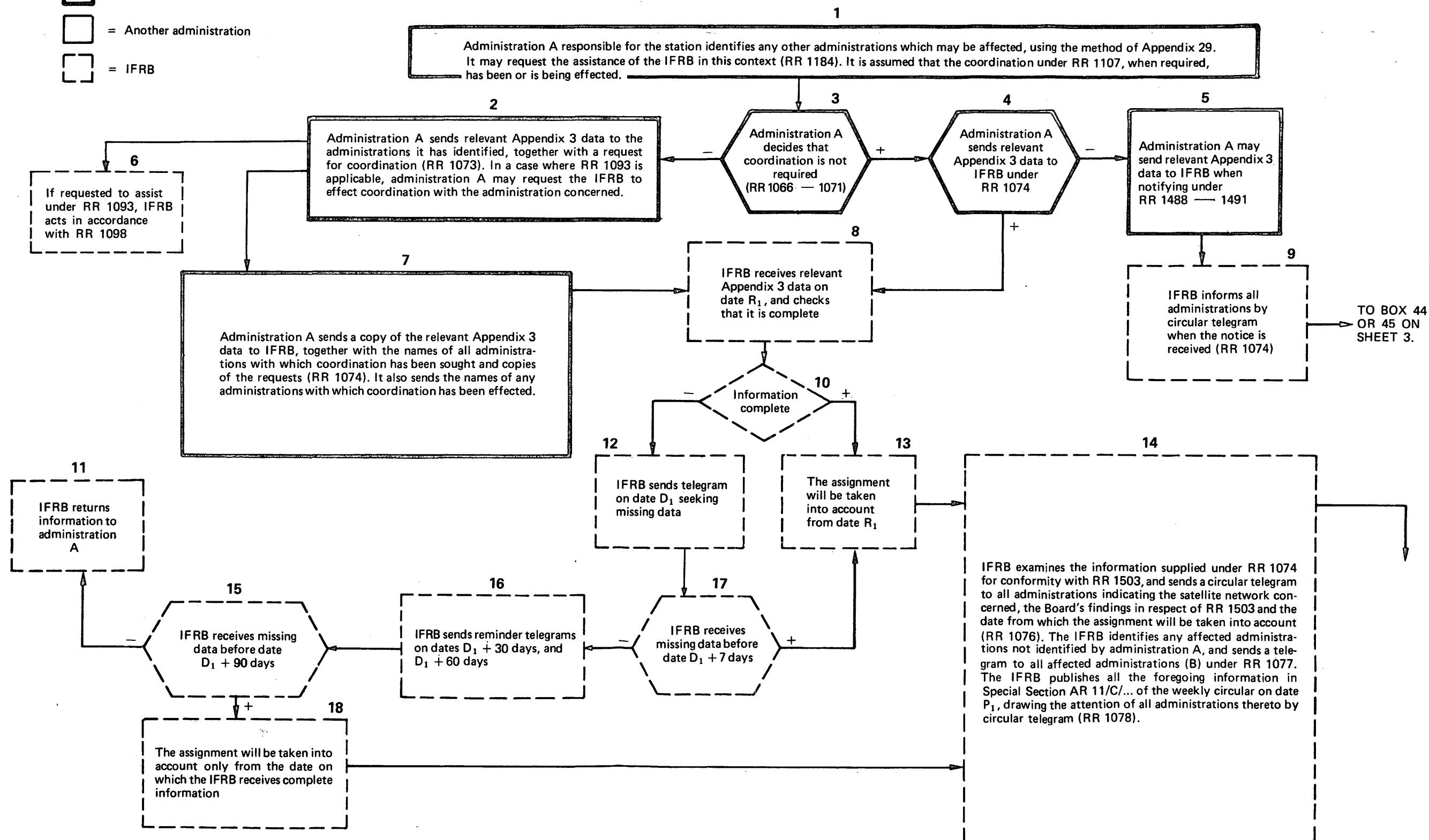
THE RR 1060 COORDINATION PROCEDURE APPLICABLE TO SPACE OR EARTH STATIONS IN A GEOSTATIONARY SATELLITE NETWORK IN RELATION TO OTHER GEOSTATIONARY SATELLITE NETWORKS OPERATING IN THE SAME FREQUENCY BAND BEFORE AN ASSIGNMENT IS NOTIFIED TO THE IFRB

FLOWCHART N° AX
Sheet 1 of 3
(ANNEX V.5.1,
See V.5.1)

+ = Yes

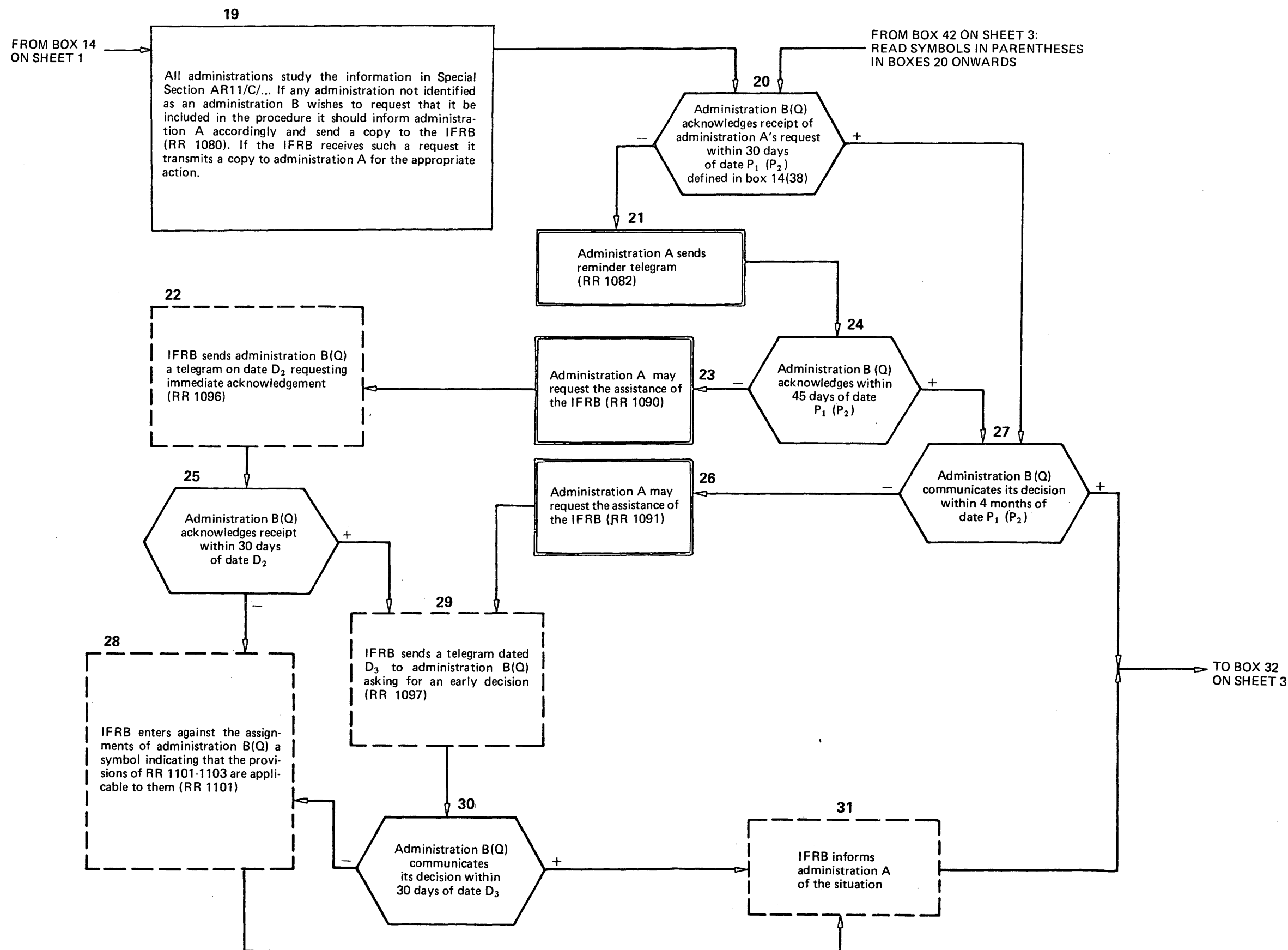
- = No

Action by :  = Administration A
 = Another administration
 = IFRB



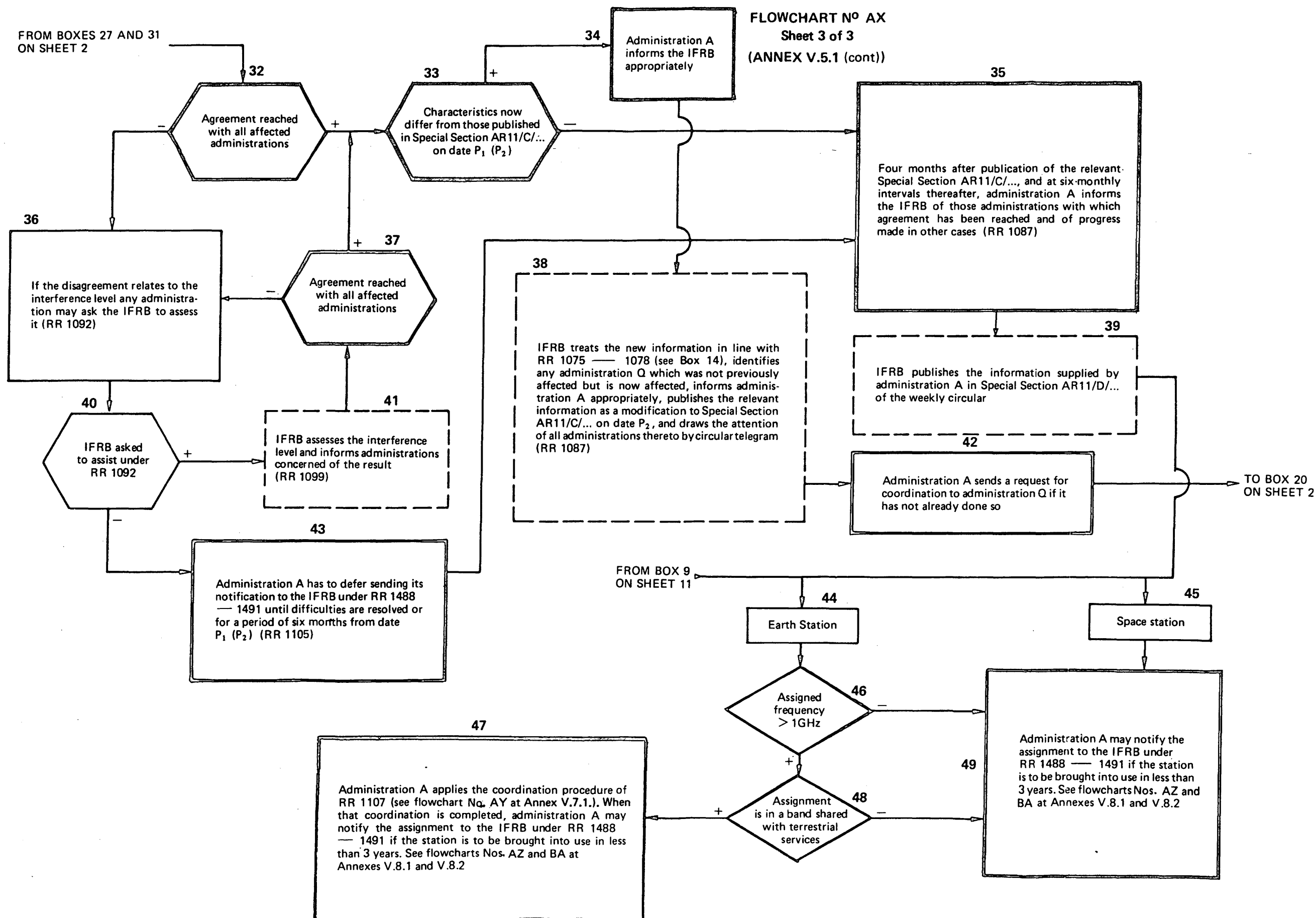
PART	CHAPTER	PAGE	REV.
V	5	17	

FLOWCHART N° AX
Sheet 2 of 3
(ANNEX V.5.1 (cont))



PART	CHAPTER	PAGE	REV.
V	5	18	

FLOWCHART N° AX
Sheet 3 of 3
(ANNEX V.5.1 (cont))



COMMISSION 5COMMITTEE 5COMISION 5ATTRIBUTION DES DOCUMENTS / ALLOCATION OF DOCUMENTS /
ATRIBUCION DE LOS DOCUMENTOSGT/WG 5AGT/WG 5B

3	3
4+Add.1+Add.2	4+Add.1+Add.2
5	5
7	7
8	8
9	9
10	10
11	-
12	12
17	-
18	18
-	19
20	20
-	21
25+Add.1+Corrigendum	25
26	26
27	-
28	-
-	29
30	30
31	31
-	33
34	-
35	35
36	-
37	37
39	39
41	-
42	-
53	-
54	-
55	-
56	-
59	59
60	60
-	62
63	63
74,75,76,78,82,87	-

M. MENCHEN

Président, Commission 5

Chairman, Committee 5

Presidente, Comisión 5

COMMISSION 5COMMITTEE 5COMISION 5ATTRIBUTION DES DOCUMENTS / ALLOCATION OF DOCUMENTS /
ATRIBUCION DE LOS DOCUMENTOSGT/WG 5A

3
4+Add.1+Add.2
5
7
8
9
10
11
12
17
18
-
20
-
25
26
27
28
-
30
31
-
35
36
37
38
39
41
42
53
54
55
56
59
60
62
63

GT/WG 5B

3
4+Add.1+Add.2
5
7
8
9
10
-
12
-
18
19
20
21
25
26
-
-
29
30
31
33
35
-
37
-
-
39
-
-
-
-
-
59
60
62
63

M. MENCHEN

Président, Commission 5

Chairman, Committee 5

Presidente, Comisión 5

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/7(Rev.1)-E

15 August 1985

Original: English

COMMITTEE 4

STRUCTURE OF COMMITTEE 4

COMMITTEE 4: General

Agenda item: 2.1

Chairman: Mr. R.G. AMERO (CAN) - Box 484

Vice-Chairman: Dr. G. HEGYI (HNG) - Box 161

Discussion on general items not covered by the Working Group, e.g.

- Terminology (Article I)

Working Group 4A: Sound BSS (Resolution No. 505)

Agenda item: 4

Chairman: -

Consider agenda item 4 in light of experience gained by administrations and the results of studies in the CCIR and make recommendations to the second session.

Working Group 4B: Sharing (Inter-service)

Agenda items: 2.1, 2.6 and 3.3

Chairman: Mr. K. KOSAKA (J) - Box 607

a) Analyze current sharing situations in frequency bands to be discussed in Committee 5 under agenda item 2.2, based on input from administrations and the results of studies in the CCIR, identifying the current availability of sharing information and areas requiring further study.

b) Identify, for the bands and services selected by Committee 5 under agenda item 2.2, the sharing criteria between services (both space and terrestrial) which need to be developed during the inter-sessional period (agenda item 2.6).

c) Identify, those bands selected by Committee 6 under agenda item 3.1, the sharing criteria between services (space or terrestrial) which need to be developed during the inter-sessional period (agenda item 3.3).

Working Group 4C: Technical parameters and criteria (Intra-service)

Agenda items 2.1 and 2.3

Chairman: Mr. D. WITHERS (UK) - Box 54

Establish the necessary technical parameters and criteria required in bands and services which are under review by Committee 5 in their consideration of agenda item 2.2, taking into account operational factors and the relevant technical aspects concerning the special geographical situations of particular countries (agenda item 2.3); such discussions should also consider the technical aspects of the situation prevailing (agenda item 2.1).

R.G. AMERO

Chairman of Committee 4

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/7-E

12 August 1985

Original: English

COMMITTEE 4

DRAFT STRUCTURE OF COMMITTEE 4

Committee 4: Situation prevailing

Agenda item: 2.1

Chairman: Mr. R. AMERO (CAN) - Box 484

Vice-Chairman: Dr. G. HEGYI (HNG) - Box 161

Initial discussion on the technical aspects of the situation prevailing in the bands allocated to space services on the basis of information from administrations and the report prepared by the IFRB (agenda item 2.1).

Working Group 4A: Sound BSS (Resolution No. 505)

Agenda item: 4

Chairman: -

Consider agenda item 4 in light of experience gained by administrations and the results of studies in the CCIR and make recommendations to the second session.

Working Group 4B: Sharing (Inter-service)

Agenda item: 2.6

Chairman: Mr. K. KOSAKA (J) - Box 607

a) Analyze current sharing situations in frequency bands to be discussed in Committee 5 under agenda item 2.2, based on input from administrations and the results of studies in the CCIR, identifying the current availability of sharing information and areas requiring further study.

b) Identify, for the bands and services selected by Committee 5 under agenda item 2.2, the sharing criteria between services (both space and terrestrial) which need to be developed during the inter-sessional period (agenda item 2.6).

Working Group 4C: Technical parameters and criteria (Intra-service)

Agenda item: 2.3

Chairman: Mr. D. WITHERS (UK) - Box 54

Establish the necessary technical parameters and criteria required in bands and services which are under review by Committee 5 in their consideration of agenda item 2.2, taking into account the relevant technical aspects concerning the special geographical situations of particular countries (agenda item 2.3); such discussions should also consider the technical aspects of the situation prevailing (agenda item 2.1).

R. AMERO
Chairman

NOTE BY THE CHAIRMAN

The terms of reference of Working Group 5B require the Working Group to:

- 1) review and establish, as necessary, guidelines for the regulatory procedures associated with frequency bands and services which the Conference decides should be:
 - 1.1 unplanned;
 - 1.2 planned;
 - 1.3 subject to other approaches;
- 2) to specify the form in which the requirements of administrations for the frequency bands indicated in agenda item 2.2 should be submitted to the Union, and to indicate the desirable date for this submission (agenda item 5.1).

S.M. CHALLO
Chairman of Working Group 5B

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/9(Rev.2)-E

26 August 1985

Original: English

COMMITTEE 4

PRELIMINARY ALLOCATION OF DOCUMENTS

Committee 4:

a) Definitions

Document 3 (CCIR): chapter 2, section 2.1, Annex 1
Document 4 + Add.1 + Add.2 (IFRB): section 4.1
Document 13 (F): sections 1 and 2
Document 68 (CLM): 68/4
Document 72 (CLM): 72/16-18
Document 110 (COMP): 110/1
Document 126 (F)

b) 4 Ad hoc 1: HDTV

Document (HOL): 23/4
Document 33 (S): 33/10
Document 34 (E): 34/7
Document 35 (CAN): 35/21
Document 149 (SMR)

Working Group 4A: Broadcasting-satellite service/sound (Resolution No. 505)

Document 3 (CCIR): chapter 11
Document 5 (USA): 5/12
Document 8 (NZL): section 4
Document 9 (URS): 9/9
Document 18 (G): paras. 54, 55, 56
Document 24 (HOL): 24/5
Document 31 (D) + Add.1: section 3.6
Document 32 (E) + Add.1 (CVA): paras. 1-7
Document 35 (CAN): section 4.8
Document 37 (B): 37/19
Document 56 (PRG): 56/2
Document 57 (PRG): 57/3
Document 59 (CHL): 59/7, 59/8
Document 60 (MEX): 60/6
Document 61 (MEX): 61/13, 61/14, 61/15
Document 76 (F): item 4
Document 78 (YUG): 78/9
Document 81 (EQA): 81/4
Document 87 (IRQ): section 7
Document 95 (CTI): 95/6
Document 101 (ARG): 101/5
Document 137 (URS) + Corr.1
Document 148 (SMR)

Working Group 4B: Sharing

Document 3 (CCIR): chapter 8
Document 4 (IFRB)
Document 8 (NZL): section 2.6
Document 9 (URS): 9/5
Document 10 (E): 10/35
Document 11 (F): 11/6 (paras. 13-17)
Document 18 (G): para. 45 (except (c)), Annex B (para. 8)
Document 19 (F): 19/13
Document 24 (HOL)
Document 27 (CHN): section 5
Document 31 (D): section 3.4
Document 35 (CAN): 35/2.11, 35/30
Document 37 (B): 37/8, 37/9, 37/10
Document 52 (COMP) + Add.1 + Add.2
Document 60 (MEX): 60/4
Document 76 (F): items 2.4, 2.6
Document 77 (GHA): 77/8
Document 78 (YUG)
Document 95 (CTI): 95/4
Document 106 (CLM)
Document 110 (COMB): b.6
Document 116 (USA)
Document 119 (G)
Document 141 (USA)
Document 153 (IFRB)
Document 158 (COM. 5)
Document 160 (B)

Working Group 4C: Technical parameters and criteria

Document 3 (CCIR): chapter 5, chapter 6
Document 5 (USA): 5/1, 5/2, 5/3, 5/8, 5/9, §§ 19, 20, 21, 32
Document 9 (URS): 9/3, 9/5
Document 10 (E): section V
Document 12 (F): paras. 14-23
Document 17 (SEN): 17/3, 17/6
Document 18 (G): paras. 25-44, Annex B, Annex C
Document 20 (KEN): paras. 2.1, 2.2
Document 21 (HOL): paras. 17, 18, 19, 38, 39, 41, 51
Document 25 (CHN): 25/2, 25/3, 25/4, 25/5, 25/6
Document 26 (CHN): 26/13, 26/14
Document 27 (CHN): 27/16
Document 30 (USA): 30/15, 30/16, 30/17, 30/27 to 30/33, 30/43
30/44, 30/49, 30/50
Document 31 (D): 31/1, 31/2, 31/3, 31/19, 31/21
Document 33 (S): 33/8
Document 35 (CAN): 35/2.7
Document 37 (B): 37/4, 37/5, 37/11, 37/12, 37/13, 37/14
Document 39 (J): 39/4
Document 41 (J): §§ 1-4
Document 42 (E): 42/8 (item 2)
Document 54 (IND): 54/1, 54/3-5, section 3
Document 59 (CHL): 59/2
Document 60 (MEX): § 2
Document 71 (CLM): 71/12 to 71/15 + Add.1
Document 72 (CLM): 72/16-20

Document 75 (ALG): 75/6
Document 76 (F): 76/15, 76/18
Document 81 (EQA): section 1.4
Document 82 (MLA, SNG, THA): 82/7
Document 87 (IRQ): 87/8, 87/17, 87/18
Document 88 (USA):
Document 95 (CTI): section 3.2
Document 106 (CLM): §§ b.8, b.9, c.4
Document 114 (USA)
Document 115 (USA)
Document 116 (USA)
Document 156 (INS): § 1
Document 160 (B): all
Document 157 (J): all
Document 119 (G)
Document 145 (CAN)
Document 151 (SMR)
Document 110 (COMB): b.8, b.9
Document 141 (USA)

General: No specific proposals

Document 25 (CHN)
Document 28 (CHN)
Document 36 (CME)
Document 41 (J)
Document 53 (D, CVA, F, POR, G, SUI)
Document 63 (KEN)
Document 64 (Secretary-General)
Document 146 (COMB)

R.G. AMERO
Chairman of Committee 4

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/9(Rev.1)-E
14 August 1985
Original: English

COMMITTEE 4

PRELIMINARY ALLOCATION OF DOCUMENTS

Committee 4: Situation prevailing and definitions

Document 3 (CCIR): chapter 2, chapter 3
Document 4 + Add.1 + Add.2 (IFRB): sections 4.1, 4.4, 4.5, 4.6, 5.1.6,
5.1.7, 5.2, 5.2.8, 5.3.2, 5.4, 5.5,
7.4, Annex A, Annex B
Document 5 (USA) : 5/1, 5/2, 5/3, paragraph 32

Document 10 (E) : 10/1
Document 12 (F) : paras. 13-17
Document 13 (F) : sections 1 and 2
Document 19 (F) : 19/13
Document 31 (D) : sections 2.1 and 3.1
Document 33 (S) : 33/8
Document 37 (B) : 37/4, 37/5
Document 60 (MEX): section 2
Document 65 (CLM): 65/1
Document 68 (CLM): 68/4

Working Group 4A: Broadcasting-satellite service/sound (Resolution No. 505)

Document 3 (CCIR): chapter 11
Document 5 (USA) : 5/12
Document 8 (NZL) : section 4
Document 9 (URS) : 9/9

Document 18 (G) : paras. 54, 55, 56
Document 24 (HOL): 24/5
Document 31 (D) : section 3.6

Document 32 (E) : paras. 1-7
Document 35 (CAN): section 4.8
Document 37 (B) : 37/19
Document 56 (PRG): 56/2

Document 57 (PRG): 57/3
Document 59 (CHL): 59/7, 59/8
Document 60 (MEX): 60/6
Document 61 (MEX): 61/13, 61/14, 61/15

Document 76 (F) : item 4
Document 78 (YUG): 78/9
Document 81 (EQA): 81/4
Document 87 (IRQ): section 7

Document 95 (CTI): 95/6
Document 101 (ARG): 101/5

Working Group 4B: Sharing

Document 3 (CCIR): chapter 8
Document 8 (NZL) : section 2.6
Document 9 (URS) : 9/5
Document 11 (F) : 11/6 (paras. 13-17)

Document 18 (G) : para. 45 (except (c)), Annex B (para. 8)
Document 19 (F) : 19/13
Document 27 (CHN): section 5
Document 31 (D) : section 3.4

Document 35 (CAN): 35/2.11, 35/30
Document 37 (B) : 37/8, 37/9, 37/10
Document 42 (E) : 42/8
Document 60 (MEX): 60/4

Document 76 (F) : items 2.4, 2.6
Document 77 (GHA): 77/8
Document 95 (CTI): 95/4

Working Group 4C: Technical parameters and criteria

Document 3 (CCIR): chapter 5, chapter 6
Document 5 (USA) : 5/8, 5/9
Document 9 (URS) : 9/3, 9/5
Document 10 (E) : section V

Document 12 (F) : paras. 14-23
Document 17 (SEN): 17/3, 17/6
Document 18 (G) : paras. 27-44, Annex B, Annex C
Document 20 (KEN): paras. 2.1, 2.2

Document 21 (HOL): paras. 17, 18, 19, 38, 39, 41, 51
Document 25 (CHN): 25/2, 25/3, 25/4, 25/5, 25/6
Document 26 (CHN): 26/13, 26/14
Document 27 (CHN): 27/16

Document 30 (USA): 30/15, 30/16, 30/17, 30/27 to 30/33, 30/43
30/44, 30/49, 30/50
Document 31 (D) : 31/1, 31/2, 31/3, 31/19, 31/21
Document 33 (S) : 33/8
Document 35 (CAN): 35/2.7

Document 37 (B) : 37/11, 37/12, 37/13, 37/14
Document 39 (J) : 39/4
Document 42 (E) : 42/8 (item 2)
Document 54 (IND): 54/1, section 3

Document 59 (CHL): 59/2
Document 68 (CLM): 68/4
Document 71 (CLM): 71/12 to 71/15
Document 75 (ALG): 75/6

Document 76 (F) : 76/15, 76/18
Document 81 (EQA): section 1.4
Document 82 (MLA, SNG, THA) : 82/7
Document 87 (IRQ): 87/8, 87/17, 87/18
Document 88 (USA)
Document 95 (CTI): section 3.2

General: no specific proposals

Document 25 (CHN)
Document 28 (CHN)
Document 36 (CME)
Document 41 (J)
Document 53 (D, CVA, F, POR, G, SUI)
Document 63 (KEN)
Document 64 (Secretary-General)

R. AMERO
Chairman

COMMITTEE 4

PRELIMINARY ALLOCATION OF DOCUMENTS

Committee 4: Situation prevailing

Document 3 (CCIR): chapter 2, chapter 3

Document 4 + Add.1 + Add.2 (IFRB): sections 4.1, 4.4, 4.5, 4.6, 5.1.6, 5.1.7,
5.2, 5.2.8, 5.3.2, 5.4, 5.5, 7.4, Annex A,
Annex B

Document 5 (USA): 5/1, 5/2, 5/3, paragraph 32

Document 10 (E): 10/1

Document 13 (F): sections 1 and 2

Document 19 (F): 19/13

Document 31 (D): sections 2.1 and 3.1

Document 33 (S): 33/8

Document 37 (B): 37/4, 37/5

Document 60 (MEX): section 2

Document 65 (CLM): 65/1

Document 68 (CLM): 68/4

Working Group 4A: Broadcasting-satellite service/sound (Resolution No. 505)

Document 3 (CCIR): chapter 11

Document 5 (USA): 5/12

Document 8 (NZL): section 4

Document 9 (URS): 9/9

Document 18 (G): paragraphs 54, 55, 56

Document 24 (HOL): 24/5

Document 31 (D): section 3.6

Document 32 (E): paragraphs 1 to 7

Document 35 (CAN): section 4.8

Document 37 (B): 37/19

Document 56 (PRG): 56/2

Document 57 (PRG): 57/3

Document 59 (CHL): 59/8

Document 60 (MEX): 60/6

Document 61 (MEX): 61/13, 61/14, 61/15

Document 76 (F): item 4

Working Group 4B: Sharing

Document 3 (CCIR): chapter 8
Document 8 (NZL): section 2.6
Document 9 (URS): 9/5
Document 18 (G): paragraph 45, Annex B
Document 19 (F): 19/13
Document 27 (CHN): section 5
Document 31 (D): section 3.4
Document 35 (CAN): 35/2.11, 35/30
Document 60 (MEX): 60/4
Document 76 (F): item 2.6

Working Group 4C: Technical parameters and criteria

Document 3 (CCIR): chapter 5, chapter 6
Document 9 (URS): 9/5
Document 10 (E): section V
Document 18 (G): paragraphs 27 to 44, Annex B, Annex C
Document 30 (USA): 30/17, 30/27 to 30/33, 30/49, 30/50
Document 37 (B): 37/13, 37/14
Document 38 (MLA): 38/7
Document 39 (J): 39/4
Document 42 (E): 42/8
Document 54 (IND): section 3
Document 59 (CHL): 59/2

R. AMERO
Chairman

WORKING GROUP 5B

PROPOSALS/COMMENTS RELEVANT TO PROCEDURES APPLICABLE
TO UNPLANNED FREQUENCY BANDS AND SERVICES

The documents allocated by Committee 5 to Working Group 5B (Document DT/6) have been studied with a view to identifying proposals and comments addressing procedures relevant to unplanned frequency bands and services. A non-exhaustive analysis of such proposals/comments is given below.

1. Proposals relevant to the advance publication procedure of Section I of Article 11 of the Radio Regulations

1.1 Specific proposals:

URS/9/4; E/10/4; G/18/6; HOL/21/1 (paragraph 2); S/33/1 to 6; CAN/35/5, 7 and 11; MEX/62/16 to 19.

1.2 General proposals/comments:

IFRB/4 + Add.1 + Add.2, section 5.1; USA/5/10; USA/30/43, item (b), 47 and 48; CAN/35/6, 8, 9 and 10; B/37/15; J/39/6; CHL/59/6; MEX/60/3; F/76/18.

2. Proposals relevant to the coordination procedure of Section II of Article 11 of the Radio Regulations

2.1 Specific proposals:

URS/9/4; E/10/4; G/18/7 and 8; HOL/21/1 (paragraph 2); S/33/7 and 8; CAN/35/13; MEX/62/20.

2.2 General proposals/comments:

IFRB/4 + Add.1 + Add.2, sections 5.2 to 5.5; USA/5/10; AUS/7/2; G/18/7 to 11 and 13; USA/30/43, items (a), (c) and (e), 47 and 48; S/33/9; CAN/35/12 and 14; B/37/15; J/39/6; CHL/59/6; MEX/60/3; F/76/18.

S.M. CHALLO
Chairman of Working Group 5B

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

Document DT/11-E

13 August 1985

Original: English

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

SUB-WORKING GROUP 6A-1

TERMS OF REFERENCE OF SUB-WORKING GROUP 6A-1

1. Examine the criteria on interregional sharing adopted by SAT-83 with respect to the decisions on interregional sharing criteria adopted by the WARC-79.
2. Examine the incompatibilities between the Region 2 BSS Plan and the services of Regions 1 and 3.
3. Make recommendations for dealing with the incompatibilities.

G.H. RAILTON

Chairman of Sub-Working Group 6A-1

WORKING GROUP 5B

POSSIBLE SIMPLIFICATION OF THE ADVANCE PUBLICATION PROCEDURE

The following possible simplification of the advance publication procedure is presented for consideration by the Working Group. It should be borne in mind that this procedure is essentially for the information only of administrations. Consequential changes to the coordination procedure will be considered, as appropriate, under agenda item 2.2.

- MOD 1041 The provisions in No. 1042 are mandatory in the case of non-geostationary satellite systems and voluntary in the case of geostationary satellite systems.
- NOC 1042 An administration (or one acting on behalf of a group of named administrations) which intends to establish a satellite system shall, prior to the coordination procedure in accordance with No. 1060 where applicable, send to the International Frequency Registration Board, not earlier than five years and preferably not later than two years before the date of bringing into service each satellite network of the planned system, the information listed in Appendix 4.
- SUP 1043
- MOD 1044 The Board shall publish the information sent under No. 1042 in a special section of its weekly circular for information only.
- SUP 1045-
1049
- ADD 1045 This publication does not imply any rights or obligations whatsoever neither for the publishing administration nor for any other administration.
- 1050 In case of difficulties arising when any planned satellite network of a system is intended to use the geostationary-satellite orbit:
- NOC 1051 a) the administration responsible for the planned system shall first explore all possible means of meeting its requirements, taking into account the characteristics of the geostationary-satellite networks of other systems, and without considering the possibility of adjustment to systems of other administrations. If no such means can be found, the administration concerned is then free to apply to other administrations concerned to solve these difficulties;
- NOC 1052 b) an administration receiving a request under No. 1051 shall, in consultation with the requesting administration, explore all possible means of meeting the requirements of the requesting administration, for example, by relocating

one or more of its own geostationary space stations involved, or by changing the emissions, frequency usage (including changes in frequency bands) or other technical or operational characteristics;

NOC 1053

- c) if after following the procedure outlined in Nos. 1051 and 1052 there are unresolved difficulties, the administrations concerned shall together make every possible effort to resolve these difficulties by means of mutually acceptable adjustments, for example, to geostationary space station locations and to other characteristics of the systems involved in order to provide for the normal operation of both the planned and existing systems.

SUP 1054

S.M. CHALLO
Chairman of Working Group 5B

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/13(Rev.2)-E
26 August 1985
Original: English

WORKING GROUP 4C

WORK PROGRAMME ON TECHNICAL PARAMETERS AND CRITERIA (INTRA-SERVICE)

1. General issues

1.1 The need for efficient utilization of orbit and spectrum, having due regard to economic and operational factors

Document 9 (USSR) - URS/9/3
Document 17 (Senegal) - SEN/17/3, 17/5
Document 20 (Kenya) - §§ 2.1, 2.2.1
Document 25 (China) - CHN/25/2 - 6
Document 26 (China) - CHN/26/13
Document 30 (USA) - USA/30/31, 32
Document 37 (Brazil) - B/37/12, 13
Document 59 (Chile) - CHL/59/2
Document 106 (Colombia) - § b.8

1.2 Time-phased introduction of measures for increasing the efficiency of use of orbit and spectrum

CPM Report, Annex 4, § 4.6.1.3.1
Document 5 (USA) - USA/5/8
Document 18 (UK) - G/18/21
Document 21 (Netherlands) - § 17
Document 30 (USA) - USA/30/27, 28
Document 31 (FRG) - D/31/3
Document 37 (Brazil) - B/37/14
Document 71 (Colombia) and Add.1
Document 106 (Colombia) - § c.4

2. Criteria involving more than one network characteristic

2.1 Means of achieving efficient harmonization of use of orbit and spectrum

CPM Report, Annex 4, §§ 4.2.9, 4.2.11, 4.2.12, 4.3.3, 4.4.9.3, 4.4.9.4, 4.6.1.6.5
Document 5 (USA) - USA/5/8, 9 and § 3.2
Document 10 (Spain) - §§ 22, 24, 25, 26
Document 12 (France) - §§ 13 - 21
Document 18 (UK) - G/18/24, G/18/26, G/18/28 and Annex C
Document 21 (Netherlands) - §§ 18, 19, 38, 39, 41
Document 25 (China) - CHN/24/5, CHN/25/5
Document 26 (China) - CHN/26/14
Document 30 (USA) - USA/30/15 - 17, 33, 43, 44, 49, 50
Document 31 (FRG) - D/31/1, 2
Document 33 (Sweden) - S/33/8

Document 37 (Brazil) - B/37/11
Document 54 (India) - IND/54/4
Document 76 (France) - F/76/18
Document 88 (USA)
Document 114 (USA)

2.2 Computer software for harmonization and planning

CPM Report, Annex 4, § 4.4.9.6
Document 26 (China) - CHN/26/14
Document 39 (Japan) - J/39/4
Document 41 (Japan) - §§ 1 - 4

2.3 Homogeneity of orbit utilization

CPM Report, Annex 4, § 4.2.1.3
Document 71 (Colombia) - CLM/71/14, 15 and Add.1

2.4 Multi-band [and multi-service] factors

CPM Report, Annex 4, §§ 4.2.1, 4.2.2
Document 37 (Brazil) - B/37/12
Document 42 (Spain) - E/42/8

2.5 Systematic use of frequency bands

CPM Report, Annex 4, § 4.6.1.2
Document 10 (Spain) - §§ 27, 28
Document 18 (UK) - G/18/28
Document 54 (India) - IND/54/1, 3

2.6 Orbit sectorization

Document 18 (UK) - G/18/28

2.7 Generalized parameters for planning purposes and Characterization of networks by orbital arc requirements

CPM Report, Annex 4, § 4.4.9.5
Document 9 (USSR) - URS/9/3, 5
Document 30 (USA) - USA/30/29-30
Document 75 (Algeria) - ALG/75/14
Document 88 (USA)
Document 145 (Canada)
Document 157 (Japan)

2.8 Reverse band working

CPM Report, Annex 4, § 4.2.10
Document 18 (UK) - G/18/15 - 20 and Annex B

3. Specific parameters and criteria

Document 95 (Ivory Coast) - § 3.2
Document 106 (Colombia) - § b.9

3.1 Visible arc and service arc, including specific consideration of geographical factors and flexibility in the positioning of satellites

CPM Report, Annex 4, §§ 4.5.1, 4.5.3, 4.5.4, 4.5.6, 4.6.1.3.2
Document 10 (Spain) - § 23
Document 18 (UK) - G/18/25
Document 21 (Netherlands) - § 51
Document 31 (FRG) - D/31/21
Document 35 (Canada) - CAN/35/2.7
Document 71 Add.1 § 2.2
Document 87 (Iraq) - IRQ/87/8
Document 156 (Indonesia) - § I.1

3.2 Satellite station-keeping

CPM Report, Annex 4, § 4.2.3
Document 18 (UK) - G/18/27
Document 76 (France) - F/76/15

3.3 Service area, coverage area, satellite antenna radiation pattern and satellite antenna pointing accuracy

CPM Report, Annex 4, § 4.2.5
Document 18 (UK) - G/18/22
Document 26 (China) - CHN/26/14
Document 71 (Colombia) - CLM/71/12
Document 72 (Colombia) - CLM/72/16-20
Document 75 (Algeria) - ALG/75/6
Document 81 (Ecuador) - § 1.4

For information only:-

Document 16(SG) Annex 6
Document 126 (France)

3.4 Earth station antenna radiation pattern

CPM Report, Annex 4, § 4.2.4
Document 18 (UK) - § 33
Document 71 (Colombia) - CLM/71/13 and Add.1

3.5 Off-axis e.i.r.p. density limits for earth station antennas

-

3.6 Polarization characteristics

CPM Report, Annex 4, § 4.2.6
Document 18 (UK) - G/18/23

- 3.7 Elimination of sources of interference and provisions for spare satellites
- CPM Report, Annex 4, § 4.6.1.3.3
Document 18 (UK) - G/18/14
Document 26 (China) - CHN/26/13
Document 82 (Malaysia, Singapore, Thailand) - 82/7
Document 87 (Iraq) - IRQ/87/17
- 3.8 Maximum level of permissible interference
- CPM Report, Annex 4, §§ 4.6.1.6.1, 4.6.1.6.2
Document 54 (India) - IND/54/5
- 3.9 Characteristics of modulation systems, including network information capacity per unit of bandwidth, susceptibility to interference and liability to cause interference
- CPM Report, Annex 4, §§ 4.2.7, 4.2.8, 4.6.1.5
- 3.10 Climate and choice of frequency bands
- CPM Report Annex 4, § 4.5.4
Document 71 (Colombia) - Add.1, § 2.1
4. Review of elements of the Radio Regulations
- (In each case it will be necessary to take account of the outcome of discussions of sections 2 and 3 of this Work Programme.)
- 4.1 Article 29
-
- 4.2 Appendices 3 and 4
- Document 160 (Brazil) - B/160/24
- 4.3 Appendix 29
- Document 160 (Brazil) - B/160/24

The following approach to the drafting of elements for the Working Group 4C report on technical parameters and criteria was agreed at the meeting on 12 August 1985:

- 1) Pending decisions in Committee 5, all Working Group 4C text would be tentative; it would relate to the FSS only, regardless of frequency band, and cover, as far as possible, all foreseen methods of regulating access to spectrum from the geostationary satellite orbit.

- 2) Elements of the report would cover, where appropriate:
- a) the situation prevailing;
 - b) prospective developments, having due regard to time, cost and operational factors;
 - c) special geographical factors;
 - d) the need for intersessional study.

D.J. WITHERS
Chairman of Working Group 4C

WORKING GROUP 4C

WORK PROGRAMME ON TECHNICAL PARAMETERS AND
CRITERIA (INTRA-SERVICE)

1. General issues

1.1 The need for efficient utilization of orbit and spectrum, having due regard to economic and operational factors

Document 9 (USSR) - URS/9/3
Document 17 (Senegal) - SEN/17/3, 17/5
Document 20 (Kenya) - §§ 2.1, 2.2.1
Document 25 (China) - CHN/25/2 - 6
Document 26 (China) - CHN/26/13
Document 30 (USA) - USA/30/31, 32
Document 37 (Brazil) - B/37/12, 13
Document 59 (Chile) - CHL/59/2

1.2 Time-phased introduction of measures for increasing the efficiency of use of orbit and spectrum

CPM Report, Annex 4, § 4.6.1.3.1
Document 5 (USA) - USA/5/8
Document 18 (UK) - G/18/21
Document 21 (Netherlands) - § 17
Document 30 (USA) - USA/30/27, 28
Document 31 (FRG) - D/31/3
Document 37 (Brazil) - B/37/14
Document 71 (Colombia) and Add.1

2. Criteria involving more than one network characteristic

2.1 Means of achieving efficient harmonization of use of orbit and spectrum

CPM Report, Annex 4, §§ 4.2.9, 4.2.11, 4.2.12, 4.3.3, 4.4.9.3, 4.4.9.4, 4.6.1.6.5
Document 5 (USA) - USA/5/8, 9 and § 3.2
Document 10 (Spain) - §§ 22, 24, 25, 26
Document 12 (France) - §§ 13 - 21
Document 18 (UK) - G/18/24, G/18/26, G/18/28 and Annex C
Document 21 (Netherlands) - §§ 18, 19, 38, 39, 41
Document 25 (China) - CHN/24/5, CHN/25/5
Document 26 (China) - CHN/26/14
Document 30 (USA) - USA/30/15 - 17, 33, 43, 44, 49, 50
Document 31 (FRG) - D/31/1, 2
Document 33 (Sweden) - S/33/8
Document 37 (Brazil) - B/37/11
Document 54 (India) - IND/54/4
Document 76 (France) - F/76/18
Document 88 (USA)
Document 114 (USA)

2.2 Computer software for harmonization and planning

CPM Report, Annex 4, § 4.4.9.6
Document 26 (China) - CHN/26/14
Document 39 (Japan) - J/39/4
Document 41 (Japan) - §§ 1 - 4

2.3 Homogeneity of orbit utilization

CPM Report, Annex 4, § 4.2.1.3
Document 71 (Colombia) - CLM/71/14, 15 and Add.1

2.4 Multi-band [and multi-service] factors

CPM Report, Annex 4, §§ 4.2.1, 4.2.2
Document 37 (Brazil) - B/37/12
Document 42 (Spain) - E/42/8

2.5 Systematic use of frequency bands

CPM Report, Annex 4, § 4.6.1.2
Document 10 (Spain) - §§ 27, 28
Document 18 (UK) - G/18/28
Document 54 (India) - IND/54/1, 3

2.6 Orbit sectorization

Document 18 (UK) - G/18/28

2.7 Generalized parameters for planning purposes and Characterization of networks by orbital arc requirements

CPM Report, Annex 4, § 4.4.9.5
Document 9 (USSR) - URS/9/3, 5
Document 30 (USA) - USA/30/29-30
Document 75 (Algeria) - ALG/75/14
Document 88 (USA)

2.8 Reverse band working

CPM Report, Annex 4, § 4.2.10
Document 18 (UK) - G/18/15 - 20 and Annex B

3. Specific parameters and criteria

Document 95 (Ivory Coast) - § 3.2

3.1 Visible arc and service arc, including specific consideration of geographical factors and flexibility in the positioning of satellites

CPM Report, Annex 4, §§ 4.5.1, 4.5.3, 4.5.4, 4.5.6, 4.6.1.3.2
Document 10 (Spain) - § 23
Document 18 (UK) - G/18/25
Document 21 (Netherlands) - § 51
Document 31 (FRG) - D/31/21
Document 35 (Canada) - CAN/35/2.7
Document 71 Add.1, § 2.2
Document 87 (Iraq) - IRQ/87/8

3.2 Satellite station-keeping

CPM Report, Annex 4, § 4.2.3
Document 18 (UK) - G/18/27
Document 76 (France) - F/76/15

3.3 Service area, coverage area, satellite antenna radiation pattern and satellite antenna pointing accuracy

CPM Report, Annex 4, § 4.2.5
Document 18 (UK) - G/18/22
Document 26 (China) - CHN/26/14
Document 71 (Colombia) - CLM/71/12
Document 72 (Colombia) - CLM/72/16-20
Document 75 (Algeria) - ALG/75/6
Document 81 (Ecuador) - § 1.4

3.4 Earth station antenna radiation pattern

CPM Report, Annex 4, § 4.2.4
Document 18 (UK) - § 33
Document 71 (Colombia) - CLM/71/13 and Add.1

3.5 Off-axis e.i.r.p. density limits for earth station antennas

-

3.6 Polarization characteristics

CPM Report, Annex 4, § 4.2.6
Document 18 (UK) - G/18/23

3.7 Elimination of sources of interference and provisions for spare satellites

CPM Report, Annex 4, § 4.6.1.3.3
Document 18 (UK) - G/18/14
Document 26 (China) - CHN/26/13
Document 82 (Malaysia, Singapore, Thailand) - 82/7
Document 87 (Iraq) - IRQ/87/17

3.8 Maximum level of permissible interference

CPM Report, Annex 4, §§ 4.6.1.6.1, 4.6.1.6.2
Document 54 (India) - IND/54/5

3.9 Characteristics of modulation systems, including network information capacity per unit of bandwidth, susceptibility to interference and liability to cause interference

CPM Report, Annex 4, §§ 4.2.7, 4.2.8, 4.6.1.5

3.10 Climate and choice of frequency bands

Document 71 (Colombia) - Add.1, § 2.1

* * * * *

The following approach to the drafting of elements for the Working Group 4C report on technical parameters and criteria was agreed at the meeting on 12 August 1985:

- 1) Pending decisions in Committee 5, all Working Group 4C text would be tentative; it would relate to the FSS only, regardless of frequency band, and cover, as far as possible, all foreseen methods of regulating access to spectrum from the geostationary satellite orbit.
- 2) Elements of the report would cover, where appropriate:
 - a) the situation prevailing;
 - b) prospective developments, having due regard to time, cost and operational factors;
 - c) special geographical factors;
 - d) the need for intersessional study.

D.J. WITHERS
Chairman of Working Group 4C

WORKING GROUP 4C

WORK PROGRAMME ON TECHNICAL PARAMETERS AND
CRITERIA (INTRA-SERVICE)

1. General issues

1.1 The need for efficient utilization of orbit and spectrum, having due regard to economic and operational factors

Document 17 (Senegal) - SEN/17/3, 17/5
Document 20 (Kenya) - §§ 2.1, 2.2.1
Document 25 (China) - CHN/25/2 - 6
Document 26 (China) - CHN/26/13
Document 30 (USA) - USA/30/31, 32
Document 37 (Brazil) - B/37/12, 13
Document 59 (Chile) - CHL/59/2

1.2 Time-phased introduction of measures for increasing the efficiency of use of orbit and spectrum

CPM Report, Annex 4, § 4.6.1.3.1
Document 5 (USA) - USA/5/8
Document 18 (UK) - G/18/21
Document 21 (Netherlands) - § 17
Document 30 (USA) - USA/30/27, 28
Document 31 (FRG) - D/31/3
Document 37 (Brazil) - B/37/14

2. Criteria involving more than one network characteristic

2.1 Means of achieving efficient harmonization of use of orbit and spectrum

CPM Report, Annex 4, §§ 4.2.9, 4.2.11, 4.2.12, 4.3.3, 4.4.9.3, 4.4.9.4, 4.6.1.6.5
Document 5 (USA) - USA/5/8, 9
Document 10 (Spain) - §§ 22, 24, 25, 26
Document 12 (France) - §§ 15, 16, 18
Document 18 (UK) - G/18/24, G/18/28 and Annex C
Document 21 (Netherlands) - §§ 18, 19, 38, 39, 41
Document 26 (China) - CHN/26/14
Document 27 (China) - CHN/27/16
Document 30 (USA) - USA/30/15 - 17, 33, 43, 44, 49, 50
Document 31 (FRG) - D/31/1, 2
Document 33 (Sweden) - S/33/8
Document 37 (Brazil) - B/37/11
Document 54 (India) - IND/54/4

2.2 Computer software for harmonization and planning

CPM Report, Annex 4, § 4.4.9.6
Document 26 (China) - CHN/26/14
Document 39 (Japan) - J/39/4
Document 41 (Japan) - §§ 1 - 4

2.3 Homogeneity of orbit utilization

CPM Report, Annex 4, § 4.2.1.3
Document 71 (Colombia) - CLM/71/14, 15

2.4 Multi-band [and multi-service] factors

CPM Report, Annex 4, §§ 4.2.1, 4.2.2
Document 37 (Brazil) - B/37/12
Document 42 (Spain) - E/42/8

2.5 Systematic use of frequency bands

CPM Report, Annex 4, § 4.6.1.2
Document 10 (Spain) - §§ 27, 28
Document 18 (UK) - G/18/28
Document 54 (India) - IND/54/1, 3

2.6 Orbit sectorization

Document 18 (UK) - G/18/28

2.7 Generalized parameters for planning purposes

CPM Report, Annex 4, § 4.4.9.5
Document 9 (USSR) - URS/9/3, 5

2.8 Reverse band working

CPM Report, Annex 4, § 4.2.10
Document 18 (UK) - G/18/15 - 20 and Annex B

2.9 Characterization of networks by orbital arc requirements

Document 30 (USA) - USA/30/29 - 30

3. Specific parameters and criteria

3.1 Visible arc and service arc, including specific consideration of geographical factors and flexibility in the positioning of satellites

CPM Report, Annex 4, §§ 4.5.1, 4.5.3, 4.5.4, 4.5.6, 4.6.1.3.2
Document 10 (Spain) - § 23
Document 18 (UK) - G/18/25
Document 21 (Netherlands) - § 51
Document 35 (Canada) - CAN/35/2.7
Document 87 (Iraq) - IRQ/87/8

3.2 Satellite station-keeping

CPM Report, Annex 4, § 4.2.3
Document 18 (UK) - G/18/27

3.3 Service area, coverage area, satellite antenna radiation pattern and satellite antenna pointing accuracy

CPM Report, Annex 4, § 4.2.5
Document 18 (UK) - G/18/22
Document 26 (China) - CHN/26/14
Document 71 (Colombia) - CLM/71/12
Document 75 (Algeria) - ALG/75/6

3.4 Earth station antenna radiation pattern

CPM Report, Annex 4, § 4.2.4
Document 18 (UK) - § 33
Document 71 (Colombia) - CLM/71/13

3.5 Off-axis e.i.r.p. density limits for earth station antennas

-

3.6 Polarization characteristics

CPM Report, Annex 4, § 4.2.6
Document 18 (UK) - G/18/23

3.7 Elimination of sources of interference and provisions for spare satellites

CPM Report, Annex 4, § 4.6.1.3.3
Document 26 (China) - CHN/26/13
Document 82 (Malaysia, Singapore, Thailand) - 82/7
Document 87 (Iraq) - IRQ/87/17

3.8 Maximum level of permissible interference

a) for FSS links

CPM Report, Annex 4, §§ 4.6.1.6.1, 4.6.1.6.2
Document 54 (India) - IND/54/5

b) for MSS feeder links

CPM Report, Annex 5, § 5.2.11

3.9 Characteristics of modulation systems, including network information capacity per unit of bandwidth, susceptibility to interference and liability to cause interference

CPM Report, Annex 4, §§ 4.2.7, 4.2.8, 4.6.1.5

* * * * *

The following approach to the drafting of elements for the Working Group 4C report on technical parameters and criteria was agreed at the meeting on 12 August 1985:

- 1) Pending decisions in Committee 5, all Working Group 4C text would be tentative; it would relate to the FSS only, regardless of frequency band, and cover, as far as possible, all foreseen methods of regulating access to spectrum from the geostationary satellite orbit.
- 2) Elements of the report would cover, where appropriate:
 - a) the situation prevailing;
 - b) prospective developments, having due regard to time, cost and operational factors;
 - c) special geographical factors;
 - d) the need for intersessional study.

D.J. WITHERS
Chairman of Working Group 4C

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/14-E
13 August 1985
Original: English

AD HOC WORKING GROUP

Note by the Chairman of the Ad Hoc Working Group of Plenary

Terms of Reference of the Ad Hoc Working Group of Plenary
(as approved at the first Plenary Meeting)

1. Based on the results of the work of Committees 4, 5 and 6, and taking into account the advice of Committee 3, to specify the preparatory actions required to be completed before the commencement of the Second Session of the Conference (agenda item 5.2).
2. To recommend a draft agenda for the Second Session of the Conference for consideration by the Administrative Council (agenda item 5.3).

----- PROPOSALS

(Documents 1 to 104)

<u>Agenda item 5.2</u> (Intersessional work)	<u>Agenda item 5.3</u> (Agenda 2nd Session)
URS/9/8	AUS/7/10
G/18, para 53	URS/9/10
	F/13/8 + page 2
	G/18, paras 54-56
	G/18, para 58
	HOL/21/1, para 3
	HOL/22/3
	HOL/23/4
	HOL/24/5
CHN/26/14	
S/33/11	D/31/25
	S/33/11
	E/34/7
	CAN/35/30
	B/37/22
J/40/10	J/40/10
J/41	
	E/42/8
SG/44	
CVA/F/GRC/MCO/POR/S/G	CVA/F/GRC/MCO/POR/S/G
- COMP/51/1	- COMP/51/1
	- COMP/53, para 3
	MEX/60/12
MEX/61/15	
CLM/67/3	
CLM/70/8	
GRC/74/6	GRC/74/6
GHA/77/8	
	F/76/20
YUG/78/8	
EQA/81/2	EQA/81/4
IRQ/87/18	
CTI/95/5	CTI/95/7
CTI/95/8	CTI/95/8
	AUS/98
EGY/99/2	

L. CONSTANTINESCU
Chairman

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/15-E
13 August 1985
Original: French

COMMITTEE 6

France

INCOMPATIBILITY BETWEEN REGIONS 2 (BSS) AND 1 (FSS)

In its reply to IFRB Circular-letter No. 603, the French Administration pointed out (Document ORB 48, page 34) that interference might be caused to the Videosat 2 and Videosat 3 satellite networks by the satellite networks of the 1983 Geneva Plan.

The French Administration sent off the advance publication of Videosat 2 on 28 July 1983 and that of Videosat 3 on 29 March 1984. The IFRB published the information concerning Videosat 2 in AR11/A/86 of 4 October 1983 and that concerning Videosat 3 in AR11/A/148 of 31 July 1984.

Until the Final Acts of Region 2 have been incorporated in the Regulations, the provisions they contain are not applicable to interregional sharing. For frequency assignments to broadcasting stations in Region 2, therefore, the relevant provisions of Article 14 and Resolution No. 33 of the Radio Regulations (Document 4(Add.2)) should be applied in relation to the stations of Regions 1 and 3.

The French Administration, therefore, requests the IFRB to carry out a detailed study of these two satellite networks, in order to comply with paragraph 2 of the terms of reference of Sub-Working Group 6A-1 (Document DT/11) and give that Group a clear idea of the incompatibilities between FSS networks which have already been notified and BSS satellites.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/16-E
14 August 1985
Original: English

WORKING GROUP 6A

REPORT OF MEETING OF SUB-WORKING GROUP 6A-1 TO WORKING GROUP 6A

Sub-Working Group 6A-1 met on 13 August 1985 and addressed the criteria by which the SAT-R2 Plan could be evaluated with respect to services in Regions 1 and 3.

The Group agreed to address these issues in three parts, i.e.:

- a) Region 2 BSS into Regions 1 and 3 BSS;
- b) Region 2 BSS into Regions 1 and 3 terrestrial services;
- c) Region 2 BSS into Regions 1 and 3 FSS.

Region 2 BSS into Regions 1 and 3 BSS

The Group endorsed the Board's decision in section 4 of Document 48 to use the criteria in Annex 4 of Appendix 30 of the Radio Regulations to examine the incompatibilities of the Region 2 plan with the Regions 1 and 3 plan.

Three beams have been identified as exceeding the pfd limits and these are given in Table 1

TABLE 1

Beams of Region 2 exceeding the pfd limits of Appendix 30

Region 2 beam	Region 1 beam	Affected channels of Region 1	Excess to pfd limit
ALS00002	URS 080	26 - 30 - 34 - 38	0.5 dB
ALS00003	URS 080	26 - 30 - 34 - 38	0.7 dB
BERBER02	CNR 130	27 - 31 - 39	1.7 dB
	E 129	27 - 31 - 39	0.4 dB
	ISL 049	29 - 33 - 37	1.8 dB

The Administrations (United Kingdom and United States of America) responsible for these beams have agreed to coordinate with the parties concerned and have agreed to the following note:

"This assignment should be brought into use only when agreement is reached or adequate measures are adopted to reduce the power flux-density over Regions 1 and 3 to conform to limits specified in Annex 4 of Appendix 30."

Two approaches to solving the above problems were suggested.

- 1) the above statements to be added as a note to the beams within the plan, or
- 2) the technical characteristics of the beams be adjusted in order to eliminate the incompatibilities.

No decision was taken on which approach to apply.

Region 2 BSS into Regions 1 and 3 terrestrial services

Here, two possible evaluation criteria were suggested:

- 1) Annex 5 to Appendix 30 of the Radio Regulations, or
- 2) criteria developed by the CCIR in Report 631 and Report 789.

No decision was taken and two Delegations, the United States of America and the USSR, have undertaken to discuss the issue further and to see if a common approach can be found.

Region 2 BSS into Regions 1 and 3 FSS

A preliminary discussion was held and the Group agreed that the relevant criteria to be used is Appendix 29 of the Radio Regulations.

A working document was requested and is under preparation.

G.H. RAILTON
Chairman of Sub-Working Group 6A-1

Draft Report - Sub-Working Group 6B-1 to Working Group 6BELEMENTS FOR CONSIDERATION WITH RESPECT TO THE
APPROPRIATE FREQUENCY BANDS WHERE THE FREQUENCY PLAN
FOR FEEDER LINKS SHOULD BE ESTABLISHED1. Introduction

In the second meeting of Working Group 6B, it was decided to establish a Sub-Working Group 6B-1. The terms of reference of Sub-Working Group 6B-1 are to summarize proposals and the initial discussion in Working Group 6B on the question of frequency bands for planning the broadcasting-satellite feeder links. This will enable Working Group 6B to make a choice on the band(s).

2. Available frequency bands for planning

The following frequency bands are available for planning the broadcasting-satellite feeder links (see Resolution No. 101).

Region 1Region 3

10.7 - 11.7 GHz

14.5 - 14.8 GHz) limited to countries
) outside Europe and to Malta

14.5 - 14.8 GHz

17.3 - 18.1 GHz

17.3 - 18.1 GHz

3. Summary of proposals

All administrations, who have submitted proposals on this item, propose to make use of the frequency band 17.3 - 18.1 GHz when preparing the plan for feeder links.

Also, it is generally accepted that the band 14.5 - 14.8 GHz could be used for some feeder links. Some administrations propose that the band 14.5 - 14.8 GHz could be used for planning. Many administrations propose that this band should only be used in exceptional cases, or be subject to procedure of coordination.

Very few administrations propose to make use of the band 10.7 - 11.7 GHz.

4. Summary of discussion in Working Group 6B

4.1 There was general agreement that:

- the band 17.3 - 18.1 GHz should be subject to planning;
- the band 10.7 - 11.7 GHz should not be considered for planning.

4.2 Many delegations were of the view that the plan should primarily be prepared for the band 17.3 - 18.1 GHz, and that the band 14.5 - 14.8 GHz should be available (in accordance with the Table of Frequency Allocations) in exceptional cases*, or be subject to procedure of coordination.

Some delegations were of the opinion that the band 17.3 - 17.8 GHz could be used for planning in Region 3.

Some delegations were in favour of preparing the plan, making use of both bands 17.3 - 18.1 GHz and 14.5 - 14.8 GHz, based on the preference of each administration.

4.3 Considerations on the band 17.3 - 18.1 GHz

This band, which is 800 MHz wide and is allocated on a world-wide primary basis to feeder links for the BSS, would enable a direct frequency translation of the channels of Appendix 30, for a given country. This would have significant economic advantages in the design of the satellites for broadcasting and also ensure efficient and effective use is made of the radio frequency spectrum.

To make better use of the frequency spectrum and the geostationary satellite orbit, it would be helpful to concentrate all (or as much as possible) of the feeder links in one band. This is only possible in the band 17.3 - 18.1 GHz, which has the additional advantage of being chosen in Region 2 in the Plan of 1983. Interregional sharing constraints will thus be minimized.

4.4 Considerations on the band 14.5 - 14.8 GHz

This band, which is 300 MHz wide would, in the view of many administrations, be insufficient to provide feeder links for all channels of Appendix 30.

One argument put forward for the band 14.5 - 14.8 GHz is that the rainfall attenuation is less than in the band 17.3 - 18.1 GHz. Also, the technique is well established in this band. These factors could in some cases lead to cost savings by using the band 14.5 - 14.8 GHz. These savings are, in the opinion of some delegations, likely to be marginal. Recent information provided by one administration shows in average 1.5 dB higher attenuation due to rainfall in the 17 GHz band compared to 14 GHz. / As to the cost of equipment production, the advantage of large-scale production can be expected if a large number of feeder links are established in the one band. /

There are more sharing constraints in this band than in the 17.3 - 18.1 GHz band, partly because of the allocation situation and partly because the band 14.5 - 14.8 GHz is more extensively utilized.

* The definition of exceptional cases should be elaborated further.

5. Concluding remarks

The frequency plan should provide for feeder links to all channels of Appendix 30, based on the requirements of the administrations.

Many delegations were of the view that the planning should try to satisfy, as far as possible, the requirements by making use of frequencies in the band 17.3 - 18.1 GHz. If this should prove impossible, the band 14.5 - 14.8 GHz should also be utilized, as appropriate.

From the economic point of view, it would be disadvantageous for a given country to have their feeder links partly in one band and partly in the other. This may not apply if an administration wishes to establish a part of its feeder links.

Some delegations favoured the use of the 14 GHz band on equal terms with the 17 GHz band. It should be clarified in what cases the 14 GHz band should be used (in exceptional cases or at the choice of each administration).

L. GRIMSTVEIT
Chairman of Sub-Working Group 6B-1

UNION INTERNATIONALE DES TÉLÉCOMMUNICATIONS

ORB-85

CAMR SUR L'UTILISATION DE L'ORBITE DES
SATELLITES GÉOSTATIONNAIRES ET LA PLANIFICATION
DES SERVICES SPATIAUX UTILISANT CETTE ORBITE

PREMIÈRE SESSION GENÈVE, AOÛT/SEPTEMBRE 1985

Document DT/18-F/E/S^V

14 août 1985

Original: français
anglais
espagnol

GROUPE DE TRAVAIL 5A

WORKING GROUP 5A

GRUPO DE TRABAJO 5A

ATTRIBUTION DES DOCUMENTS / ALLOCATION OF DOCUMENTS /
ATRIBUCION DE LOS DOCUMENTOS

Groupe de travail 5A/

Working Group 5A/

Grupo de trabajo 5A:

3, 4 + Add.1 + Add.2, 5, 7, 8, 9, 10, 11, 12, 17,
18, 20, 25 + Add.1 + Corr.1, 26 + Corr.1, 27 + Corr.1
28, 30, 31, 34, 35, 36, 37, 39, 41, 42, 53 + Add.1,
54, 55, 56, 59, 60, 63, 65, 67, 74, 75, 76, 77, 78,
81, 82, 87, 95, 96, 101, 103, 104

F.S.C. PINHEIRO

Président, Groupe de travail 5A

Chairman, Working Group 5A

Presidente, Grupo de trabajo 5A

UNION INTERNATIONALE DES TÉLÉCOMMUNICATIONS

ORB-85

CAMR SUR L'UTILISATION DE L'ORBITE DES
SATELLITES GÉOSTATIONNAIRES ET LA PLANIFICATION
DES SERVICES SPATIAUX UTILISANT CETTE ORBITE

Document DT/19(Rev.3)-F/E/S^V
21 août 1985
Original: anglais

PREMIÈRE SESSION GENÈVE, AOÛT/SEPTEMBRE 1985

GROUPE DE TRAVAIL 5B
WORKING GROUP 5B
GRUPO DE TRABAJO 5B

ATTRIBUTION DES DOCUMENTS / ALLOCATION OF DOCUMENTS /
ATRIBUCION DE LOS DOCUMENTOS

Groupe de travail 5B/
Working Group 5B/
Grupo de trabajo 5B:

3, 4 + Add.1 + Add.2, 5, 7 + Corr.1, 8, 9, 10, 12,
18, 19, 20, 21, 25 + Add.1 + Corr.1, 26 + Corr.1,
29, 30, 31, 33, 35, 37, 39, 59, 60, 62, 63, 66,
69, 72, 76, 77, 78, 87, 108, 125, 127, 132, 133

S.M. CHALLO
Président, Groupe de travail 5B
Chairman, Working Group 5B
Presidente, Grupo de trabajo 5B

UNION INTERNATIONALE DES TÉLÉCOMMUNICATIONS

ORB-85

CAMR SUR L'UTILISATION DE L'ORBITE DES
SATELLITES GÉOSTATIONNAIRES ET LA PLANIFICATION
DES SERVICES SPATIAUX UTILISANT CETTE ORBITE

Document DT/19(Rev.2)-F/E/S
20 août 1985

PREMIÈRE SESSION GENÈVE, AOÛT/SEPTEMBRE 1985

Original: anglais

GROUPE DE TRAVAIL 5B
WORKING GROUP 5B
GRUPO DE TRABAJO 5B

ATTRIBUTION DES DOCUMENTS / ALLOCATION OF DOCUMENTS / ATRIBUCION DE LOS DOCUMENTOS

Groupe de travail 5B/

Working Group 5B/

Grupo de trabajo 5B:

3, 4 + Add.1 + Add.2, 5, 7 + Corr.1, 8, 9, 10, 12,
18, 19, 20, 21, 25 + Add.1 + Corr.1, 26 + Corr.1,
29, 30, 31, 33, 35, 37, 39, 59, 60, 62, 63, 76, 77,
78, 87, 108, 125, 127, 132

S.M. CHALLO

Président, Groupe de travail 5B

Chairman, Working Group 5B

Presidente, Grupo de trabajo 5B

UNION INTERNATIONALE DES TÉLÉCOMMUNICATIONS

ORB-85

CAMR SUR L'UTILISATION DE L'ORBITE DES
SATELLITES GÉOSTATIONNAIRES ET LA PLANIFICATION
DES SERVICES SPATIAUX UTILISANT CETTE ORBITE

PREMIÈRE SESSION GENÈVE, AOÛT/SEPTEMBRE 1985

Document DT/19(Rev.1)-F/E/S

16 août 1985

Original: français
anglais
espagnol

GROUPE DE TRAVAIL 5A

WORKING GROUP 5A

GRUPO DE TRABAJO 5A

ATTRIBUTION DES DOCUMENTS / ALLOCATION OF DOCUMENTS /
ATRIBUCION DE LOS DOCUMENTOS

Groupe de travail 5A/

Working Group 5A/

Grupo de trabajo 5A:

3, 4 + Add.1 + Add.2, 5, 7, 8, 9, 10, 11, 12, 17,
18, 20, 25 + Add.1 + Corr.1, 26 + Corr.1, 27 + Corr.1,
28, 30, 31, 34, 35, 36, 37, 39, 41, 42, 53 + Add.1,
54, 55, 56, 59, 60, 63, 65, 67, 70, 74, 75, 76,
77, 78, 81 + Corr.1, 82, 87, 95, 96, 101, 103, 104,
106 + Add.1, 107, 110, 114, 115, 116, 120, 123

F.S.C. PINHEIRO

Président, Groupe de travail 5A

Chairman, Working Group 5A

Presidente, Grupo de trabajo 5A

GROUPE DE TRAVAIL 5B
WORKING GROUP 5B
GRUPO DE TRABAJO 5B

ATTRIBUTION DES DOCUMENTS / ALLOCATION OF DOCUMENTS /
ATRIBUCION DE LOS DOCUMENTOS

Groupe de travail 5B/

Working Group 5B/

Grupo de trabajo 5B: 3, 4 + Add.1 + Add.2, 5, 7, 8, 9, 10, 12, 18,
19, 20, 21, 25 + Add.1 + Corr.1, 26 + Corr.1,
29, 30, 31, 33, 35, 37, 39, 59, 60, 62, 63, 76,
77, 78, 87, 108

S.M. CHALLO

Président, Groupe de travail 5B

Chairman, Working Group 5B

Presidente, Grupo de trabajo 5B

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/20-E
14 August 1985
Original: English

WORKING GROUP 6A

SECOND REPORT OF SUB-WORKING GROUP 6A-1 TO WORKING GROUP 6A

Sub-Working Group 6A-1 met on 14 August 1985 and continued examining the criteria by which the SAT-R2 Plan could be evaluated with respect to services in Regions 1 and 3.

One delegation indicated that it would be desirable to expand the number of delegations discussing the criteria for evaluating the Region 2 BSS into Regions 1 and 3 terrestrial services from the two delegations detailed in Document DT/16.

Consequently, a small group was formed 6A-1 (ad hoc) consisting of the delegations of the United States, the USSR, Algeria, Canada, Brazil, Mexico and Argentina. As no delegation would accept the chairmanship, the Chairman of Working Group 6A agreed to accept this role on the suggestion of the Soviet Union.

This Group will start its work on 15 August.

The appropriate values for energy dispersal were discussed and no decision was taken. The delegations of Canada, the United Kingdom and the United States agreed to meet and provide a recommendation to the Sub-Working Group.

The criteria for selection of FSS networks to be taken into account when evaluating the Region 2 BSS compatibility with the FSS services in Regions 1 and 3 was discussed and there were two views:

- a) satellites in service or notified on or before 17 July 1983, or
- b) satellite systems in service or notified up until incorporation of the SAT-RS Final Acts into the Radio Regulations.

No agreement was reached and the problem has been referred to 6A for its consideration.

With respect to Document DT/16, the United Kingdom informed the Sub-Working Group that it has already initiated coordination procedures to overcome incompatibilities between the Region 2 BSS beams for which it is responsible and the affected administrations in Region 1.

G.H. RAILTON

Chairman of Sub-Working Group 6A-1, ad hoc 1

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/21-E
15 august 1985
Original: English

WORKING GROUP 4B

PROVISIONAL PROCEDURE USED BY THE BOARD IN THE APPLICATION OF ARTICLE 14

In applying Article 14 to space series, the Board encountered a series of cases which were treated through Notes to the Heads of Department. The Board adopted this approach as a provisional step in establishing its Rules of Procedure.

The attached documents are to be considered as provisional decisions to be reviewed by the Board before their publication in accordance with RR 1001 and RR 1001.1.

They consist of:

- Annex 1 : Note No. 174 (Rev.) which outlines the procedure to be applied.
- Annex 2 : Note No. 182 (Rev. 2) for frequency bands below 1 GHz.
- Annex 3 : A document containing the Appendix 28 procedure extended to bands above 1 GHz to which Article 14 applies.

K. KCSAKA

Chairman Working Group 4B

Annexes : 3

IFRB

ANNEX 1

NOTE No. 174 (Rev.) TO HEADS OF DEPARTMENTS

Subject : Provisional procedure relating to the application of
Article 14

Waiting for the final text of the appropriate chapter of the IFRB Rules of Procedure to be adopted by the Board, the following rules shall be applied.

Having considered Document D 24394 at its 1618th meeting held on 17 June 1983, as well as Document D 25500, 25501, 25502 and 25536 at its 1683rd and 1684th Meetings held on 16 and 23 August 1984 respectively, the Board took the decisions as given below.

Information relating to typical stations in the terrestrial services

1. Information relating to typical transmitting stations is acceptable for publication when it is supplied in Form AP1/C. In this case DRE will identify for the proposed service area the Administrations whose territory falls within what can be considered as an "agreement area", using technical standards (to be developed for different frequency bands) making worst-case assumptions.

2. Upon successful completion of the Article 14 procedure, a file will be prepared which will show the service area and the area within which agreement has been reached. This file will be used for checking subsequent notifications (whether for typical stations or for individual stations) under Article 12 to ensure that they are in conformity with the agreement reached under Article 14.

Use of Appendix 4 for supplying information for space services

3. The Board considered that basically the Article 14 procedure has to be applied on an assignment basis. In the case of space services a given frequency is used for either an uplink or a downlink of a given network. It will therefore be necessary, in the majority of cases, to apply the Article 14 procedure to each assignment in a satellite link, i.e. for transmitting earth station and receiving space station or transmitting space station and receiving earth station.

4. In view of the above, when information is supplied under Appendix 4 the following actions shall be taken before publication of the information :

4.1 If the Administration does not clearly indicate that the Article 14 procedure is to be applied for the space and earth stations, it should be requested to confirm whether it wishes the procedure to be applied for the space station alone or for the space and earth stations or for the earth station alone;

4.2 If the specific frequencies (assigned frequency with the associated necessary bandwidth) are not available, they have to be requested;

4.3 The Administration shall be requested to indicate preferably the specific coordinates of the earth station(s) or, if these are not available, the area in which the earth station(s) will be located (service area). If the Administration does not provide the specific coordinates of the earth station(s), DRE will develop an "agreement area" around the service area, using the most pessimistic values for the technical criteria to be used to determine the affected Administrations. If more than one earth station is indicated the Article 14 procedure applies to each assignment.

Secondary services

5. The assignments of secondary services which are already recorded in the Master Register, being subject to the provisions of RR 420 - 423, will not be taken into account by the secretariat to determine the affected Administrations for services subject to the application of Article 14 which, after application of that procedure, will have a primary or permitted category. Therefore, in developing the criteria for determination of the affected Administrations the secondary services will not be considered as being protected against a primary or permitted service subject to the Article 14 procedure. However, after the publication of the Special Section under Article 14 has been made, if any of the Administration (those identified by the Board as affected or any others) desire that its stations of a secondary service should be taken into account by the Administration applying the Article 14 procedure, it may approach the Administration concerned and the two may decide whether the stations of the secondary service shall be taken into account. If, as a result, an Administration refuses to give its agreement because stations of its secondary service were not taken into account, the Board shall disregard such a disagreement and consider that Article 14 has been applied successfully vis-a-vis that Administration.

5.1 The preceding paragraph applies only in the case where the footnote to the Table of frequency allocations does not specify that the allocation is on a secondary basis or "... on condition that no harmful interference is caused to existing...". These two latter cases will be the subject of a separate Note.

Receiving space stations and earth stations

6. For the purposes of the application of the Article 14 procedure to a receiving earth or space station, the particulars of the station concerned shall be published in a Special Section AR14/C... with the following text :

Under No. ... of the Radio Regulations, this assignment is subject of the Article 14 procedure. Since it relates to a frequency assignment for reception by a space station or an earth station, the Board has not indicated in this special section the name of any administration liable to be affected within the meaning of RR 1616 and RR 1617, and will issue a favourable Finding for the assignment with respect to RR 1503. However, any administration which considers it possible that one of its assignments, planned or in operation in accordance with the Radio Regulations, but not notified to the IFRB, may affect the assignment published herein, it shall inform the administration initiating the Article 14 procedure (RR 1617), with a copy to the Board, within the deadline specified. The administration shall try to resolve this problem under the procedure of RR 1619. If no agreement is reached between the administrations concerned, the Board will enter in the Master Register the name of the objecting administration in Column 11 of this assignment with an appropriate symbol in order to draw attention to the existence of this situation. The administration responsible for the assignment published herein will be deemed not to complain of any harmful interference that it may receive from the assignment of the administration the name of which so appears in Column 11. Furthermore, when that administration notifies its assignments to the Board, the Board will disregard the receiving space or earth station which is the subject of this publication when applying the procedure of Articles 11, 12, or 13 as not being of the same category of allocation as the assignments under examination."

Application of the provisions of RR 1076

7. If at the time of publication of such frequency assignments referred to in paragraph 6 above under the Article 11 procedure the administration concerned has not completed the application of the Article 14 procedure to a frequency assignment for reception by a space station or an earth station, the Article 11 publication shall be accompanied by the following note :

"Finding with respect to RR 1503 for frequency assignments for reception by the space station [.....] and/or the earth station(s) [.....] will be favourable if the Article 14 procedure is successfully applied."

7.1 In respect of frequency assignments for transmission by a space station or an earth station in frequency bands to which the procedure of Article 14 applies but for which the administration concerned has not completed the procedure of Article 14, the Article 11 publication shall be accompanied by the following note :

"Finding with respect to RR 1503 for frequency assignments for transmission by the space station {.....} and/or the earthstation(s) [.....] will be favourable if the Article 14 procedure is successfully applied."

Determination of affected Administrations

8.1 Generally speaking the determination of the affected Administrations shall be based on the characteristics of the assignment subject to the procedure of Article 14 and worst-case assumptions relating to the propagation characteristics and other technical parameters. This will lead to the definition of a geographical area which can be considered as the "agreement area". Any Administration whose territory falls within this area shall be included in the list of Administrations which may be affected, irrespective of whether or not the Administration concerned has an "existing*" assignment recorded in the Master Register. However, at the time of publication in the Special Section under Article 14, the names of Administrations having such assignments recorded in the Master Register shall be identified by means of an appropriate symbol.

8.2 The expression "existing*" assignment is defined as follows :

8.2.1 For assignments in the space services :

A frequency notice has been received by the IFRB under the provisions of Articles 11, Section II, III and V, 13 and 14, as the case may be. The coordination procedure RR 1060 and/or RR 1107 has been initiated or completed. The notice is being examined under RR 1499-RR 1513 or has been recorded in the MIFR with a favourable finding with respect to No. 1503. The Article 14 has been successfully applied to the assignment.

Administrations having assignments for which the Article 14 procedure has been initiated or applied without success, will be separately identified following remark :

"There exists; on behalf of this Administration an assignment whose assigned bandwidth overlaps the one published in the present section and for which the procedure of Article 14 has been initiated or has been applied without success. The Board recommends the two Administrations concerned to take into consideration the interest of one and another"

8.2.2 For assignments in the terrestrial services

A frequency notice has been received by the IFRB under the provisions of Article 12 and/or 14 as the case may be. The examination with respect to RR 1240 or 1352 is favourable and the assignment has been recorded in the MIFR. The Article 14 procedure has been applied with success to the assignment.

Administrations having assignment for which the Article 14 procedure has been initiated or applied without success, will be separately identified with the same remark as above refers.

Identification of affected Administrations

8.3 The notice under examination belongs to the terrestrial services.

(This procedure will be the subject of a forthcoming Note to Heads of Departments).

8.4 The notice under examination belongs to the space radiocommunication services.

8.4.1 Transmitting station onboard a non-geostationary satellite.

8.4.1.1 Affecting receiving earth or space station of other geostationary or non-geostationary networks: Administrations having "existing*" assignments whose assigned bandwidths overlap with the assignment to which the provisions of Article 14 apply, shall be indicated and Note 1 will be included in the text.

8.4.1.2 Affecting receiving stations of the terrestrial services in the bands where no power flux-density limits exist : Administrations having "existing*" assignments whose assigned bandwidths overlap with the assignment to which the provisions of Article 14 apply, shall be indicated and Note 2 will be included in the text.

8.4.1.3 Affecting receiving stations of the terrestrial services in the bands where power flux-density limits have been laid down by the provisions of Article 28 of the Radio Regulations : If the power flux-density limits are exceeded over some countries, these shall be indicated. In addition, those Administrations having "existing*" assignments whose assigned bandwidths overlap with the assignment to which the provisions of Article 14 apply, will be separately identified by an asterisk (*), Note 3 or 4, as the case may be, will be included in the text.

8.4.2 Transmitting station onboard a geostationary satellite.

8.4.2.1 Affecting receiving earth or space stations in non-geostationary satellite network: Administrations having "existing" assignments within the visibility area, whose assigned bandwidth overlap with this assignment to which the provisions of Art. 14 apply, shall be indicated and Note 1 will be included in the text.

8.4.2.2 Same as 8.4.1.2.

8.4.2.3 Same as 8.4.1.3.

8.4.2.4 Affecting receiving earth or space stations of other geostationary satellite networks : The method described in Appendix 29 is to be employed to determine the increase of the equivalent satellite link noise temperature (T) or receiving earth or space station noise temperature (Te or Ts). If the predetermined value of 4 % is exceeded, the Administrations affected shall be indicated and Note 6 included in the text. In the value of 4% is not exceeded, only Note 7 is included in the text.

8.4.3 Transmitting earth station associated with geostationary satellite network.

8.4.3.1 Affecting receiving space station of other geostationary satellite networks : The method described in Appendix 29 is to be employed to determine the increase at the equivalent satellite link noise temperature (T) or receiving satellite station noise temperature (Te). If the predetermined value of 4 % is exceeded, the Administrations affected will be indicated, and Note 6 included in the text. If the value of 4% is not exceeded, only Note 7 is included in the text.

8.4.3.2 Affecting receiving space station of non-geostationary satellite network : Administrations having "existing*" assignments whose assigned bandwidths overlap with the assignment to which the provisions of Article 14 apply, shall be indicated, and Note 1 will be included in the text.

8.4.3.3 Affecting receiving stations of the terrestrial services operating in the frequency bands between 100 and 500 MHz and above 1000 MHz : The method described in the Annex 2 [D. 25502 and Note 182] to this document shall be applied for the determination of an "agreement area" surrounding the transmitting earth station. Administrations whose territories are partly or fully within the "agreement area", shall be indicated and Note 8 will be include in the text. In addition, the administrations having "existing*" assignments whose assigned bandwidths overlap with the assignment to which the provisions of Article 14 apply, shall be indicated with an asterisk (*).

8.4.3.4 Affecting receiving stations of the terrestrial services in the bands between 500 MHz to 1000 MHz : (The technical criteriae are to be studied further).

Regulatory examination prior the publication under Article 14

9. Article 14 does not require the Board to make the examination of an assignment subject to the procedure of Article 14 with respect to its conformity with the Table of Frequency Allocations (except the application of Article 14) and other provisions of the Radio Regulations (regulatory examination or examination with respect to RR 1240, RR 1352, or RR 1503). However, the Board has decided that such examination shall be made for every case submitted to the Board for application of the procedure of Article 14.

10. If the Finding with respect to such regulatory examination is favourable, then and only then further examination relating to the determination of affected Administrations etc. shall be carried out. However, if the regulatory examination shows that the notice is unlikely to receive a favourable Finding with respect to RR 1240, RR 1352 or RR 1503, even after the completion of the Article 14 procedure due to the non-conformity of the notice with respect to some other provision of the Radio Regulations, the Administration shall be immediately informed and requested to confirm whether it still wishes to apply the procedure of Article 14.

Disagreement

11. In the application of the Article 14 procedure, the Administrations concerned are required to keep Board informed of the correspondence that they exchange so that the Board may be in a position to provide assistance to either Administration on request at any stage of the procedure.

12. In the case where there is a disagreement between the Administrations concerned irrespective of whether or not the Board's assistance was requested, the Board shall ensure that the disagreement is based on valid technical grounds.

Note 1 The Board has examined the assignment(s)

to the transmitting [earth] [space] station with respect to the probability of harmful interference vis-a-vis assignments to receiving space or earth stations of other non-geostationary satellite networks. In the absence of a method permitting to calculate the interference probability to or from stations pertaining to non-geostationary satellite networks, the Board noted that the following Administrations have assignments to space services whose assigned bandwidth overlap with this assignment to which the procedure of Article 14 is applied :...

Note 2 The Board has examined the assignment(s)

to the transmitting space station with respect to the probability of harmful interference vis-a-vis stations of the terrestrial services of other Administrations. For the frequency band in question no limits for the power flux-density at the surface of the earth have been provided for in Article 28 of the Radio Regulations. Therefore, the Board has no [technical] means of identifying stations in the terrestrial services of other Administrations which might be affected. However, the Board noted that the following Administrations have assignments in the terrestrial services whose assigned bandwidths overlap with and are within the visibility area of this assignment to which the procedure of Article 14 is applied :...

Note 3 The Board has examined the assignment(s)

to the transmitting space station with respect to its conformity with the provision of Article 28 of the Radio Regulations relating to the limits of power flux-density from space stations, and concluded that :

the p.f.d. limit laid down in Article 28 is exceeded at the territories of the following Administration(s):.....

If an Administration listed above has an assignment in a terrestrial service whose assigned bandwidth overlap with this assignment, to which the procedure of Article 14 is applied, it is indicated with an asterisk (*).

Note 4 The Board has examined the assignment(s)

to the transmitting space station with respect to its conformity with the provision of Article 28 of the Radio Regulations relating to the limits of power flux-density from space stations, and concluded that the p.f.d. limit is not exceeded, at the territories of any administration :.....

Note 5 (Not used)

Note 6 The Board has examined the assignment(s)

to the transmitting [earth] [space] station by using the method described in Appendix 29 of the Radio-Regulations and concluded that:

for ΔT , ΔT_e or ΔT_s , as the case may be, the predetermined value of 4 % was exceeded for assignment on behalf of the following Administrations :.....

Note 7 The Board has examined the assignment(s)

to the transmitting [earth] [space] station by using the method described in Appendix 29 of the Radio-Regulations and concluded that:

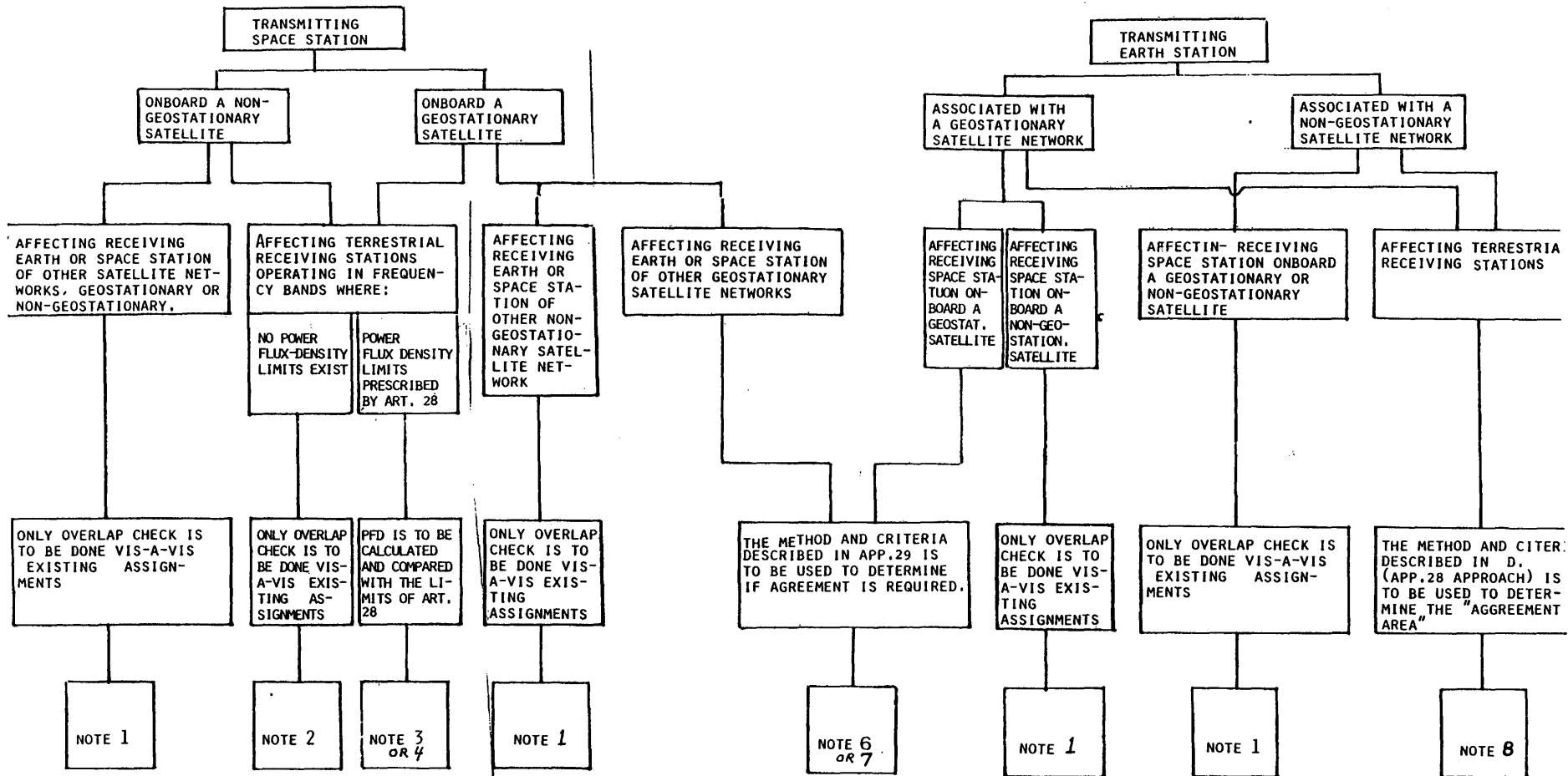
the ΔT value did not exceed 4% for assignments to stations of any other Administrations :...

Note 8 The Board has examined the assignment(s)

to the transmitting earth station by using a procedure similar to the one described in Appendix 28 of the Radio Regulations, where necessary amended, as described in the IFRB Rules of Procedure (Doc. D.) in order to determine the "agreement area". The territories of the following Administrations are fully or partly inside this "agreement area":.....

If an Administration listed above has an assignment in a terrestrial service inside this "agreement area" whose assigned bandwidth overlap with this assignment it is indicated with an asterisk (*).

EXAMINATION OF FREQUENCY NOTICES
 UNDER RR 1616
 SUBMITTED TO THE IFRB IN PURSUANCE OF ART.14
 OF THE RADIO REGULATIONS



ANNEX 2

NOTE No. 182 (Rev.2) TO HEADS OF DEPARTMENTS

Subject: Considerations to be taken into account in determination of the "Agreement area" for the transmitting earth station in the frequency band below 1 GHz subject to Article 14

Further to Note No. 174 to Heads of Departments and Addendum No. 1 to Note No. 174 to Heads of Departments adopted by the Board at its 1637th meeting on 6 October 1983 - D 24674, the following provisional procedures are to be applied in determination of the "Agreement area" around the transmitting earth station.

1. Transmission loss is calculated by applying the basic formula (2) from CCIR Rep. 396-4.

$$L_o = P_t' + G_t' + G_r - P_i$$

where L_o = basic transmission loss;

P_t' = interfering power in the input bandwidth of the receiver calculated by multiplying the value of power density per Hz of a transmitting station by the value of B (kHz) taken from Table 1A (see Annex 1) for appropriate frequency bands and comparing this value to the total peak power value, retaining the smaller of the two values for the calculation.

In the event that the total peak power is not available it may be estimated by multiplying the maximum power density by 4000.

G_t' = the gain of the interfering station antenna towards horizon.

G_r = gain of the receiving station antenna towards horizon.

P_i = maximum permissible interfering power.

2. Protection criteria used for calculations have been derived from CCIR Rec. 478-3 (Vol. VIII) and Rep. 396-4 (Vol. II) are presented in Table 1 (Annex 1).

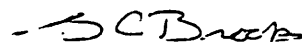
3. Agreement distance for frequencies below 500 MHz is obtained from Figures 1, 2 and 3 for land, cold sea and warm sea respectively. When a mixed path is involved the method of summation of Appendix 28 is used to obtain the resulting distance.

4. Agreement distance for the frequency range 800 - 1 000 MHz is obtained from Figures 4, 5 and 6 for land, cold sea and warm sea respectively. These are curves of Appendix 28 which have been extrapolated for frequencies below 1 GHz. Figure 7 and Table III of Appendix 28 are to be used for determining the agreement distance for 1% of the time. When a mixed path is involved the method of summation of Appendix 28 is used to obtain the resulting distance.

5. The results of calculations are presented in the attached printed form (see Annex 2) and the agreement area shall be plotted on geographical maps using azimuthal equal-distance projection (see Annex 3 as example).

./...

6. In the absence of a procedure adopted by the board, the effect of an earth station on a space station shall be reported to the Board for consideration on a case-by-case basis.



G.C. Brooks
Chairman

Annex

(2nd revision adopted by the Board at its 1710th Meeting on 1 March 1985 -
Ex D 26214)

Distribution:

Chairman and Members of the Board (for information)
Heads of DE and DR
Interim System Project Manager (5)
Heads of Division and Team Leaders
Technical Secretary
Executive Secretary

Annex 1
to Note No. 182 (Rev. 2) to Heads of Departments

TABLE 1a

Parameters required for the determination of "Agreement area"
for a Transmitting Earth Station in Space operation,
Mobile satellite (1) and Space research (1) services

Frequency band	148-149.9	235-322 335.4-399.9	405.5-406 406.1-410	433.75-434.25 449.75-450.25	806-890
Satellite service sharing the frequency band	Space operation	Mobile satellite service	Mobile satellite service	Space operation Space research	Mobile satellite service
1	2	3	4	5	6
Terrestrial service sharing the frequency band by Art. 14	Mobile, Fixed (5)	Fixed, Mobile	Fixed, Meteorolog Aids	Fixed Mobile Radiolocation	Fixed Mobile Broadcasting
Modulation at terrestrial station	(5) FM (2)	(1)	(1)	(1)	(5) FM (2)
Interference time (%)	(5) 1% (4)	(1)	(1)	(1)	(5) 1% (4)
Protection ratio (dB)	(5) 10 (2) (3)	(1)	(1)	10 (2) (3)	(5) 10 (2)
Minimum permissible median level of the wanted signal dBW/B	(2) -130 (3) (5)	(1)	(1)	-130 (2) (3)	(2) -130 (5)
B (kHz)	(5) 16 (2)	(1)	(1)	(1)	(5) 14 (2)
Permitted level of interference (P _I dBW/B)	(5) -140 (3)	(1)	(1)	-140 (3)	(5) -140 (2)
Receiving antenna gain (dB)	(5) +2 (3)	(1)	(1)	(1)	(5) +2 (2)

- (1) The criteria to be developed
- (2) See CCIR Rec. 478-3 (Vol. VIII)
- (3) See CCIR Rep. 396-4 (Vol. II)
- (4) See CCIR Rec. 452-3
- (5) In this band the parameters associated with land mobile services have been used.

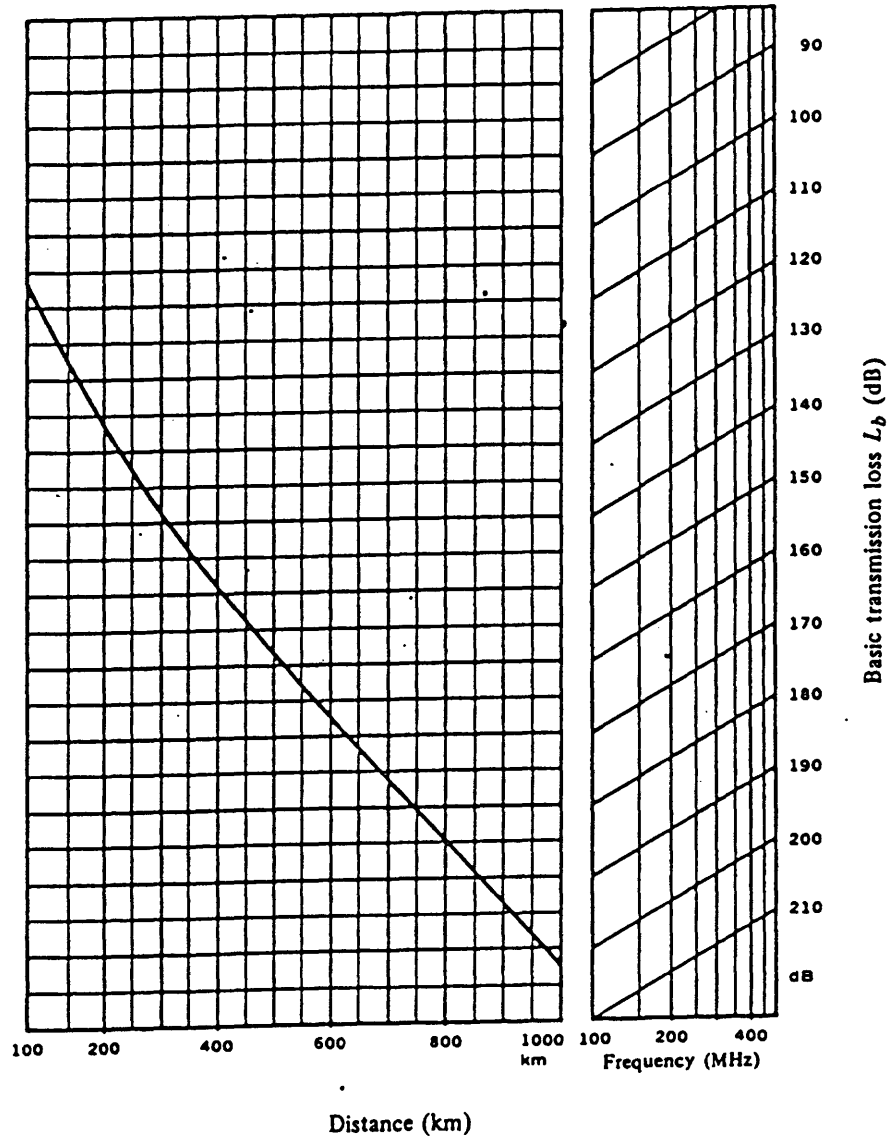


FIGURE 1 - *Basic transmission loss (dB)*
Frequency: 100 to 500 MHz - Land -
1% of the time - 1% of the locations

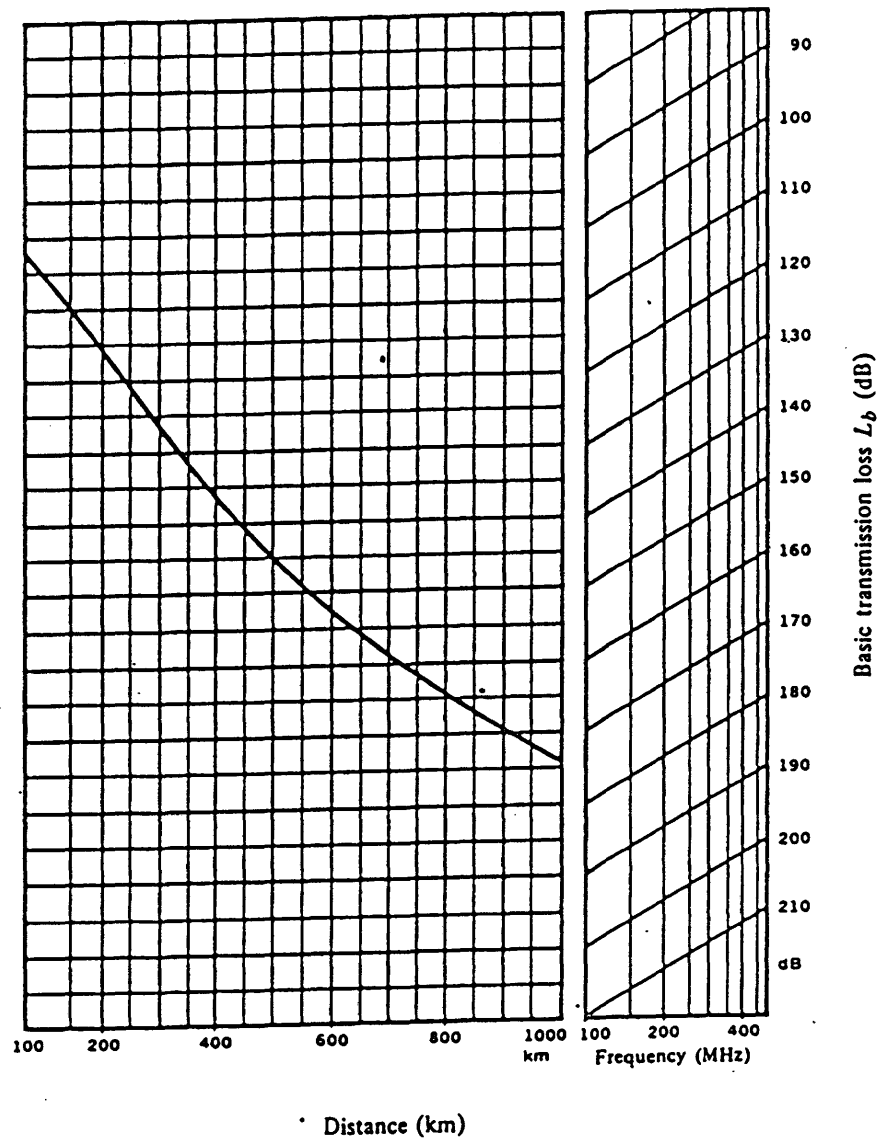


FIGURE 2 - Basic transmission loss (dB)
Frequency: 100 to 500 MHz - North Sea -
1% of the time - 1% of the locations

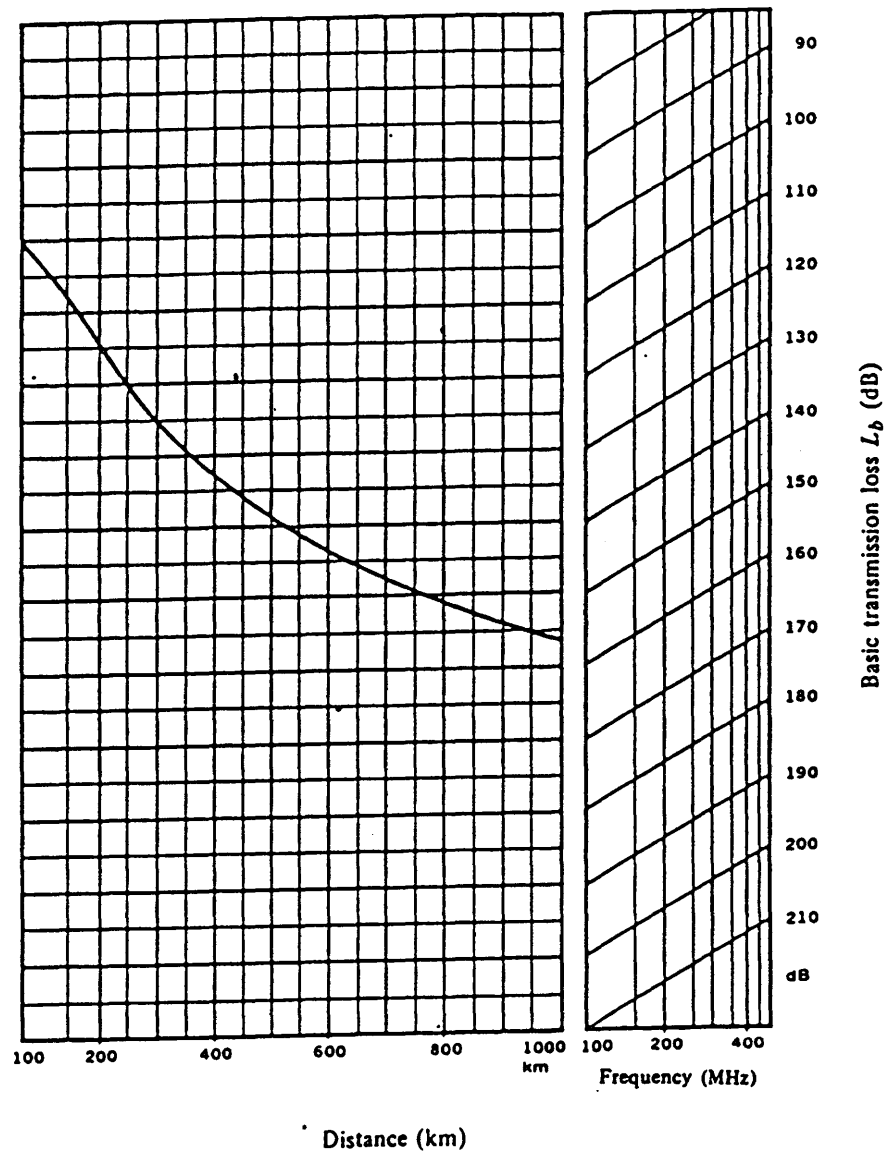


FIGURE 3 - Basic transmission loss (dB)
Frequency: 100 to 500 MHz - Mediterranean Sea -
1% of the time - 1% of the locations

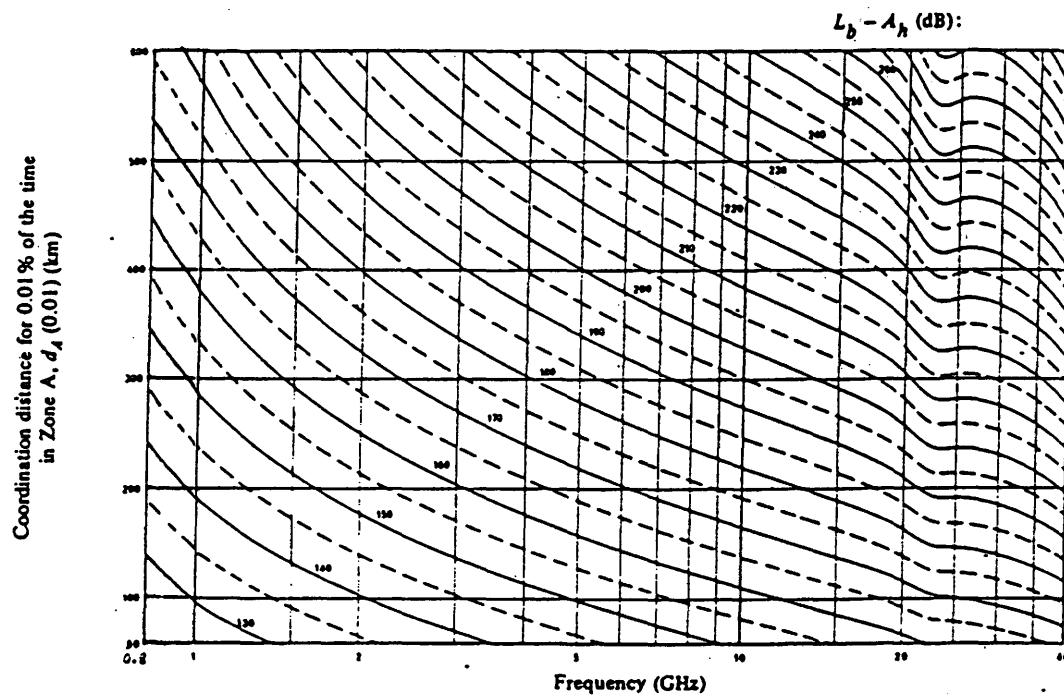


Figure 4
Coordination distance d_A (0.01) for 0.01% of the time due to propagation mode (1)
as a function of frequency and coordination loss in Zone A

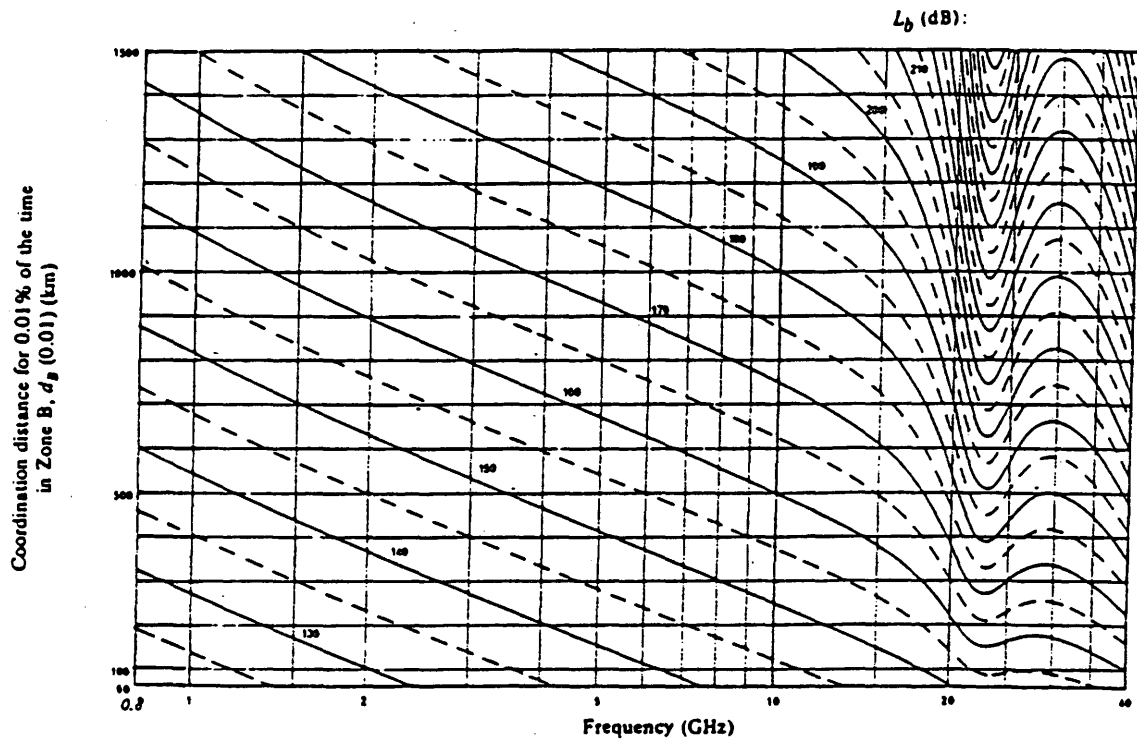


Figure 5

Coordination distance d_B (0.01) for 0.01 % of the time due to propagation mode (1)
as a function of frequency and coordination loss in Zone B

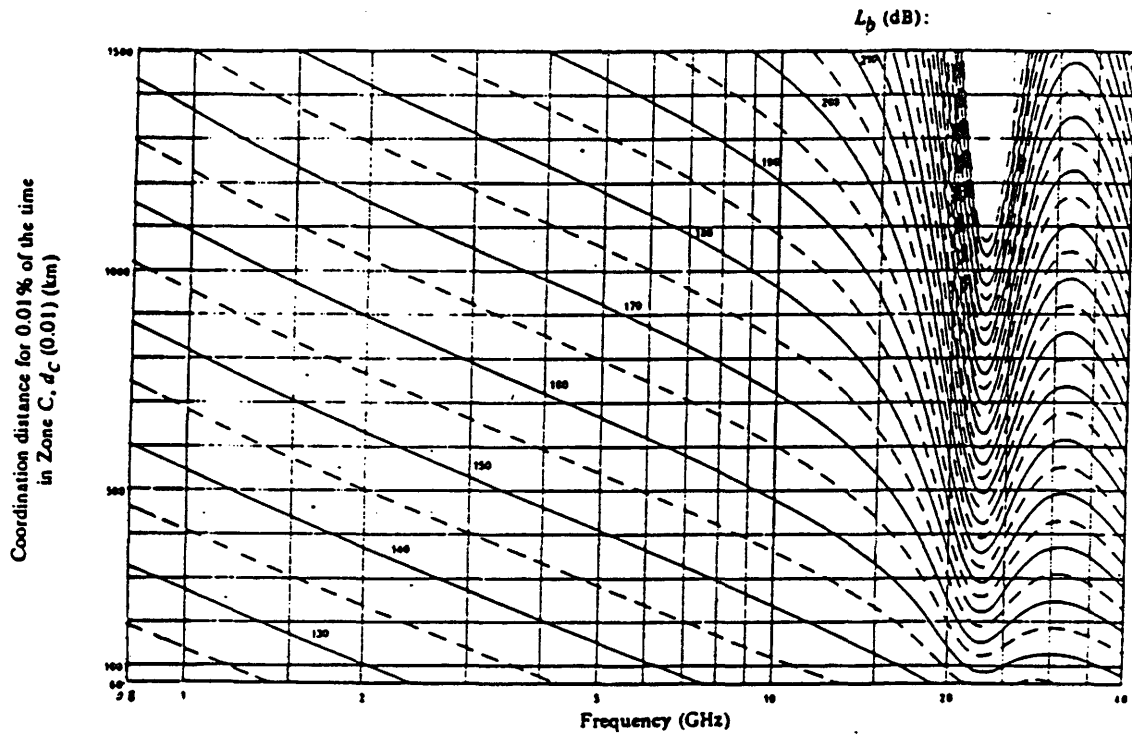


Figure 6
Coordination distance d_C (0.01) for 0.01% of the time due to propagation mode (1)
as a function of frequency and coordination loss in Zone C

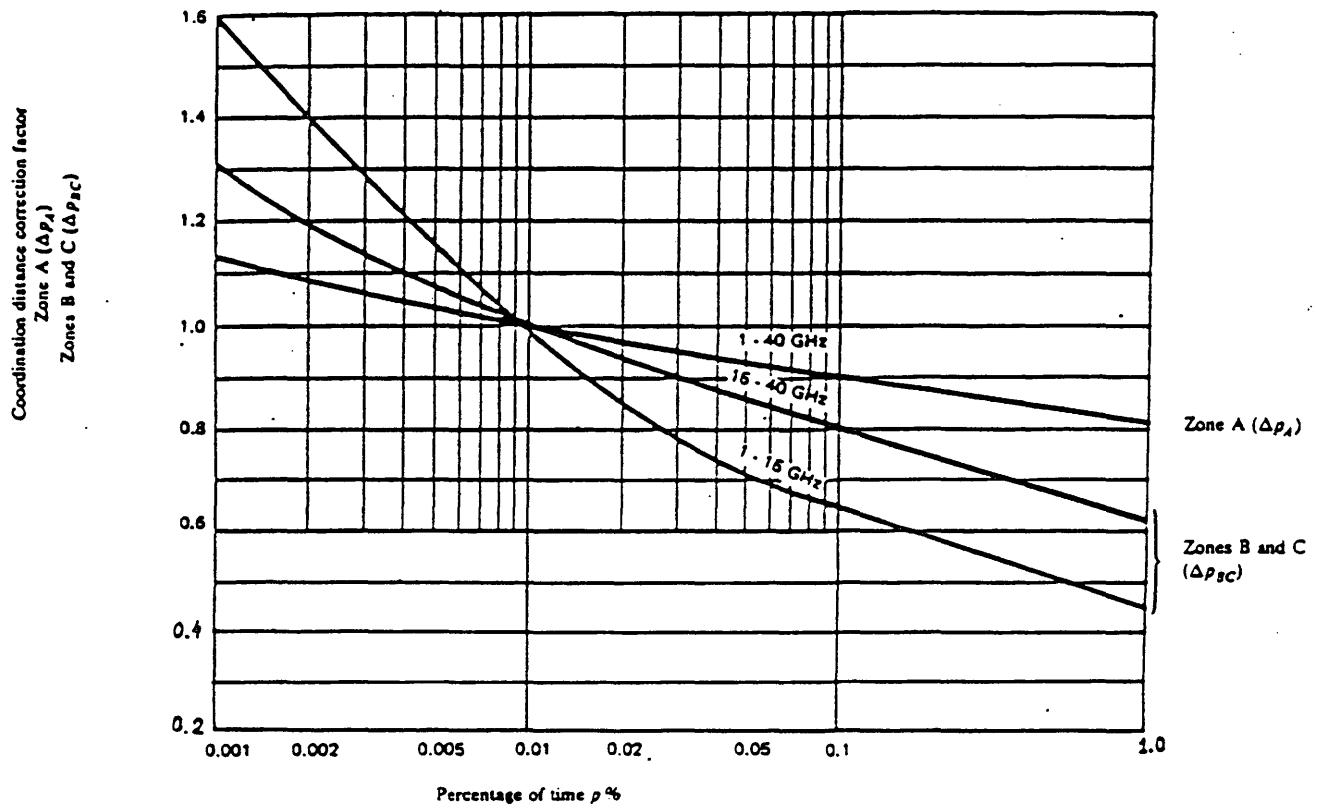


Figure 7

Coordination distance correction factor for propagation mode (1)
for percentages of time other than 0.01

ARTICLE 14
RESULTS OF TECHNICAL EXAMINATION
 (TRANSMITTING EARTH STATION)

SSD

Date:

Name of station Frequency

GEO

Geographical coord. Assigned frequency band

NONGEO

1. Calculation of agreement area

1.

Pt'	Gt'	Gr	PI	L0 (Pt'+Gt'+Gr-PI)	
Azimuth	Gt	Lo	Zone (A,B,C,AB,AC)	Distance D (Lo)	Affected country

2. List of administrations having space station assignments on frequencies overlapping assigned frequency bands either recorded in the Master Register or under coordination:

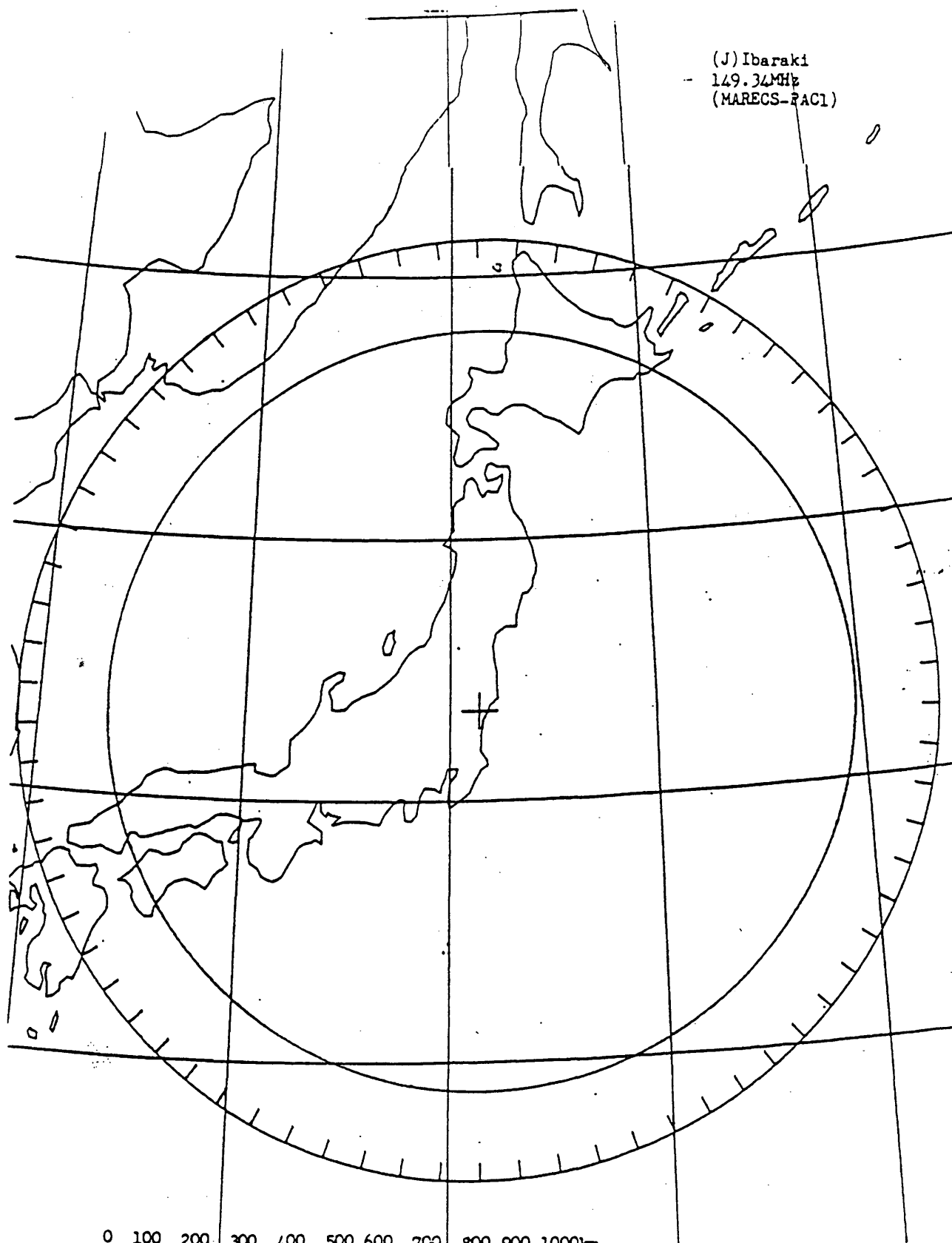
2.

GEO/GEO	GEO/NONGEO, NONGEO/GEO

Approved by Mr. _____

to Note No. 182 (Rev.2) to Heads of Departments

Annex 2



ANNEX 3

**DETERMINATION OF THE TRANSMISSION LOSS IN THE
CALCULATION OF EARTH STATION COORDINATION CONTOURS**

The APP28 computer program was developed for the calculation of earth stations coordination contours according to the method of Appendix 28 of the Radio Regulations. In performing such calculations, the program first determines the required transmission loss between the interfering terrestrial or earth station and the interfered-with earth or terrestrial station. This document explains how those calculations are performed by the program, and also discusses its utilization for the determination of "agreement contours", for those frequency bands above 1GHz for which the Article 14 agreement is required.

1. Calculation of the transmission loss for propagation mode 1

The transmission loss for propagation mode 1 is given by expression (2) of Appendix 28:

$$L_b(p) = P_t' + G_t' + G_r - Pr(p)$$

where the permissible level of the interfering emission is given by expression (3):

$$Pr(p) = 10 \log T + 10 \log B - 228.6 + J + M(p) - W$$

1.1 Transmitting earth stations:

For transmitting earth stations the value of P_t' is an input datum and G_t' depends on the azimuth. The program then calculates a constant C_1 given by:

$$C_1 = G_r - Pr(p)$$

and the transmission loss will be further calculated by:

$$L_b(p) = P_t' + G_t' + C_1$$

The calculation of C_1 is shown in Table 1 for the frequency bands appearing in Table I of Appendix 28. The utilization of the parameters contained in that Table for other bands which require the Article 14 agreement is also discussed. It is to be noted that in this case the value of constant C_1 depends only on parameters related to the receiving terrestrial station, and therefore the space service concerned with the transmitting earth station does not affect that value.

After the determination of constant C1 the program will then calculate the transmission loss in the reference band concerned. The addition of 24dB for the bands 17700-18100, 27000-37500 and 37000-39000 MHz accounts for a reference bandwidth of 1 MHz instead of 4 KHz, as for the lower bands. This addition allows the program to use the same equation for the transmission loss.

1.2 Receiving earth stations:

For receiving earth stations the value $E' = Pt' + Gt'$ of the eirp of the transmitting terrestrial stations is given in Table II of Appendix 28, and Gr depends on the azimuth. The program then calculates a constant C3 given by:

$$C3 = E' - Pr(p)$$

The transmission loss is therefore further calculated by :

$$Lb(p) = Gr + C3$$

The calculation of C3 is shown in Table 2 for the frequency bands of Table II of Appendix 28. The use of the parameters listed in Table II for other bands which require the Article 14 agreement is also discussed in Table 2.

For the bands marked with an asterisc (*) in Table 2, the value of Pr(p) is provided in Table II of Appendix 28, and therefore constant C3 can be calculated by the expression given above. However, for those other bands for which Pr(p) is not provided, it will be necessary to use the earth station receiving system noise temperature. The constant C3 in this case will be:

$$\begin{aligned} C3 &= E' - Pr(p) \\ &= E' - 10 \log T - 10 \log B + 228.6 - J - M(p) + W \end{aligned}$$

but it will be calculated by:

$$C3 = E' - 10 \log B + 228.6 - J - M(p) + W ,$$

the transmission loss being further calculated by:

$$Lb(p) = Gr + C3 - 10 \log T$$

For the frequency band 1525-1535 MHz there is no indication for the value of Pr(p), W, J or M(p) in Table II of Appendix 28. However, according to CCIR Recommendation 363 the maximum allowable interference power for the space operation service should not exceed -184dBW in a 1 kHz reference bandwidth. Since Table II assumes that for terrestrial carriers the power in 1 Hz is 30dB below the total power of the emission, it has been here assumed that the power in 1 kHz is 20dB below the total power of the emission. Therefore, for the case of receiving earth stations in the space operation service, it has been assumed that for the transmitting terrestrial stations the eirp in 1 kHz is 55-10=45dBW for line-of-sight systems and 92-10=82dBW for troposcatter systems.

As for the earth exploration satellite service in the band 2200-2290 MHz (footnote allocation), the value of -154dBW suggested in Report 382-4 has been used, together with the parameters associated with transhorizon systems.

2. Calculation of the transmission loss for propagation mode 2

The transmission loss for propagation mode 2 is given by expression (20) of Appendix 28:

$$L2(0.01) = Pt' + \Delta G - Pr(p) - F$$

where the factor F relates to percentages of time other than 0.01%. The permissible level of the interfering emission is again given by expression (3).

2.1 Transmitting earth stations:

For transmitting earth stations the value of Pt' is an input datum and the program initially calculates a constant given by:

$$C2 = \Delta G - Pr(p)$$

the factor F being further introduced. The transmission loss will then be calculated by:

$$L2(0.01) = Pt' + C2 - F$$

The calculation of C2 is shown in Table 1 for the frequency bands appearing in Table I of Appendix 28. The same comments presented in item 1.1 are also valid in this case.

2.2 Receiving earth stations:

For receiving earth stations the program initially calculates a constant given by:

$$C4 = Pt' + \Delta G - Pr(p)$$

for those bands for which the value of $Pr(p)$ is given in Table II of Appendix 28. The transmission loss is then further calculated by:

$$L2(0.01) = C4 - F$$

For those bands for which the value of $Pr(p)$ is not provided, the earth station receiving system noise temperature has to be used and the constant C4 is given by:

$$C4 = Pt' + \Delta G - 10 \log B + 228.6 - J - M(p) + W$$

In this case the transmission loss will be further calculated by:

$$L2(0.01) = C4 - F - 10 \log T$$

The calculation of C4 is shown in Table 2, for the frequency bands of Table II of Appendix 28. The use of the parameters listed in Table II for other bands which require the Article 14 agreement is also discussed in Table 2.

Bands (MHz)		Services	Calculations / Comments
Table I of Appendix 28	Article 14 allocation		
1427-1429		Space Operation	C1=35+131=166 dB C2=-7+131=124 dB
	1610-1626.5	Aer. Mob. Sat.	Appendix 28 is not used for the Aer. Mob. Sat. Serv.
	1750-1850	Space Operation Space Research	Same parameters of band 2655-2690MHz are used, including the assumption of troposcatter terrestrial stations.
	1770-1790	Meteor. Sat.	
	2025-2110	Ea. Exp. Sat.	
	2025-2120	Space Research	
	2025-2120	Space Operation	
	2500-2690	Fixed Sat.	
	2655-2690	Mobile Sat.	
2655-2690		Fixed Sat. Mobile Sat.	C1=52+140=192dB troposcatter C2=10+140=150dB stations
	5000-5250	Aer. Mob. Sat. Fixed Sat.	Appendix 28 is not used for Aer. Mob. Sat. Serv. As for the fixed-satellite service, the same parameters of band 5725-7075MHz are used.
5725-7075		Fixed Sat.	C1=45+131=176dB C2= 3+131=134dB
	7125-7155 7145-7235	Space Operation Space Research	Same parameters of band 7145-7235MHz are used.
7145-7235		Space Research	C1=47+131=178dB C2= 5+131=136dB
	7900-8025	Aer. Mob. Sat.	Appendix 28 is not used for the Aer. Mob. Sat. Serv.

Table 1: calculation of constants C1 and C2 for computer program APP28
(transmitting earth stations)

Bands (MHz)		Services	Calculations / Comments
Table I of Appendix 28	Article 14 allocation		
7900-8400		Fixed Sat. Mobile Sat. Meteor. Sat.	$C1=47+131=178\text{dB}$ $C2= 5+131=136\text{dB}$
10700-11700 12500-14500 14500-14800		Fixed Sat.	$C1=50+128=178\text{dB}$ $C2= 8+128=136\text{dB}$
	13250-13400	Space Research	Same parameters of bands between 10700 and 14800MHz are used.
	15400-15700	Fixed Sat.	
	15400-15700	Aer. Mob. Sat.	Appendix 28 is not used for the Aer. Mob. Sat. Serv.
17700-18100 27000-37500		Fixed Sat.	$C1=50+104+24=178\text{dB}$ $C2= 8+104+24=136\text{dB}$
	37000-39000	Fixed Sat.	Same parameters of band 27000-37500MHz are used.

Table 1: continuation

Bands (MHz)		Services	Calculations / Comments
Table II of Appendix 28	Article 14 allocation		
1525-1535 (*)		Space Operation	Rec. 363 was used: C3=45+184=229dB C4= 3+0+184=187dB
	1610-1626.5	Aer. Mob. Sat.	Appendix 28 is not used for the Aer. Mob. Sat. Serv.
1670-1790		Meteor. Sat.	There are no parameters developed for receiving earth stations in the meteorological satellite service itself.
1700-1710 (*)		Space Research	The most conservative case of deep space has been taken from Table II: C3=62+222=284dB C4=10+10+222=242dB
	1770-1790	Meteor. Sat.	Same as for band 1670-1790MHz
	2200-2290 (*)	Space Operation	Rec. 363 is used for the value of Pr(p), but combined with parameters for troposcatter terrestrial transmitting stations: C3=82+184=266dB C4=30+10+184=224dB
		Space Research	Same parameters of band 2290-2300MHz are used.
		Ea. Exp. Sat.	Rep. 382-4 is used for the value of Pr(p), but combined with parameters for troposcatter terrestrial transmitting stations: C3=92+154=246dB C4=10+10+154=174dB
2290-2300 (*)		Space Research	C3=62+222=284dB C4=10+10+222=242dB

Table 2: calculation of constants C3 and C4 for computer program APP28 (receiving earth stations)

Bands (MHz)		Services	Calculations / Comments
Table II of Appendix 28	Article 14 allocation		
	2500-2535	Mobile Sat.	This case is comprised by the band below.
2500-2690	2500-2690	Fixed Sat.	$C3=92-60+228.6+8-17+4=255.6\text{dB}$ $C4=40+10-60+228.6+8-17+4=213.6\text{dB}$
3400-4200		Fixed Sat.	$C3=55-60+228.6+8-17+4=218.6\text{dB}$ $C4=13+0-60+228.6+8-17+4=176.6\text{dB}$
4500-4800		Fixed Sat.	$C3=92-60+228.6+8-17+4=255.6\text{dB}$ $C4=40+10-60+228.6+8-17+4=213.6\text{dB}$
	5000-5250	Fixed Sat. Aer. Mob. Sat.	Appendix 28 does not apply for this band, since it is not allocated for terrestrial systems in the fixed service.
	7250-7375	Mobile Sat.	This case is comprised by the band below.
7250-7750		Fixed Sat. Meteor. Sat. Mobile Sat.	$C3=55-60+228.6+8-17+4=218.6\text{dB}$ $C4=13+0-60+228.6+8-17+4=176.6\text{dB}$
8025-8400 (*)	8025-8400	Ea. Exp. Sat.	$C3=55+154=209\text{dB}$ $C4=13+0+154=167\text{dB}$
8400-8500 (*)		Space Research	$C3=25+220=245\text{dB}$ $C4=-17+0+220=203\text{dB}$
10700-12750		Fixed Sat.	$C3=55-60+228.6+8-17+4=218.6\text{dB}$ $C4=10+3-60+228.6+8-17+4=176.6\text{dB}$

Table 2: continuation

Bands (MHz)		Services	Calculations / Comments
Table II of Appendix 28	Article 14 allocation		
	11700-12700	Fixed Sat.	This case of footnote allocation is comprised by the above band.
	15400-15700	Aer. Mob. Sat. Fixed Sat.	Appendix 28 is not used for the Aer. Mob. Sat. Serv. Appendix 28 does not apply for this band, since it is not allocated for terrestrial systems in the fixed service.
17700-40000		Meteor. Sat Fixed Sat. Mobile Sat.	$C3=35-60+228.6-0-5+0=198.6\text{dB}$ $C4=-10+3-60+228.6-0-5+0=156.6\text{dB}$
	31800-33800	Fixed Sat.	This case of footnote allocation is comprised by the above band.

Table 2: continuation

WORKING GROUP 5A

ANALYSIS OF BANDS PROPOSED BY ADMINISTRATIONS FOR PLANNING

TABLE OF PROPOSED BANDS

Bands allocated to BSS feeder links are not included in this table.

Band	Proposal	Remarks
4/6 GHz	E/10/2 G/18/4 KEN/20 CAN/35/4 B/37/7 COMP/53/1 and 2 PRG/55/1 CHL/59/1 MEX/60/2 CLM/67/2 GRC/74/4 ALG/75/2 GHA/77/4 YUG/78/2 EQA/81/1 IRQ/87/1 LBY/103/2 BFA/104/3	4/6 GHz
	USA/5/6 USA/30/14 to 17 USA/30/36	1) Special arrangements for access to 4 500 - 4 800 6 425 - 7 075 2) Stricter standards for bands 3 700 - 4 200 5 925 - 6 425
	AUS/7/1 J/39/2	3.4 - 4.2 4.5 - 4.8 5 850 - 7 075
	SEN/17/1	3.4 - 4.2 4.5 - 4.8 5 725 - 7 075
	IND/54/1 CTI/95/1 ARG/101/2	3 400 - 4 200 4 500 - 4 800 5 925 - 7 025

Band	Proposal	Remarks
6/4 GHz (continued)	CHN/27/16 CHN/28/19 CHN/28/22	1) 3 400 - 4 200 4 500 - 4 800 5 850 - 7 075 2) 300 MHz bands reserved 4 500 - 4 800 6 775 - 7 075
	F/12/7 F/76/14 F/76/15	1) 3 700 - 4 200 5 925 - 6 425 2) Sub-bands reserved for space operation
7/8 GHz	KEN/20 ALG/75/2 IRQ/87/1 LBY/103/2 BFA/104/3	7/8 GHz
	SEN/17/1	7 250 - 7 750 7 900 - 8 400
10.7 - 14.5 GHz	E/10/2 E/42/8	11-12/14 possibly
	F/12/7 G/18/4 KEN/20 CAN/35/4 B/37/7 COMP/53/1 and 2 PRG/55/1 CHL/59/1 MEX/60/2 CLM/67/2 GRC/74/4 ALG/75/2 GHA/77/4 YUG/78/2 EQA/81/1 IRQ/87/1 LBY/103/2 BFA/104/3	11-12/14
	AUS/7/1	10.7 - 13.25 14 - 14.5

Band	Proposal	Remarks
10.7 - 14.5 GHz (continued)	F/12/7 F/76/14 F/76/15	1) 10.95 - 11.2 11.45 - 11.7 12.5 - 12.75 14 - 14.5 2) Sub-bands reserved for space operation
	SEN/17/1	14 - 14.5
	CHN/27/16 CHN/28/19 CHN/28/22	1) 10 950 - 11 700 14 000 - 14 500 2) 250 MHz bands reserved 10 700 - 10 950 12 750 - 13 000
	IND/54/1 CTI/95/1	10.7 - 11.7 12.75 - 13.25 14 - 14.5
	ARG/101/2	10.7 - 12.2 14 - 14.5
20 - 30 GHz	SEN/17/1	18.1 - 18.6 18.6 - 18.8 18.8 - 20.2 20.2 - 21.2 27 - 27.5 27.5 - 31
	KEN/20 MEX/60/2 ALG/75/2 LBY/103/2 BFA/104/3	should be considered
NZL D	NZL/8 Para 2.2 D/31/12-16	Only in bands where FSS is sole primary service. Comments concerning shared bands, secondary or permitted services and footnote allocations.

- D/31/16 A frequency band allocated on a primary basis whose use is restricted by one or several footnotes of the Table of Frequency Allocations cannot be planned without further considerations.
- CAN/35/4 The existing and future demand in the 4, 6, 11-12 and 14 GHz bands indicates that these bands should be considered for alternative regulatory regimes.
- B/37/7 4. The FSS deserves a particular treatment in view of the extensive implications the decisions of the Conference may have upon this service, which is being increasingly used throughout the world. The FSS has several allocations in frequency bands between 25 and 275 GHz. The 6/4 and 14/11-12 GHz bands have experienced the largest technological development and nowadays trends are towards an increase in orbit/spectrum capacity in these bands. Moreover, intense orbit and spectrum utilization is only likely to occur in some portions of the GSO. In view of this, Brazil proposes that only the allocations to the FSS in the 6/4 and 14/11-12 GHz bands be considered by the Conference. Account must be taken of the fact that the adequacy of a mechanism of access different from the on demand approach depends on the degree of utilization of the particular orbital arc and frequency band under consideration. Specifically the adequacy of an a priori mechanism of access may only be justified for an orbital arc and frequency band for which a sufficiently intense utilization is likely to occur.
- J/39/2 Proposal
- Japan proposes the frequency bands 3.4 - 4.2 GHz, 4.5 - 4.8 GHz and 5.85 - 7.075 GHz allocated to the fixed-satellite service be considered.
- E/42/8 1) that WARC-ORB-85 should establish the principles and consider the technical requirements for the type of sharing between services discussed in this document, having due regard to the rational use of the orbit-spectrum resource;
- 2) that, as an alternative to the bands 10.7 - 11.7 GHz or 12.5 - 12.75 GHz, WARC-ORB-85 should see whether any FSS frequency bands other than 4/6 and 11-12/14 GHz can be found which would improve FSS payloads on this type of platform,
- 3) that, if appropriate, this subject should be included in the draft agenda of the Second Session of the Conference.
- Composite proposals from CVA, D, F, G, MCD, POR and SUI.
- COMP/53/1 That in order to make the best use of the time available, for the purposes of its discussions under agenda items 2.2 and 2.3, the WARC-ORB(1) should concentrate most of its attention upon the fixed-satellite service and the bands allocated to that service in the areas of 4/6 GHz and 11-12/14 GHz.
- COMP/53/2 That the WARC-ORB(1) should for the generality of fixed-satellite services in the bands at 4/6 GHz and 11-12/14 GHz seek to develop a flexible planning method in order to ensure equitable access to the orbit for all countries as and when they are ready for that step.

IND/54/1

The Indian Administration proposes that the fixed-satellite service in the following bands be planned on a world-wide basis:

- i) 3 400 - 4 200 MHz and 4 500 - 4 800 MHz (space-to-Earth);
- ii) 5 925 - 7 025 MHz (Earth-to-space);
- iii) 10.7 - 11.7 GHz (space-to-Earth);
- iv) 12.75 - 13.25 GHz (Earth-to-space);
- v) 14.0 - 14.5 GHz (Earth-to-space);

PRG/55/1

Paraguay proposes that the fixed-satellite service in the bands 6/4 and 14/11-12 GHz should be planned because:

CHL/59/1

In view of the situation prevailing in the fixed-satellite service (FSS), it is likely to be difficult to satisfy demand to guarantee in practice for all countries equitable access to the geostationary-satellite orbit. The Chilean Administration therefore considers that the FSS should be planned in the 6/4 GHz and 14/11-12 GHz bands. Feeder links for the broadcasting-satellite service (BSS) should also be planned in the 17 GHz band for Regions 1 and 3.

MEX/60/2

Although many of the existing services have been established in the band 6/4 and 11-12/14 GHz, the CCIR has progressed with its studies of the bands 20/30 GHz in which several administrations have been conducting interesting experiments. In order to meet the needs of administrations, it is recommended that all the bands on which basic technical information is available should be considered in the planning exercise.

CLM/67/2

Consequently, in order not to deprive the vast majority of countries, in particular the developing ones, of access to the GO, it is urgently recommended that an a priori planning mechanism be adopted in the bands 6/4 GHz and 14/11 - 12 GHz in the FSS.

GRC/74/4

The FSS and the frequency bands 6/4, 14/12/11 GHz should be planned by the Conference.

ALG/75/2

The frequency bands of the fixed-satellite service to be planned are as follows:

- 4/6 GHz,
- 7/8 GHz,
- 11 - 12/14 GHz.

This does not rule out the possibility of planning higher bands, if necessary.

F/76/14

The bands 3 700 - 4 200 MHz, 5 925 - 6 425 MHz, 10.95 - 11.2 GHz, 11.45 - 11.7 GHz, 12.5 - 12.75 GHz and 14 - 14.5 GHz are, by virtue of their intense utilization, the only bands in the fixed-satellite service which can be planned using the method referred to in section 2.3 of this document, with the exception of feeder links to broadcasting satellites. See proposal [COMP/52/1].

F/76/15

Furthermore, whatever solution is adopted, sub-bands must be set aside for the space operation service, in the frequency bands allocated to the fixed-satellite service, for station-keeping operations and for the critical phases of station acquisition and manoeuvring in orbit (see the CPM report, Annex 4, section 4.6.5.6).

- GHA/77/4 Ghana therefore proposes that only the 6/4 GHz and 14/11 - 12 GHz bands and the FSS be planned in a manner to meet the objective of Resolution No. 3 of WARC-79.
- YUG/78/2 The Socialist Federal Republic of Yugoslavia proposes that:
- a) only FSS should be considered for planning in the frequency bands 6/4 GHz and 14/11 - 12 GHz;
- EQA/81/1 a) the priority adoption of a priori planning of the bands 6/4 and 14/11 - 12 GHz for the fixed-satellite service;
- IRQ/87/1 that the fixed satellite service in the paired bands 4/6, 7/8 and 11 - 12/14 GHz should be planned by the Conference.
- CTI/95/1 Planning should cover the fixed-satellite service in the following bands:
- 3 400 - 4 200 MHz
- 4 500 - 4 800 MHz
- 5 925 - 7 075 MHz
- 10 700 - 11 700 MHz (space-to-Earth)
- 12 750 - 13 250 MHz
- 14 000 - 14 800 MHz
- ARG/101/2 On the above basis, the Argentine Republic proposes that the fixed-satellite service should be planned in the bands 3.4 - 4.2, 4.5 - 4.8, 5.925 - 7.075, 10.7 - 12.2 and 14 - 14.5 GHz.
- LBY/103/2 The FSS is to be considered as a prime priority and is to be planned in the frequency bands 4/6 GHz, 7/8, 11-12/14 and if possible 20/30 GHz.
- BFA/104/3 We propose that the bands 6/4, 8/7, 14/11-12 and 30/20 GHz should be planned.

F. PINHEIRO
Chairman of Working Group 5A

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/23-E
15 August 1985
Original: English

COMMITTEE 4

Proposals for future modification of Article I

DEFINITIONS AND TERMS

1. Document 3: CCIR/CPM Report - Chapter 2, section 2.1
- Annex 1, especially section 1.4 (terms and definitions requiring further study)
2. Document 4: IFRB Report
 - a) Inter-satellite service (RR24) - section 4.1.2
 - b) Space operations service (RR25) - section 4.1.3
(also RR127, RR129 and RR130)
 - c) Maritime mobile-satellite service (RR31) - section 4.1.4
3. Document 13 (F) - F/13/8
 - a) Modify existing definition: RR109 (feeder link)
 - b) Add new definitions
 - data relay satellite
 - data collection satellite
 - remote sensing satellite
4. Document 68 (CLM)
 - Add new term: geostationary orbit (CLM/68/4)

R.G. AMERO
Chairman of Committee 4

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

COMMITTEE 6Note from the Chairman of Committee 6

STRUCTURE OF COMMITTEE 6

Committee 6
(Matters relating to the
Broadcasting-Satellite Service
in the 12 GHz band)

: Chairman : Dr. M. MATSUSHITA (J) (624)
Vice-Chairman: Mr. E. KAMDEM-KAMGA (CME)
 (164)
Secretary : Mr. I. Dolezel (2045)
Assistant : Mr. P.D. Cross (2009)

- Working Group 6A
(Matters concerning the
Final Acts for Region 2)

: Chairman : Mr. G.H. RAILTON (PNG) (532)
Secretary : Mr. P.D. Cross (2009)

- Sub-Working Group 6A1
(Examination of: Criteria on
inter-regional sharing/
Incompatibilities between
Region 2 BSS Plan and
services of Regions 1 and 3)

: Chairman : Mr. G.H. RAILTON (PNG) (532)
Secretary : Mr. P.D. Cross (2009)

- Sub-Working Group 6A2
(Review of Document 16/
Consolidation of decisions
of SAT-R2 with the RR)

: Chairman : Mr. Jan F. BROERE (HOL) (519)
Secretary : Mr. E. Cabral de Mello
 (2025)

- Working Group 6B
(Feeder links for BC-SAT
Regions 1 and 3)

: Chairman : Mr. D. SAUVET-GOICHON (F) (224)
Secretary : Mr. D. Schuster (2071)

- Sub-Working Group 6B1
(Question of frequency bands
for planning the broadcasting-
satellite feeder links)

: Chairman : Mr. L. GRIMSTVEIT (NOR) (478)
Secretary : Mr. D. Schuster (2071)

- Sub-Working Group 6B2
(Technical Parameters for
planning of feeder links)

: Chairman : Mr. R.M. BARTON (AUS) (117)
Secretary : Mr. D. Schuster (2071)

Dr. M. MATSUSHITA
Chairman of Committee 6

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/24-E
15 August 1985
Original: English

COMMITTEE 6

Note from the Chairman of Committee 6

STRUCTURE OF COMMITTEE 6

- Committee 6
(Matters relating to the
Broadcasting-Satellite Service
in the 12 GHz band)
- : Chairman : Dr. M. MATSUSHITA (J) (624)
Vice-Chairman: Mr. E. KAMDEM-KAMGA (CME) (164)
Secretary : Mr. I. Dolezel (2045)
Assistant : Mr. P.D. Cross (2009)
- Working Group 6A
(Matters concerning the
Final Acts for Region 2)
- : Chairman : Mr. G.H. RAILTON (PNG) (532)
Secretary : Mr. P.D. Cross (2009)
- Sub-Working Group 6A1
(Examination of: Criteria on
inter-regional sharing/
Incompatibilities between
Region 2 BSS Plan and
services of Regions 1 and 3)
- : Chairman : Mr. G.H. RAILTON (PNG) (532)
Secretary : Mr. P.D. Cross (2009)
- Working Group 6B
(Feeder links for BC-SAT
Regions 1 and 3)
- : Chairman : Mr. D. SAUVET-GOICHON (F) (224)
Secretary : Mr. D. Schuster (2071)
- Sub-Working Group 6B1
(Question of frequency bands
for planning the broadcasting-
satellite feeder links)
- : Chairman : Mr. L. GRIMSTVEIT (NOR) (478)
Secretary : Mr. D. Schuster (2071)
- Sub-Working Group 6B2
(Technical parameters for
planning of feeder links)
- : Chairman : Mr. R.M. BARTON (AUS) (117)
Secretary : Mr. D. Schuster (2071)

Dr. M. MATSUSHITA
Chairman of Committee 6

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Addendum 1 to
Document DT/25(Rev.2)-E
22 August 1985
Original: English

WORKING GROUP 6B

REPORT OF SUB-WORKING GROUP 6B-2 TO WORKING GROUP 6B

A. E.i.r.p. initial planning value

After extensive consideration of this planning parameter the ad hoc Group developed the following proposal:

- 1) An e.i.r.p. initial planning value of 84 dBW will be shown in the table of planning parameters together with a reference to two associated footnotes.
- 2) The footnotes would read as follows:
 - i) This is an initial value to be used in developing the plan. It will be adjusted, if necessary, during the plan development on a case-by-case basis to ensure that the minimum carrier-to-noise and carrier-to-interference criteria specified in the plan are met for the feeder-link systems of all administrations. Adjustments will also be made, if required, to accommodate the requirements of particular administrations.
 - ii) Some administrations consider that this initial planning value may not meet their requirements.

B. Power control

The Group noted that it had already been established in Sub-Working Group 6B-2 that the feeder-link plan would be developed without the systematic use of power control. Additionally, it had also been agreed that the use of power control would be permitted but its use would need to be governed by a set of guidelines.

Document 111 provides valuable information concerning the application of power control but it was agreed by the Group that further information is required before these guidelines can be established.

It is therefore recommended that intersessional studies of this parameter should be undertaken by the CCIR (Report 952 refers) and that the second conference should then further consider this matter.

R.M. BARTON
Chairman of Sub-Working Group 6B-2

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING OF SPACE SERVICES UTILIZING IT

Document DT/25(Rev.2)-E

22 August 1985

Original: English

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

WORKING GROUP 6B

Draft report of Sub-Working Group 6B-2 to Working Group 6B

TECHNICAL PARAMETERS FOR BROADCASTING SATELLITE SERVICE FEEDER-LINK
PLANNING IN REGIONS 1 AND 3 (17.3 - 18.1 GHz BAND AND 14.5 - 14.8 GHz BAND)

Item No.	Parameter	Recommended value	CFM ref.	Proposals Docs
1	Carrier-to-noise ratio	24 dB	Annex 6, 6.2.2	40
2	Co-channel carrier-to-interference ratio	40 dB		40
3	Adjacent channel carrier-to-interference ratio	21 dB (Note 1)	Annex 6, 6.2.3	9, 18, 40
4+	e.i.r.p.	17/18 GHz band: uniform value in the range 78-87.4 dBW or determine by link budget to achieve carrier-to-noise ratio value 14 GHz band: to be discussed	Annex 6, 6.2.4	14, 18, 40, 99, 131
5	Earth station antenna diameter	5 m - 17/18 GHz band 6 m - 14 GHz band	Annex 6, 6.2.5.1	-
6	Earth station antenna gain	57 dBi	Annex 6, 6.2.5.2	-
7	Earth station antenna, co-polar response pattern	32-25 log θ dBi for $1^\circ \leq \theta \leq 48^\circ$, -10(dBi) for $\theta > 48^\circ$ (Figure 1)	Annex 6, 6.2.5.2 a)	40
8	Earth station antenna, cross-polar response pattern	-30 dB relative to co-polar on-axis gain, for $0^\circ \leq \theta \leq 1.6^\circ$, 32-25 log θ dBi for $1.6^\circ < \theta \leq 48^\circ$, -10(dBi) for $\theta > 48^\circ$ (Figure 1)	Annex 6, 6.2.5.2 b)	15, 18, 40
9	Earth station antenna mispointing loss	1 dB	Annex 6, 6.2.5.4	-
10	Satellite receiving antenna, co-polar response pattern	relative gain (dB) $-12\left(\frac{\theta}{\theta_0}\right)^2$ for $0 \leq \frac{\theta}{\theta_0} < 1.30$ $-17.5 - 25 \log\left(\frac{\theta}{\theta_0}\right)$ for $\frac{\theta}{\theta_0} > 1.30$ After intersection with curve C: as curve C.* (see Figure 2 - curve A)	Annex 6, 6.2.6.2 a)	40
11	Satellite receiving antenna, cross-polar response pattern	relative gain (dB) $-30 - 12\left(\frac{\theta}{\theta_0}\right)^2$ for $0 \leq \frac{\theta}{\theta_0} \leq 0.5$ -33 for $0.5 \leq \frac{\theta}{\theta_0} \leq 1.67$ $-40 - 40 \log\left(\frac{\theta}{\theta_0} - 1\right)$ for $1.67 < \frac{\theta}{\theta_0}$ After intersection with curve C: as curve C.* (See Figure 2 - curve B)	Annex 6, 6.2.6.2 b)	40

For reasons of economy, this document is printed in a limited number of copies. Participants are therefore kindly asked to bring their copies to the meeting since no others can be made available.

Item No.	Parameter	Recommended value	CPM ref.	Proposals Docs
12	Satellite receiving antenna, pointing accuracy	0.2°	Annex 6, 6.2.6.3	40
13	Satellite noise temperature	1500 K	Annex 6, 6.2.7	18, 40
14	Type of polarization	Circular (Note 2)	Annex 6, 6.2.8	40
15	Sense of polarization	Either, all opposite to their corresponding down-links or all the same as their corresponding down-links for each orbital position, assuming a uniform frequency-translation plan (Note 3)	Annex 6, 6.2.8	18, 40
16	AGC	Up to 15 dB range permitted, subject to no increase in interference to other satellite systems	Annex 6, 6.2.9	40
17+	Power control	Not considered in planning but permitted subject to no increase in interference to other satellite systems (Document 111 provides useful information.)	Annex 6, 6.2.10	40, 111
18	Earth station location	To meet the requirements of administrations, but if outside the down-link service area may need to employ methods of resolving incompatibilities in planning (20). (Note 4)	Annex 6, 6.3	18, 40
19	Propagation model	[Annex 2 of CPM Report evaluated for 99% - worst month]	Annex 2	40, 97, 122, 131
20	Methods of resolving incompatibilities in planning	See 20.1 below	Annex 6, 6.3.3	18, 40

Note 1 - One administration proposes to plan using a value of 24 dB, but where this cannot be applied, a value of 21 dB may be used.

Note 2 - Circular polarization assumed in planning but linear polarization may be used at a given orbit position, subject to the agreement of all the affected administrations.

Note 3 - In the situation where a non-uniform frequency translation plan is used, it is still necessary to maintain a uniform polarization/frequency arrangement at each orbit position.

Note 4 - In discussion of this item, three cases for feeder link service area were identified:

- i) within the down-link service area;
- ii) within the national territory of an administration;
- iii) within the national territory of one or more cooperating administrations serving the down-link beam of another cooperating administration.

+ Discussion of this parameter continues.

20.1 Methods of resolving incompatibilities in planning feeder links

Use of a common set of technical parameters for all feeder links in planning is desirable but preliminary studies by a number of administrations have indicated that there may be a difficulty in obtaining the required carrier-to-interference ratios on a small number of feeder links, particularly when certain administrations have special requirements to be met.

In order to overcome these difficulties, a certain amount of flexibility in the values of planning parameters used is proposed. Employment of one or more of the following techniques may be used, where necessary, in the planning process to attain the target values for interference protection:

20.1.1* Adjustment of the maximum level of e.i.r.p. of potential interfering feeder links or feeder links subject to excessive interference, subject to maintaining adequate carrier-to-noise and carrier-to-interference ratios on the adjusted feeder links

20.1.2* In circumstances where independent planning of orbit positions is adversely affected, the off-axis co- and cross-polar side-lobe response patterns of the earth station transmitting antenna may be limited to $29 - 25 \log \Theta$ (dBi). For values of off-axis angle, Θ , in the regions of the adjacent and next-but-one adjacent orbital positions in the plane of the geostationary orbit

20.1.3* In circumstances where insufficient cross-polar isolation is achieved, the off-axis cross-polar side-lobe response pattern of the earth station transmitting antenna may be limited to $24 - 25 \log \Theta$ (dBi) for $0.76^\circ \leq \Theta \leq 22.9^\circ$ and -10 (dBi) for $\Theta > 22.9^\circ$

20.1.4 Adjustment of the feeder-link channel assignments, retaining the same translation frequency for all assignments associated with a given down-link beam

20.1.5* Modifying the satellite receiving antenna beam pattern shape, size, and/or side-lobe response (e.g. multiple beam or shaped beam antenna), particularly when the feeder link is located outside the down-link service area

20.1.6 Off-setting the beam-pointing direction of the satellite receiving antenna subject to maintaining the target carrier-to-noise ratio

20.1.7 Improving the beam-pointing accuracy of the satellite receiving antenna to 0.1°

20.1.8* Separating satellite orbit positions by $\pm 0.2^\circ$ from the nominal position and specifying the transmitting antenna pattern, for relevant earth stations in the range 0° to 1° off-axis beam angles (note that this technique may require changes to Appendix 30 and should therefore be subject to further discussion)

20.1.9 Setting an upper limit of 10 dB to the rain attenuation margin included in the feeder-link power budget.

R.M. BARTON
Chairman of Sub-Working Group 6B-2

* Further work is required to complete this proposal and to define the magnitudes of some of the proposed parameter improvements that may be exceptionally assumed in planning, if necessary to achieve the target carrier-to-interference ratios.

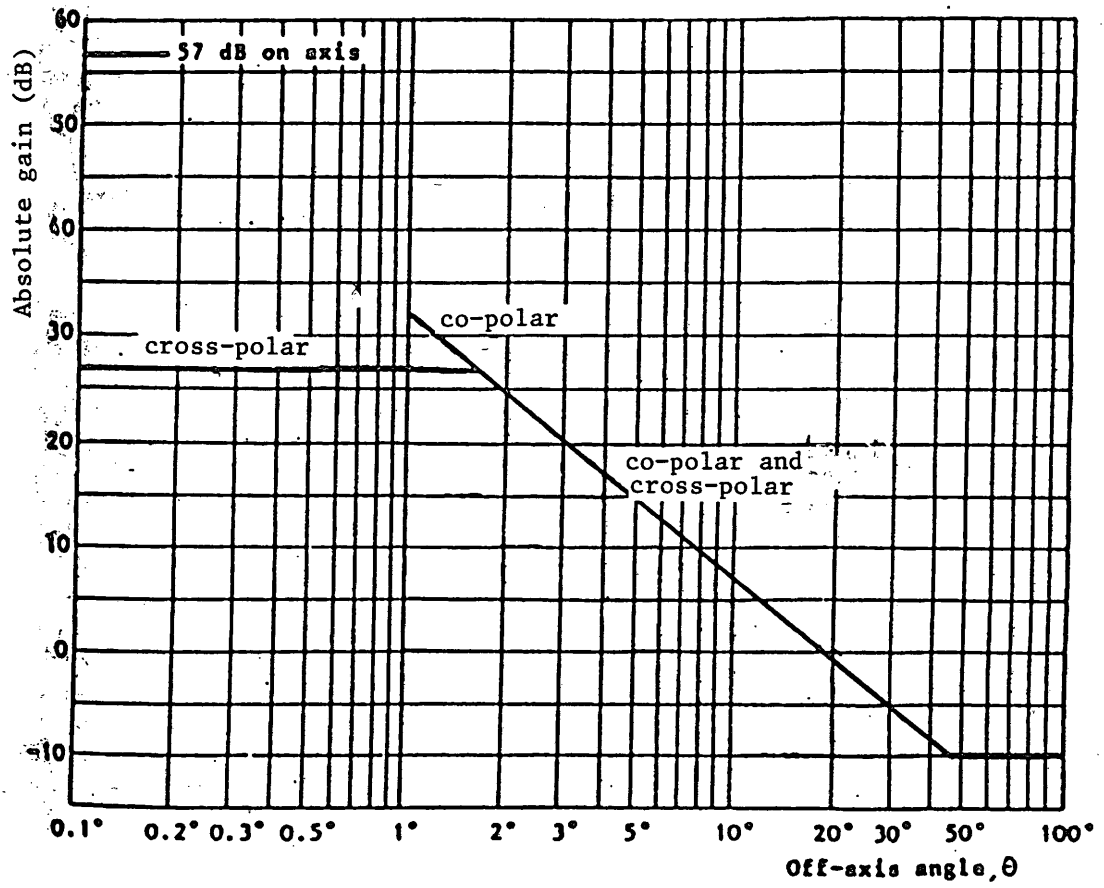


FIGURE 1

Earth station transmit antenna reference patterns
(5 m diameter antenna)

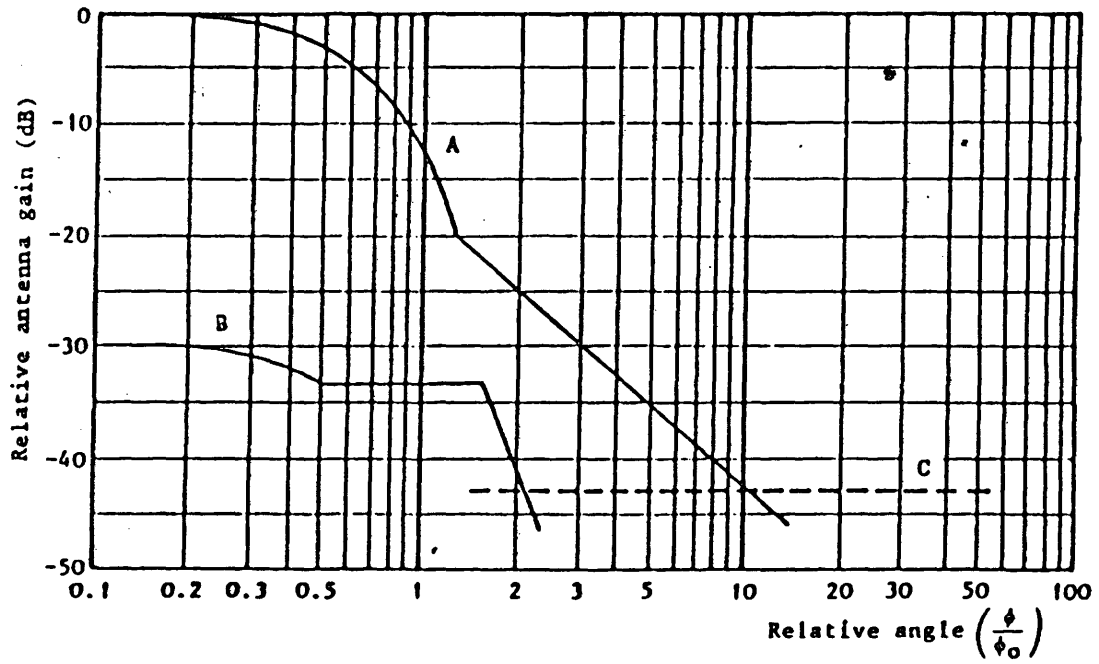
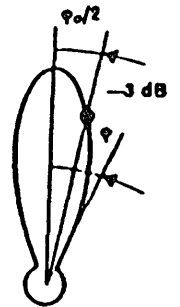


FIGURE 2

Satellite receive antenna pattern

- Curve A - co-polar component
- Curve B - cross-polar component
- Curve C - minus the on-axis gain



INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/25(Rev.1)-E
16 August 1985
Original: English

WORKING GROUP 6B

Draft first report of Sub-Working Group 6B-2 to Working Group 6B

TECHNICAL PARAMETERS FOR BROADCASTING SATELLITE SERVICE FEEDER-LINK
PLANNING IN REGIONS 1 AND 3 (17.3 - 18.1 GHz BAND)

Item No.	Parameter	Conference proposal	Comments	CPM ref.	Proposals Docs
1*	Carrier-to-noise ratio	24 dB	CPM value	Annex 6, 6.2.2	40
2*	Co-channel carrier-to-interference ratio	40 dB			40
3	Adjacent channel carrier-to-interference ratio	21 or 24 dB	CPM value is 21 dB, one administration requests the higher value (24 dB)	Annex 6, 6.2.3	9, 18, 40
4	e.i.r.p.	Uniform value in the range 78-87.4 dBW or determine by link budget to achieve carrier-to-noise ratio value	Subject to further discussion	Annex 6, 6.2.4	14, 18, 40, 99
5	Earth station antenna diameter	5 m	Two administrations wish to make further comments	Annex 6, 6.2.5.1	-
6*	Earth station antenna gain		Not discussed, CPM value is 57 dBi	Annex 6, 6.2.5.2	-
7*	Earth station antenna, co-polar response pattern	32-25 log θ dBi for $1^\circ < \theta < 48^\circ$, -10 dBi for $\theta > 48^\circ$ (Note 1)	Reduce by 3 dB where necessary (see Note 1)	Annex 6, 6.2.5.2 a)	40
8	Earth station antenna, cross-polar response pattern	-30 dB relative to co-polar on-axis gain, for $0^\circ \leq \theta \leq 0.48^\circ$, 19-25 log θ dBi for $0.48^\circ < \theta \leq 14.45^\circ$, -10 dBi for $\theta > 14.45^\circ$ or -30 dB relative to co-polar on-axis gain, for $0^\circ \leq \theta \leq 1.6^\circ$, 32-25 log θ dBi for $1.6^\circ < \theta \leq 48^\circ$, -10 dBi for $\theta > 48^\circ$ (see Note 1)	Subject to further discussion	Annex 6, 6.2.5.2 b)	15, 18, 40
9*	Earth station antenna mispointing loss		Not discussed, CPM value is 1 dB	Annex 6, 6.2.5.4	-
10	Satellite receiving antenna, co-polar response pattern		Not discussed	Annex 6, 6.2.6.2 a)	40
11	Satellite receiving antenna, cross-polar response pattern		Not discussed	Annex 6, 6.2.6.2 b)	40
12*	Satellite receiving antenna, pointing accuracy	0.2°		Annex 6, 6.2.6.3	40
13*	Satellite noise temperature	1500 - 2500 K	CPM values	Annex 6, 6.2.7	18, 40

Item No.	Parameter	Conference proposal	Comments	CPM ref.	Proposals Docs
14*	Type of polarization	Circular assumed	As CPM	Annex 6, 6.2.8	40
15*	Sense of polarization	Either, but must all be the same at each orbit position (relative to down-link)	As CPM	Annex 6, 6.2.8	18, 40
16*	AGC	Up to 15 dB permitted, subject to no increase in interference to other satellite systems	As CPM	Annex 6, 6.2.9	40
17*	Power control	Not considered in planning but permitted subject to no increase in interference to other satellite systems (Document 111 provides useful information.)	As CPM	Annex 6, 6.2.10	40, 111
18	Earth station location		Under discussion	Annex 6, 6.3	18, 40
19	Methods of resolving incompatibilities in planning		Under discussion	Annex 6, 6.3.3	18, 40
20	Propagation model		To be discussed	Annex 2	40, 97

Note 1 - In circumstances where independent planning of orbit positions are adversely affected, the side-lobe off-axis response pattern should be limited to 29-25 log 0 dBi, for values of 0 in the regions of the nearby orbital separations in the plane of the geostationary orbit, i.e. $0 \sim \pm 6^\circ, \pm 12^\circ$.

* Discussion of these parameters has concluded.

Annex: 1

ANNEX 1

Methods of resolving incompatibilities in planning feeder links

Use of a common set of technical parameters for all feeder links in planning is desirable but preliminary studies by a number of administrations have indicated that there may be difficulty in obtaining the required carrier-to-interference ratios on a small number of feeder links, particularly when certain administrations have special requirements to be met.

In order to overcome these difficulties, a certain amount of flexibility in the values of planning parameters used is proposed. Employment of one or more of the following techniques may be used, where necessary, in the planning process to attain the target values for interference protection:

- a) adjustment of the maximum level of e.i.r.p. of potential interfering feeder links or feeder links subject to excessive interference, subject to maintaining adequate carrier-to-noise and carrier-to-interference ratios on the adjusted feeder links;
- b) adjustment of the feeder link channel assignments, retaining the same translation frequency for all assignments associated with a given down-link beam;
- c) modifying the satellite receiving antenna beam pattern shape, size, and/or side-lobe response;
- d) off-setting the beam-pointing direction of the satellite receiving antenna subject to maintaining the target carrier-to-noise ratio;
- e) improving the beam-pointing accuracy of the satellite receiving antenna to 0.1° ;
- f) improving the side-lobe response pattern of the earth station transmitting antenna. (Note 1 associated with items 7 and 8 in the present document is one example of improved side-lobe response proposed.); and
- g) separating satellite orbit positions $\sqrt{\text{by } \pm 0.2^\circ}$ from the nominal position $\sqrt{\text{and specifying the transmitting antenna pattern, for relevant earth stations in the range } 0^\circ \text{ to } 1^\circ \text{ off-axis beam angles (note that this technique would require changes to Appendix 30 and should therefore be subject to further discussion)}}$.

The following techniques have also been identified and are still under discussion:

- h) setting an upper limit to the rain attenuation margin included in the feeder link power budget; and
- i) the adoption of extra rules to reduce interference created by a feeder link earth station situated outside the down-link service area.

Further work is also required to define the magnitudes of some of the proposed parameter improvements that may be exceptionally assumed in planning, if necessary to achieve the required carrier-to-interference ratios.

R.M. BARTON
Chairman of Sub-Working Group 6B-2

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/25-E
15 August 1985
Original: English

WORKING GROUP 6B

Draft first report of Sub-Working Group 6B-2 to Working Group 6B

TECHNICAL PARAMETERS FOR BROADCASTING SATELLITE SERVICE FEEDER-LINK PLANNING IN REGIONS 1 AND 3 (17.3 - 18.1 GHz BAND)

Item No.	Parameter	Conference proposal	Comments	CPM ref.	Proposals Docs
1*	Carrier-to-noise ratio	24 dB	CPM value	Annex 6, 6.2.2	40
2*	Co-channel carrier-to-interference ratio	40 dB			40
3	Adjacent channel carrier-to-interference ratio	21 or 24 dB	CPM value is 21 dB, one administration requests the higher value (24 dB)	Annex 6, 6.2.3	9, 18, 40
4	e.i.r.p.	Uniform value in the range 78-87.4 dBW or determine by link budget to achieve carrier-to-noise ratio value	Subject to further discussion	Annex 6, 6.2.4	14, 18, 40, 99
5	Earth station antenna diameter	5 m	Two administrations wish to make further comments	Annex 6, 6.2.5.1	-
6*	Earth station antenna gain		Not discussed, CPM value is 57 dBi	Annex 6, 6.2.5.2	-
7*	Earth station antenna, co-polar response pattern	32-25 log θ dBi for $1^\circ < \theta < 48^\circ$, -10 dBi for $\theta > 48^\circ$ (Note 1)	Reduce by 3 dB where necessary (see Note 1)	Annex 6, 6.2.5.2 a)	40
8	Earth station antenna, cross-polar response pattern	-30 dB relative to co-polar on-axis gain, for $0^\circ \leq \theta \leq 0.48^\circ$, 19-25 log θ dBi for $0.48^\circ < \theta \leq 14.45^\circ$, -10 dBi for $\theta > 14.45^\circ$ or -30 dB relative to co-polar on-axis gain, for $0^\circ \leq \theta \leq 1.6^\circ$, 32-25 log θ dBi for $1.6^\circ < \theta \leq 48^\circ$, -10 dBi for $\theta > 48^\circ$ (see Note 1)	Subject to further discussion	Annex 6, 6.2.5.2 b)	15, 18, 40
9*	Earth station antenna mispointing loss		Not discussed, CPM value is 1 dB	Annex 6, 6.2.5.4	-
10*	Satellite receiving antenna, co-polar response pattern		Not discussed	Annex 6, 6.2.6.2 a)	40
11*	Satellite receiving antenna, cross-polar response pattern		Not discussed	Annex 6, 6.2.6.2 b)	40
12*	Satellite receiving antenna, pointing accuracy	0.2°		Annex 6, 6.2.6.3	40
13*	Satellite noise temperature	1500 - 2500 K	CPM values	Annex 6, 6.2.7	18, 40

Item No.	Parameter	Conference proposal	Comments	CFM ref.	Proposals Docs
14*	Type of polarization	Circular assumed	As CPM	Annex 6, 6.2.8	40
15*	Sense of polarization	Either, but must all be the same at each orbit position (relative to down-link)	As CPM	Annex 6, 6.2.8	18, 40
16*	AGC	Permitted subject to no increase in interference to other satellite systems	As CPM	Annex 6, 6.2.9	40
17*	Power control	Not considered in planning but permitted subject to no increase in interference to other satellite systems (Document 111 provides useful information.)	As CPM	Annex 6, 6.2.10	40, 111
18	Earth station location		Under discussion	Annex 6, 6.3	18, 40
19	Methods of resolving incompatibilities in planning		Under discussion	Annex 6, 6.3.3	18, 40
20	Propagation model		To be discussed	Annex 2	40, 97

Note 1 - In circumstances where independent planning of orbit positions are adversely affected, the side-lobe off-axis response pattern should be limited to 29-25 log 0 dB1, for values of 0 in the regions of the nearby orbital separations in the plane of the geostationary orbit, i.e. $0 \pm 6^\circ, \pm 12^\circ$.

* Discussion of these parameters has concluded.

R.M. BARTON
Chairman of Sub-Working Group 6B-2

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

**WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT**

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/26(Rev.1)-E
16 August 1985
Original: English

COMMITTEE 6

DRAFT REPORT OF WORKING GROUP 6A TO COMMITTEE 6

Working Group 6A has set up one Sub-Group 6A-1 with the following terms of reference:

- 1) examine the criteria on interregional sharing adopted by SAT-83 with respect to the decisions on interregional sharing criteria adopted by the WARC-79;
- 2) examine the incompatibilities between the Region 2 BSS Plan and the services of Regions 1 and 3;
- 3) make recommendations for dealing with the incompatibilities.

This Sub-Group has reported to the Working Group that it had two meetings and addressed the criteria by which the SAT-R2 Plan could be evaluated with respect to services in Regions 1 and 3 (DT/16 and DT/20).

It has been agreed to address these issues in three parts i.e.:

- a) Region 2 BSS into Regions 1 and 3 BSS;
- b) Region 2 BSS into Regions 1 and 3 terrestrial services;
- c) Region 2 BSS into Regions 1 and 3 FSS.

Region 2 BSS into Regions 1 and 3 BSS

It has been agreed to endorse the Board's decision in section 4 of Document 48 to use the criteria in Annex 4 of Appendix 30 of the Radio Regulations to examine the incompatibilities of the Region 2 BSS plan with the Regions 1 and 3 plan.

Three beams have been identified as exceeding the pfd limits and these are given in Table 1.

TABLE 1

Beams of Region 2 exceeding the pfd limits of Appendix 30

Region 2 beam	Region 1 beam	Affected channels of Region 1	Excess to pfd limit
ALS00002	URS 080	26 - 30 - 34 - 38	0.5 dB
ALS00003	URS 080	26 - 30 - 34 - 38	0.7 dB
BERBER02	CNR 130	27 - 31 - 39	1.7 dB
	E 129	27 - 31 - 39	0.4 dB
	ISL 049	29 - 33 - 37	1.8 dB

Two approaches to solving the above problems were suggested:

- 1) the above note to be added as a note to the relevant beams within the plan, or
- 2) [the technical characteristics of the beams be adjusted in order to eliminate the incompatibilities.]

There was no agreement on which approach to use and the problem was referred to 6A-1 - ad hoc 1 to provide the appropriate approach.

Region 2 BSS into Regions 1 and 3 terrestrial services

The Sub-Group 6A-1 considered two possible criteria for evaluating the Region 2 Plan with respect to the terrestrial services in Regions 1 and 3, viz:

- 1) Annex 5 to Appendix 30 of the Radio Regulations as used by the IFRB in Document 48, or
- 2) Annex 5 to Appendix 30 of the Radio Regulations along with the criteria developed by the CCIR in Reports 631 and 789-1, as suggested by one administration.

The administrations (the United Kingdom and the United States of America) responsible for the beams which cause some incompatibilities have agreed to coordinate with the parties concerned and have agreed to the following note:

Note 10/xxx - This assignment shall be brought into use only when the limits of [Annex 4] are met or when an agreement is reached with the administration indicated after .../... with respect to the limits of [Annex 4 of this Appendix].

Region 2 BSS into Regions 1 and 3 FSS

The proposal of the Board in Document 48 to apply Appendix 29 of the Radio Regulations as the necessary criteria for evaluating the Region 2 BSS Plan.

Difficulties have been experienced in reaching a unanimous decision on which systems of Region 1 and 3 FSS should be taken into account in evaluating the SAT-R2 Plan.

Two viewpoints have been identified:

- a) fixed-satellite networks which were communicated to the Board on or before 17 July 1983 for publication under RR 1074
- b) fixed-satellite networks which were communicated to the Board under RR 1042 at the date of incorporation of the SAT-R2 Final Acts into the Radio Regulations.

The Working Group was informed that informal discussions were continuing. It was decided to allow time for the above discussions before addressing this problem.

A suggestion from the Chair was that the consolidated text, Document 16, be addressed. There was divided opinion. At least one delegation pointed out that the matters of principle need to be addressed and it is intended to address the comments of administrations to Document 16 as a matter of some priority.

G.H. RAILTON
Chairman of Working Group 6A

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/26-E

15 August 1985

Original: English

COMMITTEE 6

DRAFT REPORT OF WORKING GROUP 6A TO COMMITTEE 6

Working Group 6A has set up one Sub-Group 6A-1 with the following terms of reference:

- 1) examine the criteria on interregional sharing adopted by SAT-83 with respect to the decisions on interregional sharing criteria adopted by the WARC-79;
- 2) examine the incompatibilities between the Region 2 BSS Plan and the services of Regions 1 and 3;
- 3) make recommendations for dealing with the incompatibilities.

This Sub-Group has reported to the Working Group that it had two meetings and addressed the criteria by which the SAT-R2 Plan could be evaluated with respect to services in Regions 1 and 3 (DT/16 and DT/20).

It has been agreed to address these issues in three parts i.e.:

- a) Region 2 BSS into Regions 1 and 3 BSS;
- b) Region 2 BSS into Regions 1 and 3 terrestrial services;
- c) Region 2 BSS into Regions 1 and 3 FSS.

Region 2 BSS into Regions 1 and 3 BSS

It has been agreed to endorse the Board's decision in section 4 of Document 48 to use the criteria in Annex 4 of Appendix 30 of the Radio Regulations to examine the incompatibilities of the Region 2 BSS plan with the Regions 1 and 3 plan.

Three beams have been identified as exceeding the pfd limits and these are given in Table 1.

TABLE 1

Beams of Region 2 exceeding the pfd limits of Appendix 30

Region 2 beam	Region 1 beam	Affected channels of Region 1	Excess to pfd limit
ALS00002	URS 080	26 - 30 - 34 - 38	0.5 dB
ALS00003	URS 080	26 - 30 - 34 - 38	0.7 dB
BERBER02	CNR 130	27 - 31 - 39	1.7 dB
	E 129	27 - 31 - 39	0.4 dB
	ISL 049	29 - 33 - 37	1.8 dB

There was no agreement on which approach to use and the problem was referred to 6A-1 - ad hoc 1 to provide the appropriate approach.

Region 2 BSS into Regions 1 and 3 terrestrial services

The Sub-Group 6A-1 identified two possible criteria for evaluating the Region 2 Plan with respect to the terrestrial services in Regions 1 and 3, viz:

- 1) Annex 5 to Appendix 30 of the Radio Regulations as used by the IFRB in Document 48, or
- 2) criteria developed by the CCIR in Reports 631 and 789-1.

The administrations (the United Kingdom and the United States of America) responsible for the beams which cause some incompatibilities have agreed to coordinate with the parties concerned and have agreed to the following note:

Note 10/xxx - This assignment shall be brought into use only when the limits of Annex 4 are met or when an agreement is reached with the administration indicated after .../... with respect to the limits of Annex 4 of this Appendix/.

Two approaches to solving the above problems were suggested:

- 1) the above note to be added as a note to the relevant beams within the plan, or
- 2) the technical characteristics of the beams be adjusted in order to eliminate the incompatibilities.

Sub-Group 6A-1 has referred this subject to Sub-Group 6A-1 - ad hoc 1 to provide the relevant criteria to be used in evaluating the SAT-R2 Plan.

Region 2 BSS into Regions 1 and 3 FSS

The proposal of the Board in Document 48 to apply Appendix 29 of the Radio Regulations as the necessary criteria for evaluating the Region 2 BSS Plan.

Difficulties have been experienced in reaching a unanimous decision on which systems of Region 1 and 3 FSS should be taken into account in evaluating the SAT-R2 Plan.

Two viewpoints have been identified:

- a) fixed-satellite networks which were communicated to the Board on or before 17 July 1983 for publication under RR 1074
- b) fixed-satellite networks which were communicated to the Board under RR 1042 at the date of incorporation of the SAT-R2 Final Acts into the Radio Regulations.

The Working Group was informed that informal discussions were continuing. It was decided to allow time for the above discussions before addressing this problem.

A suggestion from the Chair was that the consolidated text, Document 16, be addressed. There was divided opinion. At least one delegation pointed out that the matters of principle need to be addressed and it is intended to address the comments of administrations to Document 16 as a matter of some priority.

G.H. RAILTON
Chairman of Working Group 6A

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Addendum 1 to
Document DT/27-E
21 August 1985
Original: English

WORKING GROUP 5A

Note by the Chairman

The proposals on planning principles, presented to Working Group 5A, have been analysed and assembled under broad topics. The attached listing is an Addendum to Document DT/27.

F.S.C. PINHEIRO
Chairman of Working Group 5A

Annex: 1

GUARANTEE OF ACCESS

AUS/7/6(i) Radio frequencies and the GSO are limited natural resources to which access should be guaranteed on an equitable basis for all countries able to utilize these resources efficiently and economically.

G/18/5.1 . Under the International Telecommunication Convention and the Radio Regulations all administrations, members of the ITU, are of sovereign equality and all planning approaches must reflect this reality, accordingly;

- a) All planning approaches must operate equitably, ie without advantaging or disadvantaging any administration or group of administrations vis-a-vis any others;
- b) All regulatory and technical procedures must operate impartially on those space systems, networks, frequency assignment proposals and orbital location proposals that fall within their scope;

CHN/25/
(3.1.4) that when difficulties are encountered in meeting all actual requirements for access to the orbit/spectrum resource, priority should be given to accommodating the actual requirements of administrations which have not yet established a space system or which have established only a few space systems compared to their own requirements, and later than other Administrations.

J/39/3 Any planning approaches must guarantee, in practice, for all countries or groups of countries, equitable access to the GSO/spectrum and at the same time they must enable efficient and economical use of the GSO/spectrum.

IND/54/5
(4.7) The plan should provide for procedures for guaranteeing the accommodation of any newcomer and also unforeseen requirements of administrations during the period of validity of the plan.

"The most important objective in convening WARC-ORB is to guarantee, in practice, equitable access for all countries to the two limited natural resources viz radio frequency spectrum (RFS) and geostationary satellite orbit (GSO)".

SHARING WITH OTHER SERVICES

CHN/25/8
(3.5)

The plan should be readily adaptable to the features of various kinds of requirements (including the requirements of existing satellite systems, planned satellite systems, feeder links, etc.) and to needs arising from the development of new technology and new services during the planning period. It should also be satisfactory with respect to sharing criteria between planned and unplanned space services.

D/31/15

If a frequency band is allocated to two or more services on a primary basis, the planning of a service must not obstruct or prevent the use of this band by the other services.

RESERVATION OF RESOURCES

AUS/7/6
(ii)

In the case of unsatisfied demands, unused orbit/spectrum allotments constitute an overall loss of benefit to all users and potential users of satellite systems, and therefore access to resources should not be restricted by long term reservations.

DURATION OF THE PLAN

AUS/7/8

Australia proposes that frequency assignments to space stations using the geostationary satellite orbit, (GSO), should be reviewed at periods of not less than 10 years and not more than 15 years.

J/39/3
(2)

Any plan must have the period of time when the plan is effecting. New or unforeseen requirements arising during the effective time of the plan should be accommodated.

ARG/101/3
(3)

to base the planning process on administrations' requirements to be brought into service or notified only during the period between two consecutive orbit planning conferences;

"IND/54/
(4.4)

The period for which a plan is formulated should be short enough to provide the necessary flexibility for adopting appropriate and feasible new technology and also long enough to avoid frequent changes when could result in economic and operational penalties in certain situations. From these considerations, the Indian Administration proposes that an a priori plan covering a period of 7-10 years would be appropriate for the FSS in the bands specified in our proposals"

PROVISIONS FOR MULTI-ADMINISTRATION NETWORKS

AUS/7/7

Australia proposes that the use of multi-administration satellite systems should be encouraged through the incorporation of specific provisions relating to their orbit/spectrum allotments into whatever planning principles and criteria for the efficient and economical utilisation of the orbit/spectrum resource are adopted by WARC-ORB (1).

G/18/5.11

Recognising also that international cooperation in the provision of space systems is one way of accelerating access to space radio-communications the Union should seek to foster and encourage such cooperation for those administrations which wish to participate therein.

D/31/1

The requirements of such satellite systems with global and regional service areas, which are different from those of national satellite systems covering only limited national areas, should be given due consideration in line with their great importance.

D/31/2

The continued use and development of such satellite systems after the Conference must be ensured.

ACCOMMODATION OF EXISTING SYSTEMS

D/31/4

Operating space communication systems, radio networks and stations using the geostationary-satellite orbit

- must not be restricted without reasons that are acceptable to the administrations concerned
- must, however, not acquire any permanent titles to particular frequencies or orbital positions.

YUG/78/2
(4-c)

within any planning procedures, the existing FSS systems should be adequately protected and incorporated in the plan.

ACCOMMODATION OF EXISTING SYSTEMS (contd.)

Add to
IND/54/5
(4.1)

"It is necessary to include in the category of existing systems, those which are under coordination under Article 11 or whose frequency assignments are registered in the MIFR in accordance with Article 13".

ADAPTABILITY TO CONSIDER DIFFERENT REQUIREMENTS AND ADVANCES IN TECHNOLOGY

AUS/7/6
(iii)

To allow for technological innovations which improve efficiency of use of the GSO and for changes in service requirements, sufficient flexibility must be built into the planning method.

G/18/2

Relating to a global approach to planning for the fixed satellite service. The first session of the WARC-ORBIT should actively seek a planning approach of a flexible, dynamic and evolutionary nature which will be capable of satisfying changes in both national and international requirements for use of the spectrum and the orbit and can incorporate the benefits that will flow from

improvements in technology. The principles and guidelines for these planning approaches should be prepared in accordance with agenda items 2.3, 2.4 and 2.5.

G/18/3

Relating to maximising the capacity of the orbit and the bands allocated to the fixed-satellite service. The first session of the WARC-ORBIT should, having regard to timing and economic factors, seek all available means of maximising the capacity of the orbit and the fixed-satellite service bands by recommending the adoption of new resource-enhancement techniques. These can then be introduced progressively. (See also G/18/15-20).

G/18/4

Relating to the space services and frequency bands to be planned. The first session of the WARC-ORBIT should concentrate mainly on the fixed-satellite service, on the 4/6 and 11-12/14 GHz bands allocated to that service, and should work on the assumption of a continued growth in demand for intercontinental services and a further growth in demand for national and regional services. These assumptions should be the basis for the selection of optimal planning methods for application during the next ten years or so.

ADAPTABILITY TO CONSIDER DIFFERENT REQUIREMENTS AND ADVANCES IN TECHNOLOGY (contd.)

G/18/5.1

Under the International Telecommunication Convention and the Radio Regulations all administrations, members of the ITU, are of sovereign equality and all planning approaches must reflect this reality, accordingly;

a) All planning approaches must operate equitably, ie without advantaging or disadvantaging any administration or group of administrations vis-a-vis any others;

b) All regulatory and technical procedures must operate impartially on those space systems, networks, frequency assignment proposals and orbital location proposals that fall within their scope;

G/18/5.2

Space systems, networks and stations in operation using the geostationary-satellite orbit constitute very large operational and economic investments which must not be disturbed without good reason. Risks of future disturbance should as far as possible be foreseen and minimised;

G/18/5.3

At the same time, systems, networks and stations in operation using the geostationary-satellite orbit must not acquire permanent title to particular frequencies or orbital locations;

Add to
IND/54/5
(4.4)

"The plan should be based on feasible, applicable and suitable technologies which are well proven and widely available in the time frame involved (IND/54/6).

The plan should be based on requirements taking into account the effective use of satellite systems for applications for which they are best suited (para 4.3)".

ARG/101/3
(5)

to use, as far as possible, uniform technical parameters and criteria to reduce the range of different systems and facilitate the introduction of new technology;

FLEXIBILITY

AUS/7/6
(iii)

To allow for technological innovations which improve efficiency of use of the GSO and for changes in service requirements, sufficient flexibility must be built into the planning method.

G/18/2

Relating to a global approach to planning for the fixed satellite service. The first session of the WARC-ORBIT should actively seek a planning approach of a flexible, dynamic and evolutionary nature which will be capable of satisfying changes in both national and international requirements for use of the spectrum and the orbit and can incorporate the benefits that will flow from

improvements in technology. The principles and guidelines for these planning approaches should be prepared in accordance with agenda items 2.3, 2.4 and 2.5.

[NOTES 1 and 2]

G/18/3

Relating to maximising the capacity of the orbit and the bands allocated to the fixed-satellite service. The first session of the WARC-ORBIT should, having regard to timing and economic factors, seek all available means of maximising the capacity of the orbit and the fixed-satellite service bands by recommending the adoption of new resource-enhancement techniques. These can then be introduced progressively. (See also G/18/15-20).

G/18/4

Relating to the space services and frequency bands to be planned. The first session of the WARC-ORBIT should concentrate mainly on the fixed-satellite service, on the 4/6 and 11-12/14 GHz bands allocated to that service, and should work on the assumption of a continued growth in demand for intercontinental services and a further growth in demand for national and regional services. These assumptions should be the basis for the selection of optimal planning methods for application during the next ten years or so.

[NOTES 1 and 2]

FLEXIBILITY (contd.)

G/18/5.1

Under the International Telecommunication Convention and the Radio Regulations all administrations, members of the ITU, are of sovereign equality and all planning approaches must reflect this reality, accordingly;

a) All planning approaches must operate equitably, ie without advantaging or disadvantaging any administration or group of administrations vis-a-vis any others;

b) All regulatory and technical procedures must operate impartially on those space systems, networks, frequency assignment proposals and orbital location proposals that fall within their scope;

[NOTES 1,2]

G/18/5.2

Space systems, networks and stations in operation using the geostationary-satellite orbit constitute very large operational and economic investments which must not be disturbed without good reason. Risks of future disturbance should as far as possible be foreseen and minimised;

[NOTES 1,2]

G/18/5.3

At the same time, systems, networks and stations in operation using the geostationary-satellite orbit must not acquire permanent title to particular frequencies or orbital locations;

[NOTES 1,2]

G/18/5.4

Recognising the pace of technological developments in space radiocommunications, any planning methods adopted must provide scope for the progressive introduction of new and improved techniques;

[NOTES 1,2]

CHN/28/17

The Chinese Administration is of the opinion that certain portions of frequency bands in the planned frequency bands should be reserved for accommodating unforeseen requirements within the planning period, so as to make the plan more adaptable.

Generally speaking, unforeseen requirements can be accommodated by reserving certain portions of the frequency bands or orbital arcs in the planning process. However, since countries have different geographical locations, it is difficult in practice to determine how many service arcs are to be reserved and at what positions. Therefore reservation of appropriate bands in the planned frequency bands may solve these problems and would also make for more convenient management and utilization. With regard to the regulatory procedures for these reserved frequency bands, please refer to Document 29 of WARC-ORB-85 submitted by the Chinese Administration.

FLEXIBILITY (contd.)

J/39/3(2)

Any plan must have the period of time when the plan is effecting. New or unforeseen requirements arising during the effective time of the plan should be accommodated.

COMP/53/2

That the WARC-ORBIT 1 should for the generality of fixed-satellite services in the bands at 4/6 GHz and 11-12/14 GHz seek to develop a flexible planning method in order to ensure equitable access to the orbit for all countries as and when they are ready for that step.

ARG/101/3
(4)

to ensure that the Plan application procedures allow for the inclusion of new requirements and modifications to existing allotments and assignments, in accordance with the modification procedures adopted by the Conference;

EQUITABILITY

DELETE CHN/25/1 (3.1.1)

EFFICIENCY

AVS/7/6
(iv)

Multi-lateral co-ordination procedures should be based on technical standards in the Radio Regulations that will ensure efficient utilisation of the GSO.

G/18/5.7

Concentrating space systems and networks of similar characteristics (eg in terms of spectral power density and sensitivity to interference) represents the most homogeneous and efficient use of spectrum and orbital resources, and any planning methods adopted must encourage homogeneous orbit and spectrum utilisation, especially in the more heavily used frequency bands and orbital sectors;

EFFICIENCY (contd.)

CHN/25/2

applicable advanced techniques should be employed as far as possible;

CHN/25/3

having regard to the development of technology, appropriate modifications should be made to the system-oriented technical criteria in such a way as to secure service quality;

CHN/25/4

appropriate computer programs should be used;

CHN/25/5

unified technical parameters, technical criteria and other technical measures should be used as far as possible, with a view to reducing inhomogeneities between satellite systems.

CHN/25/6

Account should be taken of both efficiency and economy in adopting techniques and technical criteria for planning. In other words, when the techniques and technical criteria for planning are adopted, prior consideration should be given to the efficient utilization of the geostationary-satellite orbit/spectrum and to more mature and less costly techniques acceptable to the majority of countries. In the meantime, all countries should be encouraged to introduce more advanced techniques calculated to promote the planning and efficient use of the geostationary-satellite orbit/spectrum.

OTHERS

G/18/5.9

Regulatory procedures applicable to space services using the geostationary-satellite orbit must be effective and efficient in operation, as simple as possible to understand and apply, and economical in their demands on administrative and technical personnel. Such procedures must also:-

- a) Provide the maximum possible assurance that new systems and networks requiring access to the spectrum and the orbit will in fact achieve that access;
- b) Ensure that access is achieved with no more disturbance than is acceptable to existing systems, space or terrestrial;
- c) Ensure the same status for new space systems and networks as for existing systems and networks in terms of international recognition and freedom from harmful interference;

G/18/5.10

Recognising the disparity between the technical resources available to different administrations and groups of administrations, those in need of special assistance for the purposes of the coordination procedures must be assured that it will be available from the ITU consistent with the resources of the Union;

OTHERS (contd.)

J/39/3
(1)

Any plan should be drawn based on the requirements submitted by each administration. The requirements should be based upon concrete and realistic plan on the use of the GSO/spectrum.

J/39/3
(7)

Any plan drawn up at the Conference shall be realistic enough to be implemented.

IRQ/87/6

An equal "Total Bandwidth" in the FSS bands 4/6, 7/8, 11 - 12/14 GHz to be associated with the orbital positions as in IRQ/87/5 should be allotted on an equal basis to each country. This "Total Bandwidth" and the selection of its constituent sub-bandwidths in the above FSS bands should be decided upon by the Conference.

IRQ/87/10

The right to utilize the allotted orbital positions and the associated frequencies as stated in IRQ/87/5 and IRQ/87/6 should be considered as an acquired and internationally recognized right. However, these allotments may be changed by a competent administrative conference if it becomes necessary to revise the plan.

MEX/96/28
(4)

The orbit/spectrum resource is a limited natural resource and therefore subject to possible saturation.

MEX/96/28
(4)

Accordingly, the Conference should pay particular attention to the special needs of the developing countries.

MEX/96/28
(6)

Likewise, in order to facilitate access to space radiocommunications for the developing countries, the establishment of subregional common user systems should be promoted.

ARG/101/3
(2)

to guarantee, in practice, equitable access to the geostationary-satellite orbit and the frequencies allocated to each of the space services to be planned for use by all countries or groups of countries, taking account of the needs of the developing countries;

LBV/103/1

a national allotment plan based on the principle of satisfying only national requirements, guaranteeing each country an orbital position and an overall bandwidth capable of satisfying all its telecommunication needs;

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/27-E

19 August 1985

Original: English

WORKING GROUP 5A

Note by the Chairman

The proposals on planning principles, presented to Working Group 5A, have been analysed and assembled under broad topics. The attached listing is as accurate as possible.

F.S.C. PINHEIRO
Chairman of Working Group 5A

Annex: 1

A N N E X

GUARANTEE OF ACCESS

- USA/5/7
(1)
An Administration's requirement for access shall be accommodated when needed.
- AUS/7/6
Radio frequencies and the GSO are limited natural resources to which access should be guaranteed on an equitable basis for all countries able to utilize these resources efficiently and economically.
- URS/9/3
(a)
to guarantee for all countries equitable access to the geostationary orbit and the frequency bands allocated to the space services utilizing it;
- E/10/2
(IV.15)
Many international documents already emphasize that one of the most important objectives of any planning process envisaged by the Conference would be to secure the most efficient and economical possible use of the orbit/spectrum resource in order to guarantee all countries equitable access to the geostationary-satellite orbit and the frequency bands allocated to space services.
- SEN/17/3
the guarantee in practice of equitable access to the geostationary-satellite orbit (GSO);
- KEN/20/
2.1 (L)
The users of GSO must ensure that all countries or groups of countries shall be guaranteed appropriate orbital slots and the associated frequencies as and when required.
- D/31/3
make sure that new space systems and radio networks which require access to the frequency spectrum and geostationary-satellite orbit are actually granted access,
- CAN/35/1
In accordance with the International Telecommunication Convention and with the Radio Regulations annexed thereto, the use of the geostationary-satellite orbit must be based on the principle of guaranteeing in practice for all countries, equitable access to the geostationary-satellite orbit and to the frequency bands allocated to the space services utilizing it. Effort must be made to also achieve an efficient utilization of the orbit and spectrum, account being taken of the need for access and technical and economical constraints.

- CME/36/
4(2) the radio frequency spectrum and the GSO are limited natural resources which belong to all mankind and equitable access to which must be guaranteed for all countries;
- B/37/1 - to guarantee, in practice, for all countries, equitable access to the GSO/ spectrum resources; and
- IND/54/5
(4.7) The plan should provide for procedures for guaranteeing the accommodation of any newcomer and also unforeseen requirements of administrations during the period of validity of the plan.
- CHL/59/2 Any planning method adopted by WARC-ORB-85 shall take due account of Article 33 of the International Telecommunication Convention and Resolutions Nos. 2 and 3 of WARC-79, in order to guarantee in practice for all countries equitable access to the geostationary-satellite orbit and the frequency bands allocated to space services.
- CLM/70/
(general) Basically, the outcome must be to safeguard in practice equal access for all countries to the OSR, having regard to the rights, interests and special needs of the developing countries.
- IRQ/87/5 At least one "optimal Orbital Position" and the associated frequencies as in IRQ/87/6 should be allotted for all countries on an equal basis to meet their national telecommunication requirements.
- MEX/96/28/
(3) All countries, whatever their level of technological development, have the right of access to the orbit/spectrum, on the basis of the principles of justice and equity and taking into account their present and future needs.
- MLA/82/1(4)
SNG
THA An administration's requirement for access to the geostationary satellite orbit (GSO) and frequency bands shall be accommodated on the basis of both actual and planned requirements.
- YUG/78/5) The essential objective of the WARC-ORB is to guarantee, in practice, for all countries, equitable access to the geostationary-satellite orbit and to the frequency bands allocated to the space services.

ARG/101/
3(2)

to guarantee, in practice, equitable access to the geostationary-satellite orbit and the frequencies allocated to each of the space services to be planned for use by all countries or groups of countries, taking account of the needs of the developing countries;

COMP/110/
3(5a.3)

All countries should in practice be guaranteed equitable access to the orbit of geostationary satellites and the frequency bands allocated to space services. If it is not possible to plan all the bands and services, for special reasons such as the fact that they are not intensively used, it will be necessary to introduce rules to avoid an inequitable situation, such as that which currently obtains for the fixed-satellite service (FSS) and the lower frequency bands.

PHL/120/
2(1)

An administration's requirement for access to the geostationary-satellite orbit (GSO) and frequency bands shall be accommodated on the basis of both actual and planned requirements.

SHARING WITH OTHER SERVICES

USA/5/7
(11)

The rights of all radio services, particularly with respect to primary allocations in the band of concern, shall be honored in any planning approach.

AUS/7/6
(vii)

The planning procedures should not place additional constraints on other services sharing the relevant frequency bands in accordance with the Radio Regulations.

F/11/6

In the event of sharing between terrestrial and satellite service enjoying primary status, planning should recognize the principle of equality of rights between these two services.

G/18/5.8

Where frequency bands allocated to one space service using the geostationary-satellite orbit are also allocated to other space services and/or to terrestrial services on an equal primary basis any planning methods adopted must fully respect the equality of rights to operate in these bands;

D/31/5

In the case of frequency bands allocated to both space and terrestrial services of the same status, all the planning procedures must fully respect the equality of rights of both types of service in these frequency bands.

B/37/12
(g)

Due consideration must be given to services sharing the same frequency band, taking into account RR Section II of Article 8.

J/39/3
(5)

Any plan shall protect the right of other services allocated in the same frequency band on a co-equal primary basis.

ARG/101/
3(8)

to respect the rights of all services sharing bands on a primary basis with the services to be planned and of services which have already been planned.

COMP/110/
3(5b.6)

When the plan is established, the restrictions imposed on space services sharing the same frequency bands allocated on a primary basis to terrestrial services should be complied with, or else measures similar to those currently in force should be taken.

RESERVATION OF RESOURCES

CHN/28/17

The Chinese Administration is of the opinion that certain portions of frequency bands in the planned frequency bands should be reserved for accommodating unforeseen requirements within the planning period, so as to make the plan more adaptable.

IRQ/87/9

The excess capacity of the GSO/spectrum resource not utilized by the plan should be available for use for all countries and regional or global satellite organizations in accordance with a "Modified Radio Regulations" which should be established by the Conference. Such use shall not affect the planned networks beyond the specified limits adopted by the drawing of the plan.

PHL/120/5

The planning method should allocate the frequency/orbit resource to the fullest without any spare capacity reserved.

MLA/82/4

SNG (4.1)
THA

The planning method should allocate the frequency/orbit resource to the fullest without any spare capacity reserved.

DURATION OF THE PLAN

G/18/66)

The conclusions in paragraphs 3 and 5 above are of course not sufficient on their own since the WARC ORBIT must look ahead for a reasonable period of years and try to foresee the growth in the various space services using the orbit. From this the WARC must also try to identify the problems that are likely to arise. In this context the timescale to be considered by the WARC deserves some clarification. Considering the pace of developments of space services generally and the fact that the radio regulatory regime for space services was first established by the WARC 1963, revised by the WARC 1971, again revised by the WARC 1979, and will be further examined by the WARC 1985/1988, a period of not more than 10 years should be envisaged. This would incidentally embrace the maximum foreseen lifetime of the more modern types of satellites.

CHN/25/7

The planning period should be suited to the renewal of satellite techniques and should contribute to the accurate forecasting of service requirements. The planning period should not be too short, as this is not favourable for planning.

CLM/70/
7(2)

that the medium-term plan should cover a period of ten years, coinciding with the interval between successive conferences, and that it should consist of three stages: submission of requests, harmonization and implementation;

GHA/77/5

Ghana proposes a firm predetermined equitable allotment of the GSO and the frequency bands allocated to the FSS based on "planning method 7" of the CPM Report (chapter 5, Annex 4, section 4.4.8) that is, a world-wide plan covering one satellite generation lifetime (about 10 years) using the requirements submitted by administrations as a basis for optimizing satellite orbit positions, beam shapes, frequency assignments, etc., on a world-wide scale.

MLA/82/2
SNG (2)
THA

The planning period should correspond to the life-time of a satellite i.e. about ten (10) years.

PHL/120/
3(2)

The planning period should correspond to the lifetime of a satellite i.e. about ten (10) years.

SPECIAL GEOGRAPHICAL SITUATIONS

CAN/35/27
(7.2.7)

The regulations must take into account the special geographical situation of particular countries or groups of countries.

KEN/63/
1(a)

The geostationary orbit is a limited natural resource which shall be preserved in the interests of all states, taking into account the needs of the developing countries and the rights of the equatorial states.

-
- 1) Interpretation of special geographical situation in the context of equatorial countries, as affecting fundamental planning principles.

YUG/78/
2(4.b)

special attention should be given to the international global and regional systems and to the systems of countries with a special geographical situation;

COMP/110/
3(5b.9)

The plan should take into account the relevant technical aspects of the special geographical situation of certain countries.

PROVISIONS FOR MULTI-ADMINISTRATION NETWORKS

USA/5/7/
(27.2)

The option for an Administration to satisfy its requirements through participation in a common user system shall be available.

AUS/7/6
(v)

For reasons of efficiency of use of the GSO, use of multi-user satellite systems to meet the needs of several countries through a common regional system should be encouraged.

NZL/8/
(2.3.1)

The growth of the fixed-satellite service (FSS) and in particular the strong trends towards regional and national systems, as shown by such systems as ARABSAT, EUTELSAT, TELE-X, TELECOM and the like require use of a planning method which permits countries within a geographic region to develop appropriate solutions for the communication needs of that region. Method [NZL] acknowledges and builds on this growth trend.

Within the broad segmentation plan appropriate orbital segments would be provided for services having connectivity requirements over several sub-regions, thereby enabling use of multi-administration networks, such as INTELSAT, etc.

E/10/2
(17)

Another important factor for Spain, already mentioned above, is the ability of the planning method to meet the requirements of administrations using the satellite networks of international organizations.

SEN/17/3

access for satellite networks serving several administrations.

CAN/35/2.8

The regulatory procedures must take into account the special needs and advantages of multi-administration systems.

B/37/12(4)

Any planning method should be able to accommodate multiadministration common user networks. These networks can contribute to satisfy the needs of many administrations in a cost effective way.

J/39/3
(Add.Cons.1)

The WARC-ORB is convened to guarantee, in practice, for all countries equitable access to the geostationary satellite orbit and frequency spectrum utilizing it. At the same time, effective and efficient use of the GSO/spectrum resources shall be sought to the maximum extent. In view —

of the above, the requirements of multi-administration systems should be considered for planning.

IND/54/
5(4.5)

The requirements of multi-administration satellite systems could be projected by any one administration acting on behalf of a group of named administrations as per the existing practice and arrangement.

CHL/59/5

The planning method adopted for the fixed-satellite service (FSS) must consider, apart from the requirements submitted by administrations to the second session of the Conference, only existing networks and systems which have successfully completed the coordination procedure by that time. Our Administration therefore considers that as well as giving priority to the requirements of all administrations, the planning method must also take due account of the requirements of international satellite telecommunication organizations with world-wide coverage, such as INTELSAT and INMARSAT. Account must also be taken of the requirements of regional and subregional systems.

GRC/74/1

The Conference should recognize the important role played by the international telecommunication satellite organizations so that these organizations will continue to be able to provide reliable and high quality telecommunication services.

GHA/77/2

give particular attention to the requirements of the multi-carrier organizations such as INTELSAT, INTERSPUTNIK, INMARSAT, EUTELSAT and ARABSAT so that they can continue to provide the world's communications services. In order to achieve this objective, they should be guaranteed adequate orbit/spectrum resources for their orderly growth and development.

ALG/75/15

The Conference should guarantee the operational continuity of existing international and regional systems.

YUG/77/2
(4.b)

special attention should be given to the international global and regional systems and to the systems of countries with a special geographical situation;

MLA/84/3
SNG (3.1)
THA

The planning method should guarantee that the GSO and frequency bands allocated to the space services utilizing it would be allotted to all countries on an equitable basis with the option open to administrations to use an orbital slot(s) individually or participate in common user or multi-administration satellites as an avenue to achieve this access.

IRQ/87/12

The use of orbital positions and the associated frequencies outside the plan by global and regional satellite networks should be regulated by special provisions that should be established by the Conference in order to provide, to the extent possible, service continuity to the countries utilizing these networks.

CTI/95/2

to give priority to international and regional systems which may satisfy the requirements of several administrations;

MEX/96/28
(5)

There are international organizations which promote the development of space services for the benefit of a number of Member States, and the requirements of these common user systems should therefore be taken into account for international traffic.

BFA/104/1

take into account existing networks, particularly the international networks serving several countries;

COMP/110/3
(5b.4)

The plan should allow for the proper functioning of networks in which several administrations take part. Moreover, multi-administration networks should not interfere in any way with efforts to establish networks of individual administrations, especially in developing countries.

PHL/120/4(3)

The planning method should guarantee that the GSO and frequency bands allocated to the space services utilizing it would be allotted to all countries on an equitable basis with the option open to administrations to use an orbital slot(s) individually or participate in common user or multi-administration satellite as an avenue to achieve this access.

ACCOMMODATION OF EXISTING SYSTEMS

- USA/5/7/1
(27.4) Existing satellite networks of Administrations, including those under active development, shall be accommodated.
- (27.5) Any planning approach shall aim to maintain the continued viable operation of existing space systems; in particular, changes involving economic or operational impact shall be minimized.
- (27.6) Any planning approach shall provide for continuity of established service through replacement of satellites, including those that prematurely fail.
- AUS/7/6
(vi) Existing satellite networks should be accommodated for the duration of their designed operational life.
- URS/9/3
(c) existing systems and systems registered before planning begins in the frequency bands to be planned should be included as an integral part of the Plan.
- G/18/5.2 Space systems, networks and stations in operation using the geostationary-satellite orbit constitute very large operational and economic investments which must not be disturbed without good reason. Risks of future disturbance should as far as possible be foreseen and minimised;
- G/18/5.3 At the same time, systems, networks and stations in operation using the geostationary-satellite orbit must not acquire permanent title to particular frequencies or orbital locations;
- D/31/3 ensure that the new services' access will cause as little disturbance as possible to existing space or terrestrial services notified to the IFRB,
- CAN/35/2.5 7.2.5 Space stations that are existing at the time of the second session of the conference must be accommodated for the remainder of their notified operational lifetime without change.

B/37/11
(c)

Existing networks should have an adequate and realistic treatment. Modifications of their parameters should be considered only to the extent that they are necessary to enable access of a new system to the GSO/spectrum resources, as indicated in b) above. Existing network is understood as any coordinated, notified or operating network.

ALG/75/17

Existing or projected systems (notified to the IFRB) other than international and regional systems would be taken into consideration when the Plan is prepared and would not be entered in the Plan.

BFA/104/1

Take into account existing networks, particularly the international networks serving several countries;

J/39/3
(3)

In any plan account should be taken of the protection and continuity of services of the existing or planned systems at the time of the planning.

IND/54/5
(4.1)

A plan should be based on the requirements projected by administrations. All requirements, covering both existing networks and projected ones of administrations should be given appropriate treatment in order to ensure that the provisions of Article 33 of the Convention are given a practical shape. In this process, the existing systems may also have to adjust some of their parameters, if required, along with those of a new entrant. However, there is a necessity to keep these adjustments to the minimum, so that operating systems are not adversely affected. The scope and extent of such an adjustment could also be defined wherever possible.

GHA/77/1

Ghana proposes that protection should be given to existing and planned common carrier systems that provide global communications to the extent that they are not adversely affected by the decisions adopted by WARC-ORB-85.

MLA/82/5
SNG
THA

5.1 An existing system is defined as a system which is in operation during the planning of the first plan.

For the first plan, the existing systems will be accommodated within the planning period of about ten years with minimum disruption being guaranteed. For subsequent plans, new and existing systems will be planned on an equal basis.

COMP/110/3
(562)

The plan should cause minimum disturbance to networks which are in service or currently in a stage of active development. Nevertheless, networks in service shall share the burden of interference problems arising from the introduction of new networks.

IRQ/87/7

The planning process should afford protection to all operational satellite networks and those which are notified to the IFRB for "Advanced Publication" in accordance with the present Radio Regulations at a date before 8 August 1985 but not earlier than 8 August 1980. This protection should be afforded until the end of the network's satellite lifetime, or until 8 August 1995, whichever comes first.

PHL/120/6 5. An existing system is defined as a system which is in operation when the plan comes into force.

For the first plan, the existing systems will be accommodated within the planning period of about 10 years with minimum disruption being guaranteed. For subsequent plans, new and existing systems will be planned on an equal basis.

CHN/25/1 3.1.2 that the requirements for existing and planned satellite systems submitted by all administrations are placed on an equal footing in the planning process and are dealt with according to the unified rules and procedures developed by the Conference;

ARG/101/3
(4) to ensure that the Plan application procedures allow for the inclusion of new requirements and modifications to existing allotments and assignments, in accordance with the modification procedures adopted by the Conference;

DIFFERENT PLANNING SOLUTIONS IN DIFFERENT CIRCUMSTANCES

AUS/7/3

Australia proposes that, taking into account regional and sub-regional differences in orbit/spectrum requirements, different planning approaches should be considered for different Regions and sub-regions, where appropriate.

B/37/3

Taking into account, i.e., the particulars of the administrations' requirements and the degree of occupancy of the GSO, different planning methods may be considered for use in different circumstances, in order to accommodate a wider range of requirements.

IND/54/
(2.1)

As far as the FSS is concerned, there are growing requirements of administrations for use of frequency bands around 4/6 GHz and 11/14 GHz, respectively referred to as C-band and Ku band. Figure A-3-2 of the CPM Report may also be referred to in this context. Some portions of the GSO are, no doubt, more congested than others but the satellite population is rapidly increasing on a world-wide basis, except for a few portions of the orbit. It would, therefore, be essential to plan use of these frequency bands by the FSS on a world-wide basis. The operation of any satellite system may have an impact on other systems even if they are not located in the same region. The interaction among the satellite systems is thus close and extensive and it would be only realistic and logical that a plan for this service be attempted on a world-wide basis. Further, any planning exercise, restricted to one or more portions of the orbit, could result in ineffective utilization of the GSO.

ADAPTABILITY TO CONSIDER DIFFERENT REQUIREMENTS AND ADVANCES IN TECHNOLOGY

USA/5/7
(27.3)

Any planning approach shall provide a means to accommodate changing requirements of Administrations while also providing for the need to minimize disruption of existing networks.

(27.9)

Any planning approach shall be adaptable to the introduction of new technology.

(27.10)

Any planning approach shall be capable of accommodating a broad range of technical and operational requirements.

F/11/3

The planning procedure adopted by the Conference must be sufficiently flexible to allow for the development of space techniques and operating requirements.

G/18/5.4

Recognising the pace of technological developments in space radiocommunications, any planning methods adopted must provide scope for the progressive introduction of new and improved techniques;

CHN/25/8

The plan should be readily adaptable to the features of various kinds of requirements (including the requirements of existing satellite systems, planned satellite systems, feeder links, etc.) and to needs arising from the development of new technology and new services during the planning period. It should also be satisfactory with respect to sharing criteria between planned and unplanned space services.

D/31/3

allow new and improved technologies to be introduced in line with the technological development of space radiocommunication,

CAN/35/
2.2

Any spectrum/orbit regulatory regime must not restrict the introduction of new technologies that are spectrum/orbit-efficient.

B/37/12
(d)

-allow for modifications of technical parameters and for technological innovations recommended by CCIR and agreed by the concerned parts, which improve the efficiency of use of the GSO.

ADAPTABILITY TO CONSIDER DIFFERENT REQUIREMENTS AND ADVANCES IN TECHNOLOGY

J/39/3
(6)

Any plan shall be able to accommodate future systems with diversified parameters and applications and be adaptable to the introduction of the most advanced satellite communications technology.

IND/54/5
(4.4)

The period for which a plan is formulated should be short enough to provide the necessary flexibility for adopting appropriate and feasible new technology and also long enough to avoid frequent changes which could result in economic and operational penalties in certain situations.

CTI/35/2

Take account, for the duration of the plan, of technological progress making it possible to reduce satellite spacing and increase the capacity of satellites without increasing their size;

MLA/82/10 10.

SNG

THA

10.1 Any planning approach should allow for changing requirements of an administration such as changes in service requirements.

FLEXIBILITY (NOTES 1 TO 4)

AUS/7/4 Australia proposes that any planning method adopted which allots frequencies and associated orbital positions to an Administration, should include provision such that for allotments that are not immediately required by that Administration, another Administration may be permitted to use the allotments for the intervening period. [NOTE 3]

E/10/2
(16) This means using, as far as possible, the most advanced technologies and making sure that the plan produced is able to handle new requirements and the technological developments which take place from one generation of satellites to the next (about every 10 years). [NOTE 4]

G/18/5.5 Recognising also the increasing diversity in the operational applications of space radio-communication, any planning methods adopted must provide scope for the accommodation of new operational applications of space radiocommunications; [NOTE 1]

KEN/20/
(2.4.2) For efficient utilisation of the resources to be planned Administration provided for in the plan but unable to implement their allotments shall be consulted directly by other Administrations wishing to implement satellite networks on their allotments with a view of temporarily relinquishing their allotments. [NOTE 3]

GHA/7/6 For maximum and efficient utilization of the allotments, Ghana proposes that it should be possible for allotments that are not used by an allottee to be used by another administration(s) subject to mutual agreement. [NOTE 3]

CAN/35/
2.4 The regulations must enable the introduction of systems with technical characteristics which differ from those considered in the formulation of the regulations. [NOTE 2]

CME/36/4
(3) Cameroon proposes that any planning method adopted for the allotment of radio frequencies and associated orbital positions to an administration should be such that another administration may, through negotiation, use the allotments for which the first administration has no immediate need. [NOTE 3]

allotments of the orbit/spectrum resource unused by one party shall be used by other parties after negotiation;

FLEXIBILITY

B/37/12
(1) allow for new or unforeseen requirements, or modifications of requirements; and [NOTE 1, 4]

ALG/75/10
Any country allotment not yet used by the country must be able to be used by another country, in whole or in part, under procedures which guarantee the rights of the country for which the allotment is entered in the Plan. [NOTE 3]

IND/54/5
(4.7) The plan should provide for procedures for guaranteeing the accommodation of any newcomer and also unforeseen requirements of administrations during the period of validity of the plan.
[NOTE 4]

COMP/110/
3(5b.3) The plan should make provision for unforeseen networks or unforeseen traffic demand. [NOTE 4]

NOTES

- 1) Allow accommodation of new requirements
- 2) Implement systems which are different from those taken into account at the time of establishing the plan or in the formulation of the regulations
- 3) Use of an other administration's allotments under appropriate agreements
- 4) Flexibility for accommodation of unforeseen requirements

EQUITABILITY

AUS/7/6
(1)

Radio frequencies and the GSO are limited natural resources to which access should be guaranteed on an equitable basis for all countries able to utilize these resources efficiently and economically.

URS/9/3
(a)

guarantee for all countries equitable access to the geostationary orbit and the frequency bands allocated to the space services utilizing it;

E/10/2
(15)

Many international documents already emphasize that one of the most important objectives of any planning process envisaged by the Conference would be to secure the most efficient and economical possible use of the orbit/spectrum resource in order to guarantee all countries equitable access to the geostationary satellite orbit and the frequency bands allocated to space services.

SEN/17/3

guarantee in practice of equitable access to the geostationary-satellite orbit (GSO);

G/18/5.1

All planning approaches must operate equitably, ie without advantaging or disadvantaging any administration or group of administrations vis-a-vis any others;

All regulatory and technical procedures must operate impartially on those space systems, networks, frequency assignment proposals and orbital location proposals that fall within their scope;

KEN/20/
(2.1-iv)

The GSO is a limited natural resource which shall be preserved and used in the interests of all countries, taking into account the needs and rights of all countries.

CHN/25/1
(3.1.1)

all administrations have equal status in submitting the actual requirements for their space services;

D/31/3

work in a way ensuring that no administration or group of administrations will have any advantage or disadvantage over another administration or group of administrations,

EQUITABILITY

CME/36/4
(4) the planning method must take account of the right of equitable access for all countries to the orbit/spectrum resource.

B/37/1
(6) Guarantee, in practice, for all countries, equitable access to the GSO/spectrum resources; and

J/39/
(OVERVIEW) - equitable access to the GSO/spectrum

COMP/53 (2) Main problem facing the WARC, ie that of ensuring equitable access to the orbit and spectrum. In

IND/54/5
(4) As recalled earlier, the most important objective in convening the WARC-ORB is to guarantee, in practice, equitable access for all countries to the two limited natural resources viz. radio frequency spectrum (RFS) and geostationary satellite orbit (GSO). The important role played by multi-administration satellites in improving telecommunications at international and/or regional levels has to be recognized. Similarly, the need for multiservice/multiband satellites

CHL/59/2 Any planning method adopted by WARC-ORB-85 shall take due account of Article 33 of the International Telecommunication Convention and Resolutions Nos. 2 and 3 of WARC-79, in order to guarantee in practice for all countries equitable access to the geostationary-satellite orbit and the frequency bands allocated to space services.

GRC/74/2 WARC 85/88 should give appropriate recognition and consideration in the requirements of such satellite systems in any planning method adopted, consistent with the best and most equitable use of the radio frequency spectrum and the GSO.

GHA/77 (2) In the interest of international cooperation in the field of satellite communications and for the sake of world peace and understanding, all countries of the world should have equitable access to the GSO.
(General Comments)

COMP/110/3
(5 a. 2) Any plan for the use of the orbit/spectrum resource should respect the right of all peoples to create, store, process, receive and transmit information.

CHN/25/1
(3.1.1)

All administrations have equal status in submitting the actual requirements for their space services;

F/11/1

Planning procedures should not cause advantage or disadvantage to a country or a group of countries, since all countries have equal right of access to the geostationary-satellite orbit.

MEX/96/28

3. All countries, whatever their level of technological development, have the right of access to the orbit/spectrum, on the basis of the principles of justice and equity and taking into account their present and future needs.

MLA/82/9

SNG

THA

9.1 Any planning approach should recognize the fundamental principle that all countries have equal rights to satisfy their telecommunication requirements.

EFFICIENCY

- USA/5/7
(27-7) Any planning approach shall, in satisfying the requirements, progressively achieve more efficient use of the GSO/spectrum resource consistent with each space system's technical, operational, or economic factors.
- (27-8) Any planning approach shall be capable of increasing orbit/spectrum capacity by reducing satellite orbital separations and/or by increasing the reuse of orbital positions. These techniques shall be applied in response to demand and to the extent feasible under prevailing technical operational and economic conditions.
- URS/9/3
(6) ensure efficient and economical use of the geostationary orbit and the frequency bands allocated to space services;
- E/10/2
(15) Many international documents already emphasize that one of the most important objectives of any planning process envisaged by the Conference would be to secure the most efficient and economical possible use of the orbit/spectrum resource in order to guarantee all countries equitable access to the geostationary satellite orbit and the frequency bands allocated to space services.
- ARG/101/3
(5) Use, as far as possible, uniform technical parameters and criteria to reduce the range of different systems and facilitate the introduction of new technology;
- F/11/4 Since frequencies and the geostationary-satellite orbit are a limited resource, the procedure selected should maximize the orbit/spectrum resource by avoiding unnecessary constraints.
- MEX/96/28 2. This resource should be utilized rationally, efficiently and economically, for the benefit of the international community as a whole.
- SEN/17/3 the efficient use of the orbit/spectrum resource;
- G/18/5.6 Recognising further the finite limits of the frequency bands allocated to space services and the uniqueness of the geostationary-satellite orbit, any planning methods adopted must aim to maximise their joint capacity;

EFFICIENCY

KEN/20
(2.1-2.2) Optimum, efficient and economic utilisation of the orbit spectrum resources. To this end, all states shall endeavour to co-operate directly or through the United Nations and its specialised agencies and any other competent international or regional organization.

CHN/25/1 Every effort should be made to achieve efficient use of the geostationary-satellite orbit/spectrum.

PHL/120/7 6. The planning method should encourage progressive improvements in satellite technology which will help increase orbit/spectrum capacity, and which are acceptable to the majority of countries.

MLA/82/6
SNG
THA

6.1 The planning method should encourage progressive improvements in satellite technology which will help increase orbit/spectrum capacity, and which are acceptable to the majority of countries.

D/31/3 aim at utilising the frequency spectrum and the geostationary-satellite orbit as efficiently as possible as the number of usable frequency bands allocated to the space services and the capacity of the geostationary-satellite orbit are limited,

be effective and efficient with regard to operation, easy to apply and economical in its demands on the administrative and technical personnel,

CAN/35/1 In accordance with the International Telecommunication Convention and with the Radio Regulations annexed thereto, the use of the geostationary-satellite orbit must be based on the principle of guaranteeing in practice for all countries, equitable access to the geostationary-satellite orbit and to the frequency bands allocated to the space services utilizing it. Effort must be made to also achieve an efficient utilization of the orbit and spectrum, account being taken of the need for access and technical and economical constraints.

EFFICIENCY

B/37/1 (6)

Achieve the most efficient and economical utilization of the GSO/spectrum resources.

MLA/82/6
SNG

THA

(6)

The planning method should encourage progressive improvements in satellite technology which will help increase orbit/spectrum capacity, and which are acceptable to the majority of countries.

J/41

(Preface)

When

determining a planning approach, it is necessary to adopt measures which aim at not only the equitable and efficient use of the geostationary satellite orbit (GSO) and spectrum but also the flexibility of accommodating new requirements and technologies. In addition, it is essential that any planning approach seeking for better ways of using GSO will necessarily require computer processing rather than manual handling.

GHA/77/4

(Planning
principles)

Ghana urges the Conference to aim at providing efficient and economic use of the GSO to satisfy the requirements of all countries to the maximum extent possible.

ALG/75/11

Take account of technical progress

To improve the efficiency with which the orbit spectrum resource is used.

COMP/110/3

(S b.8)

It should be ensured that the plan adopted meets the requirements of administrations with regard to the OSR in the most efficient way possible from the standpoint of technical, operational and economic factors and of the needs of developing countries.

BFA/104/1

ensure optimum operation of the GSO spectrum resource while permitting the development and introduction of new technical facilities which make for reduced system costs;

PROVISIONS FOR MULTI-SERVICE AND MULTI-BAND NETWORKS

B/37/12 Any planning method should be able to accommodate multiservice and/or
(i) multiband satellite networks.

J/39/3
(Additional
considerations
-2) Considering the continuing growth of requirements,
development of large platforms and the economic factors,
multi-service or multi-frequency band satellites may become
more popular. Any plan should consider requirements of above
mentioned systems unless they may jeopardize efficient and
flexible use of the GSO/spectrum resources.

E/42/8 WARC-ORB-85 should establish the principles and consider the
technical requirements for the type of sharing between services discussed
in this document, having due regard to the rational use of the orbit-
spectrum resource;

IND/54/5
(4.5) The requirements of multiservice and/or multiband systems
could be projected by administrations for inclusion of the appropriate
elements in the development of the plan after taking into
consideration the problems/difficulties, if any, in coordinating the
unplanned service frequencies forming a part of such systems.

MLA/82/11 11. Proposal
SNG
THA 11.1 Any planning approach should consider requirements of multiservice
satellite.

SHARING OF INCONVENIENCES

USA/5/8
(29-b) assure that existing systems will continue to be accommodated as new systems are introduced and that the burden of access will be shared among all systems over time.

(29-c) provide for effective technical and operational means by which affected Administrations may resolve potential interference conflicts between networks, on a timely and equitable basis. The means provided for such conflict resolution should recognize the use of world, regional, sub-regional or bilateral forums, as appropriate;

B/37/12
(b) To guarantee the access of a new system to the GSO/spectrum resources, in the case of an on demand planning method, certain conditions should be imposed such as the sharing of inconveniences among the new proposed system and the existing systems hindering its access to the said resources.

MLA/82/8
SNG
THA Any adjustment of satellite networks arising from the need to accommodate unplanned requirements and/or improvements in technology should be within the resources of most countries.

COMP/110/3
(56.2) The plan should cause minimum disturbance to networks which are in service or currently in a stage of active development. Nevertheless, networks in service shall share the burden of interference problems arising from the introduction of new networks.

IND/54/5
(4.1) A plan should be based on the requirements projected by administrations. All requirements, covering both existing networks and projected ones of administrations should be given appropriate treatment in order to ensure that the provisions of Article 33 of the Convention are given a practical shape. In this process, the existing systems may also have to adjust some of their parameters, if required, along with those of a new entrant. However, there is a necessity to keep these adjustments to the minimum, so that operating systems are not adversely affected. The scope and extent of such an adjustment could also be defined wherever possible.

COMP/110/3
(562) The plan should cause minimum disturbance to networks which are in service or currently in a stage of active development. Nevertheless, networks in service shall share the burden of interference problems arising from the introduction of new networks.

OTHERS

AUS/7/6
(ii)

In the case of unsatisfied demands, unused orbit/spectrum allotments constitute an overall loss of benefit to all users and potential users of satellite systems, and therefore access to resources should not be restricted by long term reservations.

EQA/81
(General 4.4)

The Conference should therefore adopt a Resolution stipulating that, in designing geostationary space station coverage, all available technical means should be used to reduce radiation over the territory of other countries unless those countries have expressly agreed to it, and prohibiting any intentional coverage on which there has been no consultation.

F/11/2

International rules must be such as to allow the use of a satellite network throughout its life without such use being modified by a change in the rules.

KEN/20/6.1-v) Countries should be encouraged to use less congested bands.

(vi) States and/or international organisations operating their space objects in the GSO shall take necessary action to remove non-operational or unutilised space objects from the orbit.

ALG/75/6

The beam of a national satellite should so far as possible be able to cover neighbouring countries.

(to meet in a first stage the national and/or sub-regional requirements of neighbouring countries)

ALG/75/13

Satellites should, inter alia, be able:

- to change orbital position;
- to leave the geostationary-satellite orbit as soon as they are no longer used.

S/33/9

WARCs should be convened every 4th year, one year after the CCIR plenary, in order to include modifications to the Radio Regulations, in particular to provisions and Appendices relevant for the coordination of satellite systems, based on the latest CCIR Recommendations.

(To ensure that the Radio Regulations are based on the most recent technical methods and criteria)

CTI/95/2

Allot orbital arcs rather than assign orbital positions, in order to allow some flexibility;

IRQ/87/13

For all satellite networks whether in the plan or outside the plan, the "In-Orbit" spare satellites should utilize the same orbital positions as those of the respective primary satellites in order to avoid inefficiency and complexity in utilizing the GSO.

MLA/82/7
SNG
THA

7.1 In order to improve utilization of orbit/spectrum capacity any planning method adopted should ensure that the inactive spare satellite should be co-located with the active operational satellite.

PHL/120/8

7. In order to improve utilization of orbit/spectrum capacity any planning method adopted should ensure that the inactive spare satellite should be colocated with the active operational satellite.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/28-E

20 August 1985

Original: English

WORKING GROUP 5B

Note by the Chairman

Proposals relevant to procedures applicable to bands and services which are to be unplanned are grouped together in this document under three headings:

- I : Proposals of a general nature;
- II : Specific proposals relevant to current procedures;
- III : Proposals relevant to multilateral/periodic coordination

S.M. CHALLO

Chairman of Working Group 5B

I. Proposals of a general nature

USA/5 /10

The USA proposes that the existing articles of the Radio Regulations should be maintained for such services. However, these provisions should be carefully reviewed and modified in accordance with the following guidelines:

- a. Unnecessary steps should be eliminated to make the procedures as simple as possible;
- b. The total amount of time needed to complete the process should be as short as possible;
- c. The administrative burden on Administrations and on the Board should be as small as practicable;
- d. Guidelines should be provided on the steps to be followed in coordinating potential interference problems to insure that the burden of accommodating new networks is equitably shared by both existing and new networks;
- e. The actions required of Administrations should be stated as clearly as possible, particularly with respect to the resolution of potential interference conflicts.

USA/30 /42

The United States of America proposes that the IFRB Report be examined in detail and that an agreed list of appropriate areas of needed work be developed at the first session.

USA/30 /43

Specifically, the USA proposes consideration be given to

(b) modifying its Advance Publication and coordination phases for selected services by combining or eliminating some data elements; (c) introducing optional additional mechanisms to permit coordination to be avoided if certain criteria are satisfied,

(d) providing for the notification of typical earth stations within a service area; and (e) simplifying the Appendix 3 procedures to provide information actually used in coordination. Elaborated details on the agreed topics should be developed at intersessional meetings or at the second session.

USA/30/44 In services that are inherently more homogeneous than the FSS, the United States of America proposes consideration be given to replacing delta T/T with a spacing, isolation or ABCD-type criteria to reduce the need for extensive coordination. The criteria would likely be different for different bands and services, and in some circumstances additional criteria would have to be developed, but only the more difficult cases of r.f. carrier assignments need be coordinated (e.g. FM-TV and SCPC).

USA/30/45 To ease the burden on administrations in handling these frequency management activities, the United States of America proposes that a detailed and current set of handbooks and manuals be written in clear and simple language to assist
USA/30/46 Administrations in this process. The USA proposes that a resolution be developed to charge the CCIR or a special Panel of Experts, in conjunction with the staff of the IFRB, with the development of such a comprehensive set of handbooks and manuals.

USA/30/47 The United States of America proposes that the current coordination procedures be augmented by specific obligations to which existing system operators have to adjust their systems in order to accommodate new systems, and the procedures which new systems are expected to follow in resolving interference conflicts. In
USA/30/48 particular, the USA proposes that the current provisions of Nos., 1050-1053 of the Radio Regulations be further developed in the streamlined coordination procedures. A detailed set of such procedures reflecting past operating experiences, would be developed to insure a more equitable sharing of the burden.

AUS/7/2 Australia proposes that, for straightforward applications, the IFRB develop a simplified method for the coordination, notification and recording of frequency assignments to Stations in a Space Radiocommunication Service.

NZL/8/
para. 2.4 Noting that no definitive proposals have been received, and, with the exception of the mobile-satellite service, the MSS and EESS, this Administration has confined its comments to the broadcast satellite service feeder-links in the fixed-satellite service, New Zealand is of the view that it would be premature to comment on this agenda item, other than to recognise that existing procedures appear not to present significant problems.

URS/9/4 The current procedures in the Radio Regulations should be maintained for space services not to be planned.

E/10/4 The current regulatory procedures should continue to be used for the space services in unplanned frequency bands, subject to drafting amendments designed to overcome the problems encountered by some countries.

B/37/17 Brazil proposes that the current procedures in the Radio Regulations be thoroughly revised and modified to enable a real guarantee of equitable access to the GSO/spectrum resources. Ambiguity must be avoided and each provision should be as clear and simple as possible.

B/37/18 The Brazilian administration proposes that provisions dealing with the following aspects should make integral part of the revised procedures:

- a. period of validity of a frequency assignment;
- b. sharing of inconveniences between a new system and systems of all other affected administrations; and
- c. time limits for the conclusion of the several phases of identification, coordination and notification processes, with special regard to the interconnection between the several phases.

J/39/6 Japan proposes the existing procedures of Article 11 and 13 of the Radio Regulations should be reviewed and modified in accordance with the following guidelines.

- (1) To simplify the existing procedures,
- (2) To keep compatibility with new regulatory procedures to be introduced in the planned service and band.

CHL/59/6 Our Administration proposes that the advance publication, coordination and notification procedures described in the Radio Regulations should continue to be applied for unplanned space services and frequency bands, subject to appropriate refinements to take account of the problems encountered by the IFRB and administrations in applying these regulatory procedures.

F/76/18 The current procedure could be applied, subject to the following modifications:

- a) amendment of Appendix 4 to the Radio Regulations to include data on the various types of carrier used, taken from a standardized list;
- b) amendment of Appendix 29 to the Radio Regulations to replace the single threshold value of 4% by a variable threshold value dependent upon the standardized types of carrier of the two networks involved;
- c) review of Appendix 3 to the Radio Regulations.

GHA/77/7 Ghana recommends that, based on the conclusions of the Conference, the relevant and regulatory procedures of the IFRB relating to coordination, notification and registration, which may require changes should be amended accordingly.

YUG/78/4 8. The Socialist Federal Republic of Yugoslavia proposes that simplified regulatory procedures be established pertaining to space services and frequency bands which have not been identified for planning.

IRQ/87/14 The present regulatory procedure of Articles 11 and 13 of the Radio Regulations should be improved in order to:

- a) remove their present complexity and simplify their application;
- b) reduce the administrative burden involved in their application particularly to the developing countries;
- c) shorten as appropriate the time required for the various phases of their application.

HOL/127/
Annex,
para. 2 2. The current procedures laid down in the Radio Regulations are maintained for the other (satellite) services.

II. Specific proposals relevant to current procedures

G/18/6. That the necessity, or otherwise, for continuation of the "advance publication" procedure be examined and unless found to be essential in the interests of administrations generally this element of the present procedures be recommended for removal from Article 11 of the Radio Regulations and possibly replaced by a voluntary, extra-regulatory mechanism.

G/18/10. That the First Session of the WARC should make recommendations for improvements in the present procedures to ensure that all administrations can have access, with minimum effort and cost, to an accurate listing of the characteristics of those space stations actually operating or intended to operate in the geostationary-satellite orbit.

- S/33/1 MOD 1041 The provisions in Nos. 1042 and 1043 are mandatory in the case of non-geostationary satellite systems and voluntary in the case of geostationary satellite systems.
- S/33/2 NOC 1042 §1. (1) An administration (or one acting on behalf of a group of named administrations) which intends to establish a satellite system shall, prior to the coordination procedure in accordance with No. 1060 where applicable, send to the International Frequency Registration Board, not earlier than five years and preferably not later than two years before the date of bringing into service each satellite network of the planned system, the information listed in Appendix 4.
- S/33/3 NOC 1043 (2) Any amendments to the information sent concerning a planned satellite system in accordance with No. 1042 shall also be sent to the Board as soon as they become available.
- S/33/4 SUP 1044 to 1058
- S/33/5 ADD 1044 The Board shall publish the information sent under Nos. 1042 and 1043 in a special section of its weekly circular for information only.
- S/33/6 ADD 1045 This publication does not imply any rights or obligations whatsoever neither for the publishing administration nor for any other administration.

S/33/7

This part of the procedures should be amended to include the following elements and any necessary consequential changes:

- a) The IFRB shall once a year register information in accordance with Appendix 3 of the RR, received from administrations requesting coordination.
- b) All satellite networks, which are registered shall have the registration date as the date from which the assignment will be taken into account for coordination.
- c) The registered information shall be published once a year in a special section of IFRBs weekly circular (around 1 July).
- d) If an administration does not send the complete information listed in Appendix 3 required for the coordination to the IFRB before (the first of June) the request for coordination will not be registered the current year but will have to wait until next year.
- e) In addition to the information in accordance with Appendix 3 the administrations requesting coordination shall specify the possible service arcs of their satellite networks.
- f) If a number of the administrations specify nominal orbital positions for satellite systems, which will result in incompatibility between the systems, IFRB shall propose alternative orbital positions within (1 month) after the date of registration of the information in accordance with Appendix 3.
- g) These orbital positions shall be within the specified possible service arc.
- h) An administration receiving a proposal according to paragraph f) shall reply within (2 months) after the date of registration of the information in accordance with Appendix 3.
- j) If the IFRB does not receive a reply within this period it is assumed that the administration accepts the proposals by IFRB.
- k) If it is not possible to solve the problem the IFRB shall assemble a bilateral/multilateral coordination meeting with all the administrations concerned and representatives from the IFRB present.

S/33/8

Appendix 29 should remain as a base for coordination.

CAN/35/5

ADD 1042.1 Administrations shall take a maximum period of five years into account when deciding, where appropriate, to initiate the coordination and/or the notification procedure. This period will begin on the date of publication of the information in the weekly circular up to the date on which the satellite network is brought into service. The overall time period of five years may be extended by four months upon request of the administration initiating this procedure. In exceptional circumstances, the administration may request and be granted a further extension to this period; such an extension may be provided but shall in no case exceed eighteen months from the date of the publication of the complete information in the weekly circular (see No. ----).

CAN/35/6

A consequential provision is proposed whereby failure to bring the satellite network into service within five years plus eighteen months would necessitate the re-coordination of the satellite network and the administration would then have a further maximum period of three years in which to bring the satellite network into use.

CAN/35/7

It is proposed to clarify the wording of No. 1043 thus: "Administrations shall immediately send to the Board all amendments to the information specified under No. 1042."

CAN/35/8

Under the existing Regulations, there is no mention of what constitutes a significant amendment to an API which would necessitate a revised publication date (No. 1057) and consequently a delay in the commencement of the coordination or notification procedures (No. 1057). There will be cases where an amendment to the information supplied under Appendix 4 does not significantly affect other systems and in such cases, a delay in the commencement of these procedures would not be warranted, although the amendment would still need to be published by the Board. A provision of this nature is proposed for the API and a similar provision is also needed to be applied to the coordination and notification procedures if such a provision were to be adopted.

CAN/35/9

A new provision is proposed whereby any amendment to the date of bringing into service would need to be examined by the Board so as to ensure that this date remains within the overall maximum period (five years, ADD 1042.1) and that, if this period was exceeded, all relevant procedures would need to be reapplied. This same provision should also be reflected in the coordination and notification procedures.

CAN/35/10

It is proposed to insert a provision to the effect that the Board will undertake preliminary examination of the API information or associated amendments immediately upon receipt of this information. Such a provision would "formally" allow the Board to obtain an early indication of possible coordination difficulties and thereby to be in a better position to deal with situations as they arise, particularly whenever No. 1054 is invoked; at the same time delays might be alleviated.

CAN/35/11

ADD 1057A An administration responsible for a planned satellite system may undertake the coordination procedure or, when this is not appropriate, the sending of its frequency assignment notices to the Board immediately after the four month period from the date of the weekly circular containing the complete information listed in Appendix 4, as specified in No. 1047.

MOD 1058 In complying with the provisions of Nos. 1049 to 1054 and upon request of an administration which believes that unacceptable interference may be caused to its existing or planned space service, an administration shall defer the commencement of the coordination or notification procedure for two months following the four month period specified in No. 1057A.
(The last sentence of No. 1058 could be suppressed).

CAN/35/12

In keeping with the approach proposed herein for Section I of Article 11, it is proposed to indicate that if the coordination data received differs significantly from the information sent under the API (norms will need to be established for this determination), then the API will need to be formally amended before proceeding with the coordination procedure.

- CAN/35/13 It is proposed to indicate under the provisions of No. 1075 that the Board will act only upon receipt of the complete information listed in Appendix 3; for example, MOD 1075. On receipt of the complete information referred to in No. 1074, the Board shall ...
- CAN/35/14 It is proposed that this provision might take into account the period of five years mentioned under the suggested ADD 1042.1 herein. For example: MOD 1105 last line to read: "taking into account the provisions of Nos. 1042.1 and 1496"
- CAN/35/15 In footnote 1496.1, a reference might be made to the five year period suggested herein under ADD 1042.1.
- CAN/35/16 As suggested under No. 1075 herein, it is proposed that the Board should examine the notice with respect to the API information to ensure that any changes in system characteristics between the API and the notice are not sufficiently substantive as to require a formal modification. A clause to this effect might be included in the provisions under No. 1502.
- CAN/35/17 In order to deal with situations where an administration is not able to bring its satellite system into service within five years of the date of publication of the API information sent under No. 1044, it is proposed to allow an extension of eighteen months to cover all circumstances, as already suggested herein under ADD 1042.1. No. 1550 provides an analogy but pertains only to a change in the projected date of bringing into use of frequency assignments already recorded in the Master Register. Nos. 1570, 1572 and 1573 also make a similar time allowance for space stations in orbit for entirely different reasons. It is proposed to have a general provision whereby an eighteen month extension to the "standard" five year period (ADD 1042.1) would be provided for any justifiable circumstances, whether or not the assignment had in fact been recorded in the Master Register. This new provision would then be related to the suggested ADD 1042.1.

- MEX/62/16 MOD
(Title of
Article 11) Coordination of Frequency Assignments to Stations in a Space Radiocommunication Service which have not been planned, ~~Except Stations in the Broadcasting-Satellite Service~~ and to Appropriate Terrestrial Stations¹
- MEX/62/17 MOD 1042 1. (1) An administration (or one acting on behalf of a group of named administrations) which intends to establish a satellite system for a service which has not been planned shall, prior to the coordination procedure in accordance with No. 1060 where applicable, send to the International Frequency Registration Board, not earlier than five years and preferably not later than two years before the date of bringing into service each satellite network of the planned system, the information listed in Appendix 4.
- MEX/62/18 MOD A.11.1 ¹For the coordination of planned services frequency assignments to stations in the broadcasting-satellite service and other services in the frequency bands 11.7-12.2 GHz (in Regions 2 and 3) and 11.7-12.5 GHz (in Region 1), see also Article 15.
- MEX/62/19 MOD 1049 3. (1) An administration on behalf of which information on projected satellite networks has been published, receiving comments sent in accordance with No. 1047 shall endeavour to resolve any difficulties that may arise and shall provide any additional information that may be available.
- MEX/62/20 MOD 1060 6. (1) Before an administration (or, in the case of a space station, one acting on behalf of a group of named administrations) notifies to the Board or brings into use any frequency assignment to a space station on a geostationary satellite or to an earth station that is to communicate with a space station on a geostationary satellite, it shall, except in the cases described in Nos. 1066 to 1071, effect coordination of the assignment with any other administration whose assignment, for a space station on a geostationary satellite or for an earth station that communicates with a space station on a geostationary satellite, might be affected., see No. 1506.
- MEX/62/21 MOD 1107 16. (1) Before an administration notifies to the Board or brings into use any frequency assignment to an earth station, whether for transmitting or receiving, in a particular band allocated with equal rights to space and terrestrial radiocommunication services in the frequency spectrum above 1 GHz, it shall, except in the cases described in Nos. 1108 to 1111, effect coordination of the assignment with each administration whose territory lies wholly or partly within the coordination area¹ of the planned earth station, see No. 1509. The request for coordination concerning an earth station may specify all or some of the frequency assignments of the associated space station, but thereafter each assignment shall be dealt with individually.

MEX/62/22 MOD 1148 23. (1) Before an administration notifies to the Board or brings into use any frequency assignment to a terrestrial station within the coordination area¹ of an earth station, in a band above 1 GHz allocated with equal rights to terrestrial radiocommunication services and space radiocommunication services (space-to-Earth), excepting the services mentioned in Article 15 the broadcasting-satellite-service, it shall, except in cases described in Nos. 1155 to 1158, effect coordination of the proposed assignment with the administration responsible for the earth station with respect of the frequency assignments which are:

NOC
(Title of Register² of Frequency Assignments¹ to Terrestrial Radiocommunication
Art. 12) Stations³

MEX/62/23 MOD A.12.2 ²For the notification and recording in the Master International Frequency Register of frequency assignments to radio astronomy ~~and space radiocommunication stations~~, stations and stations of unplanned services, see Article 13.

MEX/62/24 MOD A.12.3 ³For the notification and recording ~~in~~ of frequency assignments to planned space services ~~terrestrial stations in the frequency bands 11.7-12.2 GHz (in Regions 2 and 3) and 11.7-12.5 GHz (in Region 1), so far as their relationship to the broadcasting-satellite-service in these bands is concerned~~, see also Article 15.

MEX/62/25 MOD
(Title of Register¹ of Frequency Assignments¹ to Radio Astronomy and Space
Art. 13) Radiocommunication Stations and Stations of Unplanned Space Services
~~Except Stations in the~~²Broadcasting-Satellite-Service Stations of Planned Space Services

MEX/62/26 MOD A.13.2 ²For notification and recording of planned space services ~~frequency assignments to stations in the broadcasting-satellite service and other services in the frequency bands 11.7-12.2 GHz (in Regions 2 and 3) and 11.7-12.5 GHz (in Region 1)~~, see also Article 15.

MEX/62/27
The Mexican Administration considers that Article 15 should be amended in such a way as to reflect clearly the decisions of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It with respect to the provisions and associated plans applicable to those services which have been planned.

IRQ/108/19

The Advanced Publication Section of Article 11 should be retained to serve as a means of declaration, or announcement, by the responsible administration of its intent to establish its projected satellite network(s). In addition this section should specify the following:

- a) the period within which advanced publication should be affected before the date of bringing into use of the projected network(s);
- b) the deadline for receiving comments from administrations whose services may be affected by the new network(s);
- c) the type and the extent of information that should be provided by the responsible administration on its projected satellite network(s). The information may be those of the present Appendix 4 of the Radio Regulations;
- d) procedures for the amendment of published information;
- e) action(s) that the IFRB should take in cases of failure to comply with the provisions therein.

IRQ/108/20

The present provision in section I of Article 11 from Radio Regulations 1048 to 1058 inclusive which are in effect providing for a form of "pre-coordination" of satellite networks prior to the commencement of the proper coordination process, as provided for in section II of the same article, can be suppressed.

IRQ/108/21

The application of the coordination procedure of section II (or a simplified version of it as to be decided later) shall commence after a period not exceeding (10) months from the date of publication of the complete information in the IFRB Weekly Circular. The coordination shall be affected with those administrations who have submitted comments regarding possible effects to their services by the new network(s) or whose services may be affected as identified by the Board within the framework of the coordination stage itself, (through the information of Appendix 3 for example).

- AUS/125/11 The advance publication procedure should be mandatory.
- AUS/125/12 It should be mandatory to publish only basic information concerning the proposed satellite network.
- AUS/125/13 This publication of advance information on a satellite network does not imply any rights or obligations whatsoever, neither for the publishing administration or for any other administration.
- AUS/125/14 The publication of advance information may be made at any time prior to the date of the satellite network being brought into use, but it should preferably occur no later than 2 years before the date of bringing into service of the satellite network.
- AUS/125/15 Administrations may seek the assistance of the Board if they encounter difficulties in carrying out this procedure.

III. Proposals relevant to multilateral/periodic coordination.

- USA/30/43 Specifically, the USA proposes consideration be given to (a) establishing the coordination/notification process on a periodic basis.

G/18/7. The present procedures of Articles 11 and 13 of the Radio Regulations should be re-established on an annual basis with pre-set calendar dates for the completion of selected elements of those procedures.

G/18/8. That the First Session should consider and make recommendations on the best means of bringing together all administrations and system operators involved in a difficult case of coordination of a space station assignment or in a case where multi-lateral coordination is required, actively engaging the IFRB in this action.

G/18/11. That at intervals of approximately four years after 1988 there should be further WARC's of not more than three weeks duration whose prime function should be to review and as necessary revise those parts of the Radio Regulations pertaining to the planning and use of the geostationary-orbit including the technical methods and criteria of the associated appendices to the Radio Regulations. Each such WARC should be held in the year following the (4-yearly) Plenary Assembly of the CCIR thus avoiding the need for a CPM.

G/18/12. That the First Session should consider whether some cost-sharing mechanism can be developed so that for an administration responding to a request for space station coordination its costs of participation in a coordination meeting envisaged in proposal G/18/8 may be shared or may be borne by the Union as a whole.

G/18/13. That the First Session should consider the situation likely to arise in the event of a failure to reach agreement in a coordination meeting; consider the mechanisms for arbitration open to Members of the Union under Articles 50 and 82 of the International Telecommunication Convention (Nairobi 1982) or under the Special Additional Protocol to that Convention; and consider whether it would be useful for the ITU to establish a list of arbitrators from whose membership a panel could be drawn for use in such case. The conference should also consider the possibility of conciliation as an alternative to arbitration and the potential value of the ITU establishing a list of conciliators to provide the basis for a 'Conciliation Commission'.

S/33/9 WARC's should be convened every 4th year, one year after the CCIR plenary, in order to include modifications to the Radio Regulations, in particular to provisions and Appendices relevant for the coordination of satellite systems, based on the latest CCIR Recommendations.

SUB-WORKING GROUP 6A2

Note by the Secretary-General

Comments received from administrations in response to
Circular-letter No. 39
(Consolidated version of AP30)

General comments

- AUT : Because of fundamental problems which have not been solved until now, the Austrian Administration puts forward the proposal that the question of including the Broadcasting-Satellite Service Plan for Region 2 into Appendix 30 to the Radio Regulations shall be postponed until the Second Session of the Orbit WARC."
- B : [In addition, the Brazilian Administration] expects that the incorporation be made in the appropriate form into the Radio Regulations of Resolutions and Recommendations and provisions and associated plans for feeder links in the 17.3 - 17.8 GHz [band] of the Final Acts of the SAT-R2 Conference."
- BEL : No comments.
- CAN : In the document some sections were taken from Appendix 30 and others from the Final Acts depending on which the editor considered more correct. As a result, the document showed many more amendments to Appendix 30 than necessary and we were concerned that Region 1 and 3 administrations would view these as changes to the Appendix. In our review of the document, we considered the existing Appendix 30 as the reference and showed only the necessary changes to incorporate the Final Acts. As a result, many of our comments merely represent a different approach.

We have noticed that the editor of the document used the draft Final Acts (i.e. the text distributed at the final plenary in 1983). We used the published version of the Final Acts. There are some discrepancies which are mainly editorial.

We felt a need to add a note to define the word "plan" when it appears alone (i.e. without an adjective such as "Region 2" plan) in order to facilitate references in the text.

CAN : (continued)

In some sections there were serious errors such as referring to Regions 1 and 3 where the text should read Region 2 (see para 7.1.1 for example).

Only in two places did we propose changes to the text of the Final Acts where errors were obvious (see paras 3.4 and 2.4 of Annex 6 [of the consolidated text]).

Overall we are satisfied with the consolidated document and we feel that it will form a sound basis for the revision of Appendix 30 at the Conference. We might have other comments on the contents (not the consolidation process), and these will be included in our proposals to the Conference, together with proposals for parts II and III and the resolutions and recommendations of the Final Acts."

Many sections in the following articles [as from Article 5] include a time element which was correctly changed from Appendix 30 to show months instead of days. These should be shown as changes to Appendix 30 rather than a new text from the Final Acts. See examples in paras 5.1.3, 5.3.2, 6.1.3, 6.1.5, 6.1.10, 6.2.3, 6.2.4, 7.1.4, 7.2.5, 7.2.6, 7.2.11, 7.2.13, 7.3.4, 7.8.4, 8.4.

CHL : Many modifications proposed by the Administration of Chile are for the sake of greater clarity of the text and to correct errors that have occurred when transcribing the signature version of the Final Acts to the published version.

F : The French Administration considers that the provisions and associated Plan for the broadcasting-satellite service for Region 2, as set out in the Final Acts of the SAT-R2 Conference, cannot be incorporated in the present Appendix 30 to the Radio Regulations since they have not been examined by the WARC on the Use of the Geostationary-Satellite Orbit.

Such an examination, concerning the conditions of interregional sharing, might lead to a modification of the provisions and associated Plan: the SAT-R2 Conference was unable for lack of time to establish compatibility between the Region 2 Plan and the provisions of Appendix 30 to the Radio Regulations (see Resolution No. 4 (SAT-R2)); such compatibility relates to the sharing of the Region 2 broadcasting-satellite service with the broadcasting-satellite service in Regions 1 and 3 and other services in those Regions (fixed service and fixed-satellite service).

The French Administration therefore takes the view that a consolidated version of Appendix 30 to the Radio Regulations can be adopted only after the WARC has made a proper examination of sharing between the different services in the frequency bands common to the three Regions and the first session has made its views known on item 6.1 of the agenda.

- G : The United Kingdom has no comment at this stage, because this Administration holds views about the question of consolidation which go beyond the textual level.
- I : Before the Final Acts of RARC-SAT-83 can be incorporated into the Radio Regulations, it will be necessary to consider in detail the effect of Region 2 assignments on Region 1 and 3 assignments in order to eliminate the existing incompatibilities.

Taking into account that before the first session of the WARC Orbit Conference there is not sufficient time to finish this work, the Administration of Italy thinks that the eventual incorporation of the Final Acts of RARC-SAT-83 into the Radio Regulations should be postponed to the second session of the WARC Orbit Conference."

- J : In the draft text there are some differences between the provisions of Appendix 30 and those of the Final Acts of RARC-SAT-83, which cause inconvenience in the application of the draft text. For this reason, it is considered necessary to revise the following provisions:
- POR : The Administration of Portugal is studying the problem in the light of IFRB Circular-letter No. 603. They doubt whether there will be enough time before the first session of the ORB-85 conference to be able to arrive at conclusions concerning the inclusion of the SAT-R2 Final Acts in the Radio Regulations. A longer period would be useful. The incorporation would then only be foreseen for the second session of the Orbit WARC.
- THA : The Administration of Thailand approves the draft consolidated text in principle.
- URS : After examining the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2 (Geneva, 1983) and the draft consolidated version of Appendix 30 to the Radio Regulations prepared by the General Secretariat, the USSR Administration considers that the decisions of this Conference may not be incorporated in the Radio Regulations unless they are aligned with the decisions of the World Broad-casting-Satellite Administrative Radio Conference (Geneva, 1977), which were adopted both by the Regions 1 and 3 countries and by the Region 2 countries.

Our general comments are contained in the USSR Administration's proposals for agenda item 6.1 of the First Session of WARC-ORB [Document No. 9 (ORB-85)]. The present document, which responds to the Secretary-General's request in Circular-letter No. 39 of 20 September 1984, presents the USSR Administration's proposals and comments concerning the alignment of the consolidated version of Appendix 30 with the decisions of WBSARC-77.

Detailed comments

Table of Contents

VEN : In the Table of Contents, under Article 9, in the fifth line, replace "especiales" by "espaciales". Only concerns the Spanish text.

Article 1

CAN : In Article 1, insert the following note after the definition of "Region 2 Plan:":
"Note: When the word "plan" appears alone, it refers to either the Regions 1 and 3 Plan or the Region 2 Plan in the appropriate context."
(Reason: to facilitate reference in the text and avoid repetitions.)

URS : No comments.

Article 2

URS : No comments.

Article 3

Section 3.1

CAN : In para 3.1, at the end of the line, retain "for those Regions", but change the word "those" to "their".

URS : Delete the words "in Regions 1 and 3" from section 3.1
Reason: For purposes of consistency and alignment with the decisions of WBSARC-77.

Section 3.3

URS : Delete section 3.3 in its entirety.
Reason: For purposes of consistency and alignment with the decisions of WBSARC-77.

Section 3.4

CAN : In para 3.4, in the second line, replace "on both sides of" by "from the centre of".

URS : Delete section 3.4 in its entirety.
Reason: For purposes of consistency and alignment with the decisions of WBSARC-77.

Section 3.5

B : In Annex 2 (to Circular-letter No. 39), para 3.4 (FA) becomes para 3.5 of the consolidated text. However, there is no para 3.5 following para 3.4 of the consolidated text.

CAN : After para 3.4, add para 3.5 as follows: "An administration is considered to be affected if the limits specified in Annex 1 are exceeded."

Article 4

Section 4.1

- CHL : In footnote 1 referring to para 4.1 of the consolidated text, insert the words "for Regions 1 and 3" after "Annex 6".
- URS : In footnote 1 to section 4.1 (page 4 of the English text) the words "In Regions 1 and 3" which have been added should be deleted to render the footnote applicable to all three Regions.

Reasons: WBSARC-77 adopted, for all Regions and for a frequency deviation of 600 kHz, a carrier energy dispersal corresponding to a 22 dB reduction in the spectral power flux-density in a 4 kHz bandwidth (see section 3.18, Annex 8 to the Final Acts of WBSARC-77). The decisions of RARCSAT-83 did not make the use of carrier energy dispersal compulsory, which conflicts with the decisions of WBSARC-77 and might complicate conditions of sharing with terrestrial services in the other Regions.

Section 4.3.1.4

- CHL : In para 4.3.1.4, retain the words "which are considered to be affected" at the end of the line.

Reason: The text of Appendix 30 is clearer than that proposed.

Section 4.3.1.5

- CAN : In para 4.3.1.5, delete the amendment and keep the original wording.
- CHL : Delete para 4.3.1.5.

Reason: As a consequence of the change to para 4.3.1.4.

- URS : Revert to the previous wording of section 4.3.1.5 in order to eliminate the inconsistency with section 4.3.1.3

Section 4.3.3.5

- CAN : In para 4.3.3.5, at the end of the second line, retain "necessary".
- VEN : (Does not concern the English text.)

Section 4.3.3.6

- CAN : In para 4.3.3.6, delete the amendment and keep the original wording.
- URS : Revert to the previous wording of section 4.3.3.6 in order to eliminate the inconsistency with section 4.3.3.3.

Section 4.3.5

- URS : Delete the words "Regions 1 and 3" from section 4.3.5a) and delete section 4.3.5b) in its entirety.
- Reasons: The basic procedures for possible modifications to the Plans must be identical for all Regions.

Article 4 (continued)

Section 4.3.5.2

B : In para 4.3.5.2 of the consolidated text, the reference to para 4.3.1 is for Regions 1 and 3; it will be necessary to add para 4.3.3 for Region 2.

CAN : In para 4.3.5.2, in the second line after "4.3.1", add "and 4.3.3".

Section 4.3.6

B : In para 4.3.6 of the consolidated text, the reference to para 4.3.1 is for Regions 1 and 3; it will be necessary to add para 4.3.3 for Region 2.

CAN : In para 4.3.6, at the end of the sentence in the second line, add "and 4.3.3".

Section 4.3.12

CAN : In para 4.3.12, the underlining should reflect amendment to Appendix 30.

J : Replace para 4.3.12 of the draft consolidated text by the following:

(For all Regions)

4.3.12 An administration that has not notified its comments either to the administration seeking agreement or to the Board within a period of four months following the date of the weekly circular referred to in 4.3.5.1 or 4.3.6 shall be understood to have agreed to the proposed assignment. This time limit may be extended, by up to three months, for an administration that has requested additional information under 4.3.10 or for an administration that has requested the assistance of the Board under 4.3.20. In the latter case the Board shall inform the administration concerned of this request.

Reason: It is recognised that the provision of the Final Acts of RARC-SAT-83 would be suitable.

URS : In section 4.3.12, stipulate a single time limit for all Regions.

Article 5

Section 5.2.11.1/

- B : In para 5.2.11.1 of the consolidated text, change the word "unfavourable" to "favourable".
- CAN : In para 5.2.11.1, in the first line, change "unfavourable" to "favourable".
- CAN : In footnote 1, in the 3rd line, delete "provided" and retain the original words "only on condition".
- URS : Delete section 5.2.11.1, since its substance is repeated in other sections and is contradictory.

Section 5.2.11.2

- CAN : In para 5.2.11.2, add "(SAT-R2)" after "Resolution [No.] 2" (4th and 7th lines).

Section 5.2.6

- CAN : In para 5.2.6, in the first line, insert "has received" after "5.1.3", and remove "has received" from between "use" and "in".

Article 6

- CAN : Following the footnotes relating to Section I of Article 6, there should be some indication that the footnotes 1 and 2 relating to Appendix 30 have been deleted.

Section 6.1.1 a)

- J : (For all Regions). In para 6.1.1 of the draft consolidated text, delete the words "Regions 1 and 3" from the third line of sub-paragraph a).

Reason: It is recognised that the provision of Appendix 30 to the RR would be suitable.

- URS : Delete the words "Regions 1 and 3" from section 6.1.1a).
- VEN : (Does not concern the English text.)

Section 6.1.1 b)

- J : (For all Regions). In para 6.1.1 of the draft consolidated text, delete sub-paragraph b).

Reason: It is recognised that the provision of Appendix 30 to the RR would be suitable.

- URS : Delete section 6.1.1b), since section 6.1.1a) describes the situation more clearly.

Article 6 (continued)

Section 6.1.10

CHL : (Does not concern the English text.)

Section III

CAN : In Section III of Article 6 several sub-sections are shown as amendments when the only change is a reversal of words "receipt of a notice by the Board". The original texts should be kept. See paras 6.3.14, 6.3.19, 6.3.21, 6.3.24, 6.3.25, 6.3.26, 6.3.28, 6.3.31, 6.3.35.

Section 6.3.32

VEN : (Does not concern the English text.)

Section 6.3.36

J : (For all Regions). In para 6.3.36, delete the words "Region 2" towards the end of the first sentence.

Reason: It is recognised that the revised provision would be suitable for being applied in all Regions.

Section 6.3.40

J : Delete para 6.3.40 of the draft consolidated text.

Reason: The provision is not needed according to paras 6.3.36 and 6.3.41.

Section 6.3.41

J : (For all Regions). In para 6.3.41, delete the words "in Region 2" in the second line.

Reason: It is recognised that the revised provision would be suitable for being applied in all Regions.

Article 7

Title

URS : In the title, define the frequency bands to which the Article applies more precisely, by splitting up the first phrase which has been added into two parts: "and in the frequency bands 12.2 - 12.7 GHz (in Region 3) and 12.5 - 12.7 GHz (in Region 1) ...", the rest of the text remaining unchanged.

Reasons: To bring the frequency bands covered by Article 7 into line with the Table of Frequency Allocations in the Radio Regulations (Article 8).

Footnote 1 to the title

CAN : Insert "For Regions 1 and 3", at the beginning of the footnote and add a new paragraph as follows: "For Region 2, these provisions do not replace the procedures prescribed in Articles 11 and 13 of the Radio Regulations".

Section 7.1.1

CAN : In para 7.1.1, in the third line, replace "1 and 3" by "2".

URS : Delete the words "for systems in Regions 1 and 3" which have been added in section 7.1.1.

Reasons: To standardize the procedures for systems in all three Regions.

Section 7.1.3

CAN : In para 7.1.3, in the third line, insert "For Region 2," at the beginning of the second sentence.

Section 7.1.3.1

CAN : In para 7.1.3.1, insert "For Region 2," at the beginning of the paragraph.

Section 7.1.8

URS : Modify the title of section 7.1.8 to read: "Region 1 (12.5 - 12.7 GHz) and Region 3 (12.2 - 12.7 GHz)." Reasons: For consistency with the Table of Frequency Allocations in the Radio Regulations.

Section 7.2.5

CHL : (Does not concern the English text.)

Section 7.2.11

URS : In section 7.2.11, delete the phrase "or fails to give a decision in the matter within one month of dispatch of the Board's telegram of request under paragraph 7.2.9".

Reasons: Conflicts with section 7.2.13.

Article 7 (continued)

Section IV

CAN : In Section IV of Article 7 several sub-sections are shown as amendments when the only change is a reversal of words "receipt of a notice by the Board". The original texts should be kept. See paras 7.4.8.2, 7.4.9.1, 7.4.9.4, 7.4.9.5, 7.4.9.6, 7.4.10.1, 7.4.11.2, 7.4.11.3.

Section 7.4.8.2

B : In para 7.4.8.2 of the consolidated text change the word "favourable" to "unfavourable".

CHL : (Does not concern the English text.)

Section 7.4.9.1

CAN : In para 7.4.9.1 (second line) change "Plans" to "Plan".

Section 7.4.9.4

CAN : In para 7.4.9.4 (third line) change "Plans" to "Plan".

Section 7.4.12.2

CAN : In para 7.4.12.2 (fourth line) replace "in conformity" by "in accordance".

CAN : In para 7.4.12.2 (fourth line) change "Plans" to "Plan".

Section 7.4.12.3

B : In para 7.4.12.3 of the consolidated text, an explanation of the addition of "in Region 1 or 3" is needed.

CAN : In para 7.4.12.3 replace "Region 1 or 3" by "Region 2".

J : (For all Regions). In para 7.4.12.3 of the draft consolidated text, delete the words "in Region 1 or 3" in the first line of the text.

Reason: It is recognised that the revised provision would be suitable for being applied in all Regions.

URS : In section 7.4.12.3, delete the words "in Region 1 or 3".

Reasons: To standardize the procedure for all three Regions, without affecting the substance.

Section 7.4.13.2

CAN : In para 7.4.13.2, replace "Region 2" by "Regions 1 and 3".

J : Delete para 7.4.13.2 of the draft consolidated text.

Reason: The provision is not needed according to paras 7.4.12.3 and 7.4.13.3.

URS : Delete section 7.4.13.2.

Reasons: To standardize the procedure for all three Regions, without affecting the substance.

Article 7 (continued)

Section 7.4.13.3

CAN : In para 7.4.13.3, replace "Region 1 or 3" by "Region 2".

J : (For all Regions). In para 7.4.13.3 of the draft consolidated text, delete the words "in Region 1 or 3" in the second line of the text.

Reason: It is recognised that the provision would be suitable for being applied in all Regions.

URS : In section 7.4.13.3, delete the words "in Region 1 or 3".

Reasons: To standardize the procedure for all three Regions, without affecting the substance.

Section 7.8.1

CAN : This should be 7.9 since 7.8 applies only to Region 2 while the rest of the Section applies to all Regions. Consequential changes in the other paragraph numbers should be made.

Section 7.8.3

CAN : In para 7.8.3, in the last line, replace "mark" by "symbol".

Section 7.8.6

CAN : In para 7.8.6, in the second line, replace "Region 2" by "Regions 1 and 3" and in the third line, replace "Regions 1 and 3" by "Region 2".

J : Replace para 7.8.6 of the draft consolidated text by the following:

(For all Regions)

7.8.6 If, in connection with an inquiry by the Board under paragraph 7.8.5 the notifying administration has failed to supply the Board, within three months, with the necessary or pertinent information, the Board shall make suitable entries in the Remarks Column of the Master Register to indicate the situation."

URS : In section 7.8.6, delete the references to the different Regions and adopt a standard time limit (e.g. three months) for all Regions.
Reason: To standardize procedures and time limits.

Article 8

CAN : Under Article 8 of the consolidated text there should be some indication that Article 9 has been deleted.

URS : No comments.

Section 8.1

CHL : In para 8.1, in the first line, delete the words "and if the circumstances appear to warrant,".

Reason: Take the text of the Final Acts of the Region 2 Conference.

Section 8.3

CAN : In para 8.3, insert "In the case of Region 2" at the beginning of the paragraph.

Section 8.5

CHL : In para 8.1, in the first line, and in para 8.5, in the second line, delete the words "and if the circumstances appear to warrant,".

Reason: Take the text of the Final Acts of the Region 2 Conference.

Article 9

Title

URS : Revert to the original text of Article 9, Appendix 30 to the Radio Regulations, changing the frequency band in the title to 12.2 - 12.7 GHz, in order to retain in Appendix 30 the fundamental provision guaranteeing adequate protection for terrestrial services in Regions 1 and 3 from interference from Region 2 broadcasting-satellite space stations. The change in the frequency band for the BSS in Region 2 adopted by RARCSAT-83 modifies the conditions for sharing with terrestrial services in Regions 1 and 3, a modification which must be taken into account in Appendix 30 and in particular in Article 9 and its related Annex 5.

Article [10] 9

Title

URS : Revert to the number 10 (in view of the proposal to reinstate the original Article 9).

In the title of the Article, revert to the figure 12.2 GHz instead of 12.5 GHz, which is erroneous, since the Article relates to the protection of other satellite services.

Article ~~[10]~~ 9 (continued)

Section ~~[9-1]~~ 10.1

URS : As in the title of the Article, revert to the band limit 12.2 GHz given in the original text of the Article.

Section ~~[9-2]~~ 10.2

URS : No comments.

Section ~~[9-3]~~ 10.3

URS : Change the reference in the last sentence of this section to Annex 9 instead of 10. [Delete Annex 10 from Appendix 30. In Annex 6, the reference pattern for the space station transmitting antenna should be replaced by the pattern adopted by WBSARC-77.]

URS : Insert a section 10.4 with the following wording, similar to that of section 10.2:

10.4 In particular the power flux-densities at a reference test point (longitude ..., latitude ...) prior to any modifications to the Region 2 Plan shall not exceed the values shown in Annex 9.

For the test point coordinates, an appropriate point should be chosen on African territory which has the lowest angular separation in relation to the nearest service area in the Region 2 Plan.

Reasons: Since the frequency band 12.2 - 12.7 GHz is allocated to the BSS in Region 2, whereas it is used by the FSS in the other Regions (12.5 - 12.75 GHz in Region 1 and 12.2 - 12.75 GHz in Region 3), in order to protect the FSS in Regions 1 and 3 from potential interference from broadcasting satellites in Region 2, criteria and conditions should be established similar to those for protection of the Region 2 FSS from broadcasting satellites in Regions 1 and 3. For this purpose, the same reference pattern for the transmitting antenna should be adopted in Region 2 as that adopted in Regions 1 and 3, thereby strictly adhering to the decisions of WBSARC-77. One should determine the permissible values of power flux-density produced by emissions from the broadcasting-satellite space stations in Region 2 at a test point on the territory of Region 1 (in Africa) which are not to be exceeded prior to modifications to the Region 2 Plan. The p.f.d. should be calculated using the same method, which is set out in Annex 9.

Article 10

URS : No comments.

Article 11

URS : One should verify that the conditions for protection of the terrestrial services in the other Regions are met and delete any frequency assignments which exceed the permissible limits.

Article 12

URS : No comments.

Article 13

CAN : Under Article 13 of the consolidated text, there should be some indication that Article 15 has been deleted.

URS : No comments.

Article 14

URS : No comments.

Annex 1

CAN : In the title of Annex 1, insert the word "Proposed" before "Modification".

URS : Amend footnote 1) to the title by deleting the words "in the case of Regions 1 and 3" from the first sentence and deleting the second sentence in its entirety.

Delete footnote 2) from the title.

Reasons: The method for calculating interference to Regions 1 and 3 services from the Region 2 broadcasting-satellite service adopted in the Final Acts of RARCSAT-83 takes account of atmospheric absorption, whereas the method for calculating interference to Region 2 services from the Regions 1 and 3 broadcasting-satellite services in the current Appendix 30 does not. This discrepancy contravenes the principle of equal rights of services in the various Regions.

In this connection, the USSR Administration points out that the equation for calculating atmospheric absorption given in the Final Acts of RARCSAT-83, taken from CCIR Report 719-1, gives a value of approximately 3 dB for a zero angle of incidence. A different formula is given in the Report of the CCIR Conference Preparatory Meeting to WARC-ORB-85, also taken from Report 719-1 but modified at the Interim Meeting of CCIR Study Group 5. This gives a value of approximately 2 dB for a zero angle of incidence. Both of these equations are based on a theoretical curve of the specific signal attenuation in oxygen and theoretical assumptions concerning the equivalent length of radio-wave paths through oxygen in the atmosphere. They have not been confirmed by experiment and for this reason should not be used for inter-Regional interference calculations.

Section 3

CAN : In the first paragraph of para 3. of Annex 1, insert the word "following" before "power flux-densities".

CHL : In para 3. of Annex 1, delete the paragraph directly preceding the power flux-densities given, delete the second indent following "where θ is" and insert a new paragraph:

"In the same way, an administration in Region 1 or in Region 3 with an assignment in the Regions 1 and 3 Plan shall be considered as being affected if the proposed use would result at any point in the service area affected in exceeding the power flux-densities given above, where θ is the difference in degrees between the longitude of the Region 2 broadcasting-satellite space station and that of the broadcasting-satellite space station affected in Region 1 or in Region 3."

Annex 1 (continued)

Section 4

CAN : Under the title of para 4. of Annex 1, there should be some indication that two whole paragraphs concerning Regions 1 and 3 have been moved to para 8. of Annex 1.

Section 5

URS : "Limits to the change in the power flux-density to protect the terrestrial services of administrations in Regions 1 and 3".

Delete footnote 2) to sub-section a), since these limits do not apply in the band 12.5 - 12.7 GHz. Change the frequency band in sub-section a) to 12.2 - 12.5 GHz.

Insert an additional sub-section c):

"c) in the frequency band 12.2 - 12.7 GHz for territories of administrations in Region 1, east of longitude 30°E:

-134 dB (W/m²/5 MHz) for angles of incidence $\text{GAMMA} = 0^\circ$

-134 + 4.6975 GAMMA^2 dB (W/m²/5 MHz) for angles of incidence
 $0^\circ \leq \text{GAMMA} \leq 0.8^\circ$

-128.5 + 25 log GAMMA dB (W/m²/5 MHz) for angles of incidence
 $\text{GAMMA} > 0.8^\circ$.

Reasons: The need to protect radio-relay links used to transmit AM-SSB television signals in accordance with the data contained in CCIR Reports 789-1 and 631-2 and the Report of the CCIR CPM for RARCSAT-83.

Insert an additional sub-section d):

"d) in the frequency band 12.5 - 12.7 GHz for territories of the Region 1 administrations listed in No. 850 of the Radio Regulations:

-148 dB (W/m²/4 kHz) for angles of incidence $0^\circ \leq \text{GAMMA} \leq 5^\circ$

-148 + 0.5 (-5) dB (W/m²/4 kHz) for angles of incidence
 $5^\circ \leq \text{GAMMA} \leq 25^\circ$

-138 dB (W/m²/4 kHz) for angles of incidence $\text{GAMMA} > 25^\circ$

Reasons: To reflect accurately the current provisions of the Radio Regulations. RR 850 lays down that the power flux-density limits given in No. 2574 of the Radio Regulations shall apply on the territory of the countries listed in RR 850.

VEN : In para 5. of Annex 1, in the first line of the first paragraph, replace "desfavorablente" by "desfavorablemente". Only concerns the Spanish text.

Annex 1 (continued)

Section 7

URS : Delete the last sentence, since there is no justification for the value -150 dB (W/m²/40 kHz).

Annex 2

URS : No comments.

Annex 3

Section 1.3

CHL : (Does not concern the English text.)

Section 2.2

CHL : In para 2.2 of Annex 3, sub-paragraph b), delete the words "in the case of Region 2", and add at the end of the sentence "for service areas in Region 2."

Section 2.4

CAN : After para 2.4 of Annex 3, insert the heading for 2.4.1 "Broadcasting-satellite service areas in" before "Regions 1 and 3:".

After para 2.4.1 of Annex 3, insert the heading for para 2.4.2 "Broadcasting-satellite service areas in" before "Region 2:".

URS : No comments.

Figure 4

CHL : At the end of the title of Figure 4 in Annex 3, add the words "(Regions 1 and 3)"

Figure 5

CHL : At the end of the title of Figure 5, add the words "(Region 2)".

Annex 4

CHL : (Does not concern the English text.)

URS : No comments.

Annex 5

Section 1)

URS : Delete footnote 1).

Section 2)

B : In para 2) of Annex 5 of the consolidated text, amend as follows:
"2) In the band ... of administrations in Region 3 and those in ..."

Section 3)

URS : Add a sub-section 3):

"3. In the band 12.2 - 12.5 GHz, for territories of administrations in Region 1, east of longitude 30°E:

-134 dB (W/m²/5 MHz) for angles of incidence GAMMA = 0°

-134 + 4.6875 GAMMA² dB (W/m²/5 MHz) for angles of incidence
0° ≤ GAMMA ≤ 0.8°

-128.5 + 25 log GAMMA dB (W/m²/5 MHz) for angles of incidence
GAMMA > 0.8°".

Section 4)

URS : Add a sub-section 4):

"4. In the band 12.5 - 12.7 GHz for territories of the Region 1 administrations listed in No. 850 of the Radio Regulations:

-148 dB (W/m²/4 kHz) for angles of incidence 0° ≤ GAMMA ≤ 5°

-148 + 0.5 (-5) dB (W/m²/4 kHz) for angles of incidence
5° ≤ GAMMA ≤ 25°

-138 dB (W/m²/4 kHz) for angles of incidence GAMMA > 25°

Reasons: Alignment with the Radio Regulations and the corrected version of Annex 1.

Annex 6

CAN : Before Annex 6, there should be some indication that Annexes 6 and 7 have been deleted in accordance with the Final Acts; titles might be useful.

Annex 6 (continued)

Section 1.4

- CAN : In the note referring to para 1.4 of Annex 6, delete "where a feeder-link plan has also been established" as the addition is irrelevant. Paras 1.8 and 1.9 also have nothing to do with feeder links.
- CAN : Paras 1.5, 1.6 and 1.7 are not necessary in Annex 6 as they are included in Part II of the Final Acts (Annex 5).

Section 1.10

- B : In the 4th line of para 1.10 of Annex 6 of the consolidated text, change the words "radio" to "ratio" and "reffered" to "referred".

Section 1.11

- B : In the first line of para 1.11 of Annex 6 of the consolidated text, change the symbol "dB" to the word "decibels".

Section 2.4

- CAN : In para 2.4 of Annex 6 "earth-space" should read "space-earth".

Section 2.4.2

- B : In the 9th line of para 2.4.2 of Annex 6 of the consolidated text, change the words "is the" to the symbol "=".

Section 3.6

- B : In para 3.6 of Annex 6 of the consolidated text:
a) delete "DB(K-1)" for the formula of G/T;
b) in the 4th line from the bottom, add the symbol "K" into brackets.
- CHL : (Does not concern the English text.)

Section 3.7.2

- CAN : In para 3.7.2 of Annex 6, in sub-para a) after "community reception, for which use" and in sub-para b) after "individual reception, for which use", replace "should" by "must".

Figure 8

- CAN : In Figure 8 of Annex 6, the curve should be amended to show the relative angle at 35 and 45.1.

Section 3.8

- CAN : In the last paragraph under para 3.8 of Annex 6, replace "the Final Acts of the 1983 Conference" by "this Appendix".
- CHL : In para 3.8, at the end of the last paragraph, replace "the Final Acts of the 1983 Conference" by "this Appendix".

Annex 6 (continued)

CAN : In para 3.9.2 of Annex 6, in the last line of the second paragraph, replace "en" by "in".

VEN : (Does not concern the English text.)

Section 3.9.3

VEN : (Does not concern the English text.)

Section 3.9.4

URS : Delete the words "In Region 2", as this possibility should be extended to all Regions.

Section 3.11

URS : Delete the last sentence, since the requirement to maintain tolerance should be the same for all Regions.

Section 3.13.1

B : In the 3rd line of para 3.13.1 of Annex 6 of the consolidated text, change the word "elliptical" to "non-elliptical".

URS : Include Region 2 in the first sentence. Delete the second sentence.

Reasons: The text should as far as possible be the same for all Regions; moreover, the second sentence on the possibility of using antennas with special beam shapes is very unclear and open to interpretation.

Section 3.13.3

B : In the second line from the bottom of para 3.13.3 of Annex 6 of the consolidated text, add the word "degrees" at the end of the sentence.

CHL : (Does not concern the English text.)

URS : The space station transmitting antenna pattern used in the Region 2 Plan is different from that adopted at WBSARC-77 by the representatives of all three Regions. It allows somewhat higher levels of radiation in certain directions. This may make it more difficult to provide the required protection for the terrestrial services of other Regions. It is thus proposed that in cases where problems arise with regard to the protection of terrestrial services in other Regions, Region 2 administrations should be obliged to use the same side-lobe suppression as adopted in the Plan for Regions 1 and 3. This provision should be contained in a Note to Figures 10 and 11.

Annex 6 (continued)

Section 3.18

- B : In the 8th line from the bottom of para 3.18 of Annex 6 of the consolidated text, change the word "specific" to "specified".
- CAN : In para 3.18, in the first para under the heading "In Region 2", replace "specific" by "specified".
- CHL : (Does not concern the English text.)
- URS : Delete the heading of the first sub-section ("In Regions 1 and 3") and delete the second sub-section in its entirety.

Reasons: WBSARC-77 stipulated that a carrier energy dispersal corresponding to a peak-to-peak deviation of 600 kHz must be used. The decisions of RARCSAT-83 regarding the use of energy dispersal conflict with the decisions of WBSARC-77, thereby complicating the settlement of inter-Regional problems, and cannot be adopted.

Annex 7

- CHL : In the heading "Annex 7", delete the note "1" and the corresponding footnote and at the end of the title of Annex 7, add "of Regions 1 and 3".

Reason: There are two notes "1" at the bottom of the page. The text becomes clearer if one is deleted.

- URS : Delete footnote 1 to the title, since a number of the sections in Annex 7 (e.g. 3) apply to all the Regions.

Annex 8

- CHL : In the heading "Annex 8", delete the note "1" and the corresponding footnote and at the end of the title of Annex 8, add "in Regions 1 and 3".

- URS : No comments.

Annex 9

- URS : Amend the title by extending it to cover also the calculation of the power flux-density produced by BSS space stations in Region 2.

Also include the power flux-density calculations at a selected test point in Africa and incorporate the results in the Table appended to the text of Annex 9.

Annex 10

- CHL : In para 2. of Annex 10, in the fourth indent, delete the symbol "+" before "sin θ ".
- URS : Delete in its entirety. Reasons: For consistency with the amended text of Article [10] 9 in the light of the reasons given for the amendments to that Article.

R.E. BUTLER
Secretary-General

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/30-E
20 August 1985
Original : English

WORKING GROUP 5A

Note from the Chairman

SERVICES AND FREQUENCY BANDS TO BE PLANNED

I. SERVICES

With respect to item 2 of the Agenda of the Conference, Working Group 5A decided on a provisional basis that the planning shall concern the fixed satellite service only.

II. BANDS

II.1

Without prejudging the exact limits of the bands as well as the planning principles and methods that may be adopted, Working Group 5A decided provisionally that planning will be carried out in the following bands:

- i) Band 6/4 GHz;
- ii) Band 14/11-12 GHz.

II.2 The band 30/20 GHz will be reviewed in the light of decisions relating to the planning principles and methods.

II.3 Working Group 5A started discussions on the band 8/7 GHz and will resume these discussions in future meetings.

F.S.C. PINHEIRO
Chairman of Working Group 5A

DRAFT TERMS OF REFERENCE FOR SUB-WORKING GROUP 6A-2

- To review Document 16, taking into account the views of administrations and comments of the IFRB in Document 4;
- to prepare a draft text that consolidates the decisions of the SAT-R2 Conference with the Radio Regulations.

G.H. RAILTON

Chairman of Sub-Working Group 6A-2

GROUPE DE TRAVAIL 5A

WORKING GROUP 5A

GRUPO DE TRABAJO 5A

RELATION ENTRE LES METHODES ET LES PROPOSITIONS

RELATIONSHIP BETWEEN METHODS AND PROPOSALS

RELACIÓN ENTRE LOS MÉTODOS Y LAS PROPOSICIONES

Méthode Method Método	Variante Variant Variante	Propositions Proposals Proposiciones
A	A1	SEN/17, CHN/25 - 26, GHA*/77
	A2	KEN*/20, 63
	A3	IND/54 BFA/104
	A4	PHL/120
B		URS/9, SEN/17, CHL/59, ARG/101
C	C1	AUS*/7
	C2	ALG*/75, IRQ/87, CME*/36, ALG/AGL/ARS/BFA/BHR/CME/COG/EGY/ETH/GAB/GHA/IRQ/JOR/ KEN/KWT/LBY/MDG/MWI/MLI/MRC/NIG/OMA/QAT/SEN/SOM/SYR/ TZA/TCD/TGO/TUN/YMS/146
	C3	LBY/103
D	D1	NZL/8
	D2	CTI/95
E		USA/5-30-107-114-123
F	F1	USA/5-30-107-114-123
	F2	F/12
	F3	D/CVA/F/MCO/POR/G/SUI/53, D/31
G		G/18, D/CVA/F/MCO/POR/G/SUI/53, D/31
H		E/10, D/CVA/F/MCO/POR/G/SUI/53, D/31

- * Cession d'allotissements
- * Transfer of allotments
- * Cesión de adjudicaciones

F.S. COUTO PINHEIRO

Président du Groupe de travail 5A

Chairman of Working Group 5A

Presidente del Grupo de Trabajo 5A

RELATION ENTRE LES METHODES ET LES PROPOSITIONS
RELATIONSHIP BETWEEN METHODS AND PROPOSALS
RELACIÓN ENTRE LOS MÉTODOS Y LAS PROPOSICIONES

Méthode Method Método	Variante Variant Variante	Propositions Proposals Proposiciones
A	A1	SEN/17, CHN/25 - 26, GHA*/77
	A2	KEN*/20, 63
	A3	IND/54, CLM/70, 106, BFA/104
	A4	PHL/120
B		URS/9, SEN/17, CHL/59, ARG/101
C	C1	AUS*/7
	C2	ALG*/75, IRQ/87, CME*/36, ALG/AGL/ARS/BFA/BHR/CME/COG/EGY/ETH/GAB/GHA/IRQ/JOR/ KEN/KWT/LBY/MDG/MWI/MLI/MRC/NIG/OMA/QAT/SEN/SOM/SYR/ TZA/TCD/TGO/TUN/YMS/146
	C3	LBY/103
D	D1	NZL/8
	D2	CTI/95
E		USA/5-30-107-114-123
F	F1	USA/5-30-107-114-123
	F2	F/12
	F3	D/CVA/F/MCO/POR/G/SUI/53, D/31
G		G/18, D/CVA/F/MCO/POR/G/SUI/53, D/31
H		E/10, D/CVA/F/MCO/POR/G/SUI/53, D/31

* Cession d'allotissements

* Transfer of allotments

* Cesión de adjudicaciones

F.S. COUTO PINHEIRO

Président du Groupe de travail 5A

Chairman of Working Group 5A

Presidente del Grupo de Trabajo 5A

RELATION ENTRE LES METHODES ET LES PROPOSITIONS

RELATIONSHIP BETWEEN METHODS AND PROPOSALS

RELACIÓN ENTRE LOS MÉTODOS Y LAS PROPOSICIONES

Méthode Method Método	Variante Variant Variante	Propositions Proposals Proposiciones
A	A1	SEN/17, CHN/25 - 26, GHA*/77
	A2	KEN*/20, 63
	A3	J/39, IND/54, CLM/70, 106, BFA/104
	A4	PHL/120
B		URS/9, SEN/17, CHL/59, ARG/101
C	C1	AUS*/7
	C2	ALG*/75, IRQ/87, CME*/36, ALG/AGL/BFA/CME/COG/EGY/ETH/GAB/GHA/KEN/LBY/MDG/MWI/ MLI/MRC/NIG/SEN/SOM/TZA/TCD/TGO/TUN/146
	C3	LBY/103
D	D1	NZL/8
	D2	CTI/95
E		USA/5-30-107-114-123
F	F1	USA/5-30-107-114-123
	F2	F/12
	F3	D/CVA/F/MCO/POR/G/SUI/53, D/31
G		G/18, D/CVA/F/MCO/POR/G/SUI/53, D/31
H		E/10, D/CVA/F/MCO/POR/G/SUI/53, D/31

* Cession d'allotissements

* Transfer of allotments

* Cesión de adjudicaciones

F.S. COUTO PINHEIRO

Président du Groupe de travail 5A

Chairman of Working Group 5A

Presidente del Grupo de Trabajo 5A

RELATION ENTRE LES METHODES ET LES PROPOSITIONS
RELATIONSHIP BETWEEN METHODS AND PROPOSALS
RELACION ENTRE LOS METODOS Y LAS PROPOSICIONES

Méthode Method Método	Variante Variant Variante	Propositions Proposals Proposiciones
A	A1	SEN/17, CHN/25 - 26, GHA*/77
	A2	KEN*/20, 63
	A3	CME*/36, J/39, IND/54, CLM/70- 106, BOL/CLM/EQA/PRU/VEN/110, EQA/81, BFA/104
	A4	MLA/SNG/THA/82, PHL/120
B		URS/9, SEN/17, CHL/59, ARG/101
C	C1	AUS*/7
	C2	ALG*/75, IRQ/87
	C3	LBY/103
D	D1	NZL/8
	D2	CTI/95
E		USA/5-30-107-114-123
F	F1	USA/5-30-107-114-123
	F2	F/12
	F3	D/CVA/F/MCO/POR/G/SUI/53, D/31, CAN/35
G		G/18, S/33, D/CVA/F/MCO/POR/G/SUI/53, D/31, CAN/35
H		E/10, D/CVA/F/MCO/POR/G/SUI/53, D/31, CAN/35

- * Cession d'allotissements
- * Transfer of allotments
- * Cesión de adjudicaciones

F.S. COUTO PINHEIRO
Président du Groupe de travail 5A
Chairman of Working Group 5A
Presidente del Grupo de Trabajo 5A

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/32-E

19 August 1985

Original: French

WORKING GROUP 5A

Note by the Chairman

Following consideration of all the proposals submitted and with a view to simplifying the Working Group's task, the various planning methods have been consolidated in the form of the eight methods specified in this document. Any delegation which considers that an important part of its proposals has not been included in this document is asked to contact the Vice-Chairman of Working Group 5A.

F.S. COUTO PINHEIRO
Chairman of Working Group 5A

PLANNING METHODS

- A. A priori planning
- B. A priori planning with generalized parameters
- C. Mixed planning
- D. Mixed planning of orbital arcs
- E. Planning of long-term requirements
- F. Cyclical planning
- G. Cyclical planning at two levels
- H. Non-cyclical planning

METHOD A

A priori planning

1. Principle

An a priori assignment Plan is established for all administrations.

2. Forum

Periodical planning conference.

3. Scope of application

World-wide, or regional.

4. Duration

7-10 years.

5. Type of requirements

Orbital position, antenna beam, frequency assignment, etc.

6. Accommodation of requirements

Planning is based on the requirements submitted by the administrations, possibly modified by optimization at the Conference using the computer (variant A1), in agreement with a planning coordination group (variant A1) or in agreement with the administrations (variants A2 and A3).

7. Accommodation of existing requirements

These networks are considered either as having the same status as planned networks (variant A1) or as having to be included with the fewest possible modifications (variants A2 and A3).

8. Accommodation of unforeseen requirements

This is done by using reserved bands (variant A1), or reserve orbit-spectrum capacity (variant A2) or by various means (variant A3). Variant A4, on the other hand, excludes the use of reserve capacity as well as too costly adjustments.

9. Results

Orbital position, antenna beam, frequency assignment, etc. for each administration.

10. Transfer of allotments

This possibility is foreseen for certain countries.

11. Variants

A1: optimization by computer, planning coordination group, reserved bands.

A2: reserve orbit-spectrum capacity.

A3: various means of accommodating unforeseen requirements.

A4: no reserve capacity.

METHOD B

A priori planning with generalized parameters

1. Principle

An a priori allotment Plan is established for all administrations, based on limiting values of general parameters.

2. Forum

Periodical planning conference.

3. Scope of application

World-wide, or regional.

4. Duration

Approximately ten years.

5. Type of requirements

Frequency bands, service areas, reference patterns, values determining signal propagation conditions, angle of arrival, space satellite station-keeping and antenna pointing accuracy, channel bandwidth, number of sub-bands, standards for permissible interference levels.

6. Accommodation of requirements

The Plan is drawn up on the basis of requirements by determining the associated values of the general technical parameters A, B, C, and D using an algorithm to be submitted for approval by the second session of the Conference.

7. Accommodation of existing networks

These networks are included as an integral part of the Plan.

8. Accommodation of unforeseen requirements

For unforeseen requirements of networks in the Plan, certain network characteristics may be modified within the limits set by the Plan for the generalized parameters A, B, C, and D, thereby avoiding the problems which would arise with the establishment of more precise characteristics.

For networks not foreseen in the Plan, there should be a workable procedure for modification of the Plan.

9. Results

Orbital position, antenna beam, frequency bands, polarizations, limiting values of generalized parameters (to allow some flexibility for system design).

10. Transfer of allotments

Not provided for.

11. Variants

None.

METHOD C

Mixed planning

1. Principle

An a priori allotment plan is established for the national requirements of all administrations. In addition, the orbit spectrum resource outside the Plan is managed by a procedure for satisfying other requirements.

2. Forum

Single planning conference (variant C2).

A group of experts meet after each CCIR Plenary Assembly to take technological progress into account in the Plan (variant C2).

3. Scope of application

World-wide (variants C1, C2, C3).

Regional (variant C1).

4. Duration

Indefinite (variant C2).

5. Type of requirements

Global frequency band of identical width for each administration to ensure it has at least one orbital position at whatever date it decides to put its allotment into service (variant C2).

Individual service area for each administration.

Outside the Plan, supplementary international and national requirements.

6. Accommodation of requirements

Establishment of the allotment Plan is based on a combination of various types of discrimination - frequency, polarization, orbital and geographical position.

7. Accommodation of existing networks

Protection by suitable procedures against interference from allotments in the Plan and from future systems outside the Plan.

8. Accommodation of unforeseen requirements

Orbital-spectrum resource outside the Plan.

9. Results

Orbital position, service area (which should, as far as possible, be able to cover neighbouring countries), identical bandwidth for everyone in order to protect the allotment against any interference (variant C2).

10. Transfer of allotments

This possibility is provided for certain countries.

11. Variants

C1: World-wide or regional basis

C2: World-wide basis. All requirements identical. Single conference.

C3: World-wide basis.

METHOD D

Mixed planning of orbital arcs

1. Principle

An a priori allotment plan is established for all administrations with orbital arcs being specified instead of orbital positions. Bilateral or multilateral coordination procedures are used for obtaining access to these arcs.

2. Forum

Periodical planning conference.

3. Scope of application

World-wide or regional.

4. Duration

Ten years (variant D2).

5. Type of requirements

Service area, bandwidth, sensitivity to interference, polarization, radiation pattern, e.i.r.p., antenna dimensions, angle of elevation (variant D2).

6. Accommodation of requirements

Priority for "preferential" requirements with a view to serving a specific sub-region, in relation to "normal" requirements (variant D1) or, on the contrary, priority for international and regional systems (variant D2).

7. Accommodation of existing networks

This is done as far as possible (variant D1) or by insertion in the Plan, in the case of regional and international networks (variant D2).

8. Accommodation of unforeseen requirements

Access by coordination.

9. Results

Orbital arc associated with requirements indicated.

10. Transfer of allotments

Not provided for.

11. Variants

D1: "preferential" and "normal" requirements - existing networks accommodated if possible.

D2: priority for international and regional systems with insertion in the Plan of existing systems of this type.

METHOD E

Planning of long-term requirements

1. Principle

Cyclical multilateral planning for the administrations concerned on the basis of long-term requirements.

2. Forum

Multilateral planning meeting (MPM).

3. Scope of application

World-wide.

4. Duration

One meeting every two years.

5. Type of requirements

Long-term requirements expressed not more than 15 years before they are brought into service, and renewed five years before.

These requirements correspond to the data in Appendix 3, possibly modified, for instance as regards a preferred orbital position and service arc, and the data required for Appendix 29 calculations, possibly modified.

Some countries do not submit any requirements (ten year moratorium).

6. Accommodation of requirements

Optimization of orbital positions and other characteristics is carried out on the basis of "isolation" criteria.

The interference suffered by the various networks will be shared equitably among all the administrations concerned.

7. Accommodation of existing requirements

If necessary to provide access for new networks, increased interference levels or modifications to network transmission parameters will be accepted. If there is no other solution, minimal orbital displacement.

8. Unforeseen requirements

These requirements will be accommodated at the MPM as they occur (if submitted at least seven months before the meeting).

9. Results

Orbital position, service arc and frequency of each network. For every other network, the orbital position which provides a minimum "isolation" between networks, or corresponds to an "isolation" acceptable for the affected administration.

10. Transfer of allotments

Not provided for.

11. Variants

Nil.

METHOD F

Cyclical planning

1. Principle

Cyclical multilateral planning will be carried out for the administrations concerned on the basis of short-term requirements.

2. Forum

"Multilateral" (MPM, variant F1) or "cyclical" (CPM, variant F2) planning meeting.

3. Scope of application

World-wide.

4. Duration

One meeting every two years.

5. Type of requirements

Short-term requirements expressed not more than five years before they are brought into service.

These requirements correspond to the data in Appendix 3, possibly modified (variant F1) or those in Appendix 4, with the addition of information on the type of carriers (variant F2). These data include in particular a preferred orbital position and the service arc, as well as the necessary data for Appendix 29 calculations, possibly modified (variant F1) or with a threshold depending upon the type of carrier (variant F2).

6. Accommodation of requirements

Optimization of orbital positions and other characteristics is carried out on the basis of "isolation" criteria (variant F1) or of the increase in noise temperature (variant F2) or possibly on other bases (variant F3).

The interference suffered by the various networks will be shared equitably among all the administrations concerned.

For variant F2, the details of certain characteristics may be decided, on an optional basis, at a post-CPM coordination meeting between the administrations concerned.

7. Accommodation of existing networks

If it is necessary to provide access for new networks, increased interference levels (variants F1, F2, F3) or modifications to network transmission parameters (variant F1) are accepted. If there is no other solution, minimum orbital displacement (variant F1).

8. Unforeseen requirements

These requirements will be taken into account at the MPM (or CPM) as they occur (if submitted far enough in advance).

9. Results

Orbital position, service arc and guidelines concerning the frequency of each network.

10. Transfer of allotments

Not provided for.

11. Variants

F1: "Isolation" method. Possible modification of existing orbital positions.

F2: "ΔT" method. No modification of existing orbital positions. (Optional) supplementary coordination meetings.

F3: Unspecified technical method.

METHOD G

Cyclical planning at two levels

1. Principle

Cyclical planning is carried out by arranging for the submission of requirements at regular intervals and by holding space WARCs in accordance with a regular cycle with a view to revising the Radio Regulations if necessary as regards GSO planning.

2. Forum

Bilateral or multilateral meetings.

Space WARC.

3. Scope of application

Administrations concerned for bilateral or multilateral meetings.

World-wide for space WARC's.

4. Duration

Bilateral or multilateral meetings to be held irregularly.

Four-year intervals between space WARC's.

5. Type of requirements

Appendix 3.

6. Accommodation of requirements

CPM Report techniques and spectrum and orbit conservation measures.

7. Accommodation of existing networks

Minimum modifications with a need to define repositioning limits for existing networks.

8. Unforeseen requirements

Convening of a new meeting, on request.

9. Results

Initial data, with possible modifications.

10. Transfer of allotments

Not provided for.

11. Variants

Nil.

METHOD H

Non-cyclical planning

1. Principle

Planning is carried out by multilateral meetings between administrations concerned, convened when required.

2. Forum

Bilateral or multilateral meeting.

3. Scope of application

Administrations concerned.

4. Duration

Irregular.

5. Type of requirements

Appendix 3.

6. Accommodation of requirements

CPM Report techniques and spectrum and orbit conservation measures.

7. Accommodation of existing networks

Minimum modifications.

8. Unforeseen requirements

Convening of a new meeting, on request.

9. Results

Initial data, with possible modifications.

10. Transfer of allotments

Not provided for.

11. Variants

Nil.

Report of Sub-Working Group 6B-2

PROPOSAL FOR THE WORK OF COMMITTEE 4

In its consideration of technical parameters for planning, Sub-Working Group 6B-2 has identified some criteria that may be affected by sharing criteria between services in the 14.5 - 14.8 GHz band.

As these parameters require determination for planning the Sub-Working Group requests that the advice of Committee 4 be invited on:

- 1) earth station antenna response characteristics for feeder links:
 - a) co-polar
 - b) cross-polar;
- 2) type of polarization (linear or circular);
- 3) sense of polarization.

R.M. BARTON
Chairman of Sub-Working Group 6B-2

WORKING GROUP 5A

Note from the Chairman

PLANNING METHODS

1. Discussion on the planning methods to be used has brought out many nuances of differences existing between the several proposals. It may be very difficult, if not impossible, to reach any decision - even provisional decisions - without a methodical approach to decision making.
2. It is proposed that WG5A should consider the various planning methods and, if possible, select one of them. It is further proposed that, if necessary, a Drafting group should be created which - on the basis of decisions reached in WG5A - would prepare draft texts in order to permit WG5A;
 - to select one of the possible planning methods;
 - to adopt a combined solution, or
 - to transfer the question for decision in Committee 5.
3. In order to clarify the situation resulting from the proposals of administrations, it is proposed to try to reach provisional decisions on the following matters without prejudice to the decision to be adopted by WG5A in respect of the planning method.
4. Working Group 5A is requested to consider and decide on the following:
 - 4.1 Whether different planning methods should be considered for different Regions and sub-Regions, where appropriate.
 - 4.2 Whether satellite systems could be given different status depending on their use (international, regional, sub-regional or national) or on the Region or Sub-regions covered by them.
 - 4.3 Whether the scope of the planning conference or meeting should:
 - be worldwide;
 - be regional;
 - be sub-regional.

4.4 Whether the planning conference or planning meeting should be attended by:

- all administrations (worldwide, regional or sub-regional);
- administrations concerned.

4.5 What should be the planning duration (interval between planning conferences or planning meetings).

4.6 Whether the planning method should consider:

- requirements submitted by administrations;
- requirements defined by a conference;
- uniform requirements.

4.7 Whether the planning method should consider (or be based on):

- detailed characteristics of systems;
- limited set of characteristics.

4.8 Whether the planning method should:

- set aside portions of the resources to accommodate requirements that could appear during the period between planning conferences or meetings;
- consider the full orbit/spectrum resource.

4.9 Whether existing (in operation or notified) systems at the time of the planning conference or planning meeting should:

- be treated in an equal footing with new requirements;
- be subjected to some adjustments to allow for the accommodation of the new (entrant) systems;
- not be subjected to any adjustments (changes).

4.10 Whether different technical parameters and criteria should be adopted for different frequency bands and/or orbital arcs.

4.11 Whether different planning methods could be adopted for different frequency bands and/or orbital arcs.

F.S.C. PINHEIRO
Chairman of Working Group 5A

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

**WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT**

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/35 (Rev.1)-E

22 August 1985

Original: English

WORKING GROUP 5B

TERMS OF REFERENCE OF SUB-WORKING GROUPS 5B AD HOC 1

AND 5B AD HOC 2

The terms of reference of Sub-Working Groups 5B Ad hoc 1 and 5B Ad hoc 2 are as follows:

5B Ad hoc 1

To consider and prepare recommendations for Working Group 5B on matters concerning the application of Article 14 of the Radio Regulations to space radiocommunication services, taking into account the Report of the IFRB, proposals submitted by administrations and discussions in Working Group 5B.

5B Ad hoc 2

To prepare on the basis of the Report of the IFRB, proposals submitted by administrations and discussions in Working Group 5B, a consolidated and concise document for the consideration of Working Group 5B concerning regulatory guidelines on Sections I and II of Article 11 of the Radio Regulations and the appropriate appendices in respect of unplanned bands and services.

S.M. CHALLO

Chairman of Working Group 5B

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

**WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT**

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/35-E
20 August 1985
Original: English

WORKING GROUP 5B

TERMS OF REFERENCE OF SUB-WORKING GROUPS 5B AD HOC 1 AND 5B AD HOC 2

The terms of reference of Sub-Working Groups 5B Ad hoc 1 and 5B Ad hoc 2 are as follows:

5B Ad hoc 1

To consider and prepare recommendations for Working Group 5B on matters concerning the application of Article 14 of the Radio Regulations to space radiocommunication services, taking into account the Report of the IFRB, proposals submitted by administrations and discussions in Working Group 5B.

5B Ad hoc 2

To prepare a consolidated and concise document for the consideration of Working Group 5B concerning regulatory guidelines on sections I and II of Article 11 of the Radio Regulations in respect of unplanned bands and services, taking Appendices 3 and 4 into account.

S.M. CHALLO
Chairman of Working Group 5B

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/36-E
16 August 1985
Original: English

SUB-WORKING GROUP 6A2

Note by the Chairman of Sub-Working Group 6A2

The consequential modifications to the Radio Regulations contained in Part III of the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, are reproduced at Annex for ease of reference.

J.F. BROERE
Chairman

Annex : 1

ANNEX

PART III

Consequential modifications to Radio Regulations

1. *Modifications to the provisions of Article 8 of the Radio Regulations*

ARTICLE 8

Table of Frequency Allocations

GHz
11.7 — 12.75

Allocation to Services			
	Region 1	Region 2	Region 3
MOD	11.7 — 12.5 FIXED BROADCASTING BROADCASTING-SATELLITE Mobile except aeronautical mobile	11.7 — 12.1 FIXED 837 FIXED-SATELLITE (space-to-Earth) Mobile except aeronautical mobile 836 839 840	11.7 — 12.2 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE
		12.1 — 12.2 FIXED-SATELLITE (space-to-Earth) 836 839 840 842	
		12.2 — 12.7 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 838 840	12.2 — 12.5 FIXED MOBILE except aeronautical mobile BROADCASTING 838 840 845
MOD	12.5 — 12.75 FIXED-SATELLITE (space-to-Earth) (Earth-to-space) 840 848 849 850	839 840 844 846 12.7 — 12.75 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE except aeronautical mobile 840	12.5 — 12.75 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile BROADCASTING-SATELLITE 847 840

III/Art. 8

- 290 -

- MOD 836 In Region 2, in the band 11.7 – 12.2 GHz, transponders on space stations in the fixed-satellite service may be used additionally for transmissions in the broadcasting-satellite service, provided that such transmissions do not have a maximum e.i.r.p. greater than 53 dBW per television channel and do not cause greater interference or require more protection from interference than the coordinated fixed-satellite service frequency assignments. With respect to the space services, this band shall be used principally for the fixed-satellite service.
- MOD 837 *Different category of service:* in Canada, Mexico and the United States, the allocation of the band 11.7 – 12.1 GHz to the fixed service is on a secondary basis (see No. 424).
- MOD 839 The use of the band 11.7 – 12.7 GHz in Region 2 by the fixed-satellite and broadcasting-satellite services is limited to national and sub-regional systems. The use of the band 11.7 – 12.2 GHz by the fixed-satellite service in Region 2 is subject to previous agreement between the administrations concerned and those having services, operating or planned to operate in accordance with the Table, which may be affected (see Articles 11, 13 and 14). For the use of the band 12.2 – 12.7 GHz by the broadcasting-satellite service in Region 2, see Part I of the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2.
- MOD 840 For the use of the band 11.7 – 12.75 GHz in Regions 1, 2 and 3, see Resolution 34.
- SUP 841
- MOD 842 *Additional allocation:* the band 12.1 – 12.2 GHz in Brazil and Peru, is also allocated to the fixed service on a primary basis.
- SUP 843
- MOD 844 In Region 2, in the band 12.2 – 12.7 GHz, existing and future terrestrial radiocommunication services shall not cause harmful interference to the space services operating in accordance with the Broadcasting-Satellite Plan prepared at the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2.
- MOD 846 In Region 2, in the band 12.2 – 12.7 GHz, assignments to stations of the broadcasting-satellite service made available in the Plan established by the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2 may also be used for transmissions in the fixed-satellite service (space-to-Earth), provided that such transmissions do not cause more interference or require more protection from interference than the broadcasting-satellite service transmissions operating in accordance with that Plan. With respect to the space services, this band shall be used principally for the broadcasting-satellite service.
- MOD 869 The use of the band 17.3 – 18.1 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service. For the use of the band 17.3 – 17.8 GHz in Region 2 by the feeder links for the broadcasting-satellite service in the band 12.2 – 12.7 GHz, see Part II of Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2.

2. *Modifications to the provisions of Article 11 of the Radio Regulations*

ARTICLE 11

NOC

**Coordination of Frequency Assignments to Stations
in a Space Radiocommunication Service Except Stations
in the Broadcasting-Satellite Service
and to Appropriate Terrestrial Stations¹**

- MOD A.11.1 ¹For the coordination of frequency assignments to stations in the broadcasting-satellite service and other services in the frequency bands 11.7 – 12.2 GHz (in Region 3), 11.7 – 12.5 GHz (in Region 1) and 12.2 – 12.7 GHz (in Region 2) as well as the coordination of frequency assignments to feeder link stations utilizing the fixed-satellite service (Earth-to-space) in the frequency band 17.3 – 17.8 GHz (in Region 2) and other services in this band in Region 2, see also Article 15 and Article 15A respectively.

3. *Modifications to the provisions of Article 12 of the Radio Regulations*

ARTICLE 12

MOD	(Title)	Notification and Recording in the Master International Frequency Register of Frequency Assignments¹ to Terrestrial Radiocommunication Stations^{2, 3, 4}
MOD	A.12.3	³ For the notification and recording of frequency assignments to terrestrial stations in the frequency bands 11.7 – 12.2 GHz (in Region 3), 12.2 – 12.7 GHz (in Region 2) and 11.7 – 12.5 GHz (in Region 1), so far as their relationship to the broadcasting-satellite service in these bands is concerned, see also Article 15.
ADD	A.12.4	⁴ For the notification and recording of frequency assignments to terrestrial stations in the frequency band 17.7 – 17.8 GHz (in Region 2), so far as their relationship to the fixed-satellite service (Earth-to-space) in this band is concerned, see also Article 15A.

4. *Modifications to the provisions of Article 13 of the Radio Regulations*

ARTICLE 13

NOC		Notification and Recording in the Master International Frequency Register of Frequency Assignments¹ to Radio Astronomy and Space Radiocommunication Stations Except Stations in the Broadcasting-Satellite Service²
MOD	A.13.2	² For notification and recording of frequency assignments to stations in the broadcasting-satellite service and other services in the frequency bands 11.7 – 12.2 GHz (in Region 3), 11.7 – 12.5 GHz (in Region 1) and 12.2 – 12.7 GHz (in Region 2), as well as the notification and recording of frequency assignments to feeder link stations in the fixed-satellite service (Earth-to-space) in the frequency band 17.3 – 17.8 GHz (in Region 2) and other services in this band in Region 2, see also Article 15 and Article 15A respectively.

5. *Modifications to the provisions of Article 15 of the Radio Regulations*

ARTICLE 15

MOD	(Title)	Coordination, Notification and Recording of Frequency Assignments to Stations of the Broadcasting-Satellite Service in the Frequency Bands 11.7 – 12.2 GHz (in Region 3), 12.2 – 12.7 GHz (in Region 2) and 11.7 – 12.5 GHz (in Region 1) and to the Other Services to Which These Bands Are Allocated, so far as Their Relationship to the Broadcasting-Satellite Service in These Bands is Concerned
MOD	1656	The provisions and associated Plan for the broadcasting-satellite service in the frequency bands 11.7 – 12.5 GHz (in Region 1) and 11.7 – 12.2 GHz (in Region 3) adopted by the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, as contained in Appendix 30 to the Radio Regulations, and the provisions and associated Region 2 Plan for the broadcasting-satellite service in the frequency band 12.2 – 12.7 GHz adopted by the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, as contained in Part I of the Final Acts of the latter Conference, shall apply to the assignment and use of frequencies by stations of the broadcasting-satellite service in these bands and to the stations of other services to which these bands are allocated so far as their relationship to the broadcasting-satellite service in these bands is concerned.

III/Art. 15A

- 292 -

6. *New Article 15A of the Radio Regulations*

ADD

ARTICLE 15A

**Coordination, Notification and Recording of Frequency
Assignments to Stations in the Fixed-Satellite Service
(Earth-to-Space) in the Frequency Band 17.3 – 17.8 GHz (Region 2)
Providing Feeder Links for the Broadcasting-Satellite Service and
also to Stations of Other Services to Which this Band is Allocated
in Region 2, so far as Their Relationship to the Fixed-Satellite Service
(Earth-to-space) in this Band is Concerned in Region 2**

1668

The provisions and associated Plan adopted by the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, for feeder links associated with the broadcasting-satellite service utilizing the fixed-satellite service (Earth-to-space) in the band 17.3 – 17.8 GHz (Region 2) as contained in Part II of the Final Acts of the said conference, shall apply to the assignment to and use by feeder links of frequencies in this band and to stations of other services to which this band is allocated in Region 2 so far as the relationship of these other services to the fixed-satellite service (Earth-to-space) in this band is concerned in Region 2.

7. *Modifications to the provisions of Appendix 3 to the Radio Regulations*

APPENDIX 3

MOD (Title)

**Notices Relating to Space Radiocommunications
and Radio Astronomy Stations ¹**

(See Articles 11 and 13)

ADD

¹ For notices of assignments to feeder links (other than those for telecommand and tracking) in the band 17.3 - 17.8 GHz for the broadcasting-satellite service in the frequency band 12.2 - 12.7 GHz in Region 2, the basic characteristics to be furnished are prescribed in Annex 2, Part II of the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service, Region 2, Geneva, 1983.

9. *Action on Resolutions and Recommendations of WARC-79*

- | | | |
|-----|--------------------|--|
| SUP | RESOLUTION No. 31 | Relating to the Application of Certain Provisions of the Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, to Take into Account Changes Made by the World Administrative Radio Conference, Geneva, 1979 to the Table of Frequency Allocations for Region 2 in the Band 11.7 - 12.7 GHz |
| SUP | RESOLUTION No. 100 | Relating to the Coordination, Notification and Recording in the Master International Frequency Register of Assignments to Stations in the Fixed-Satellite Service with Respect to Stations in the Broadcasting-Satellite Service in Region 2 |
| SUP | RESOLUTION No. 503 | Relating to the Coordination, Notification and Recording in the Master International Frequency Register of Frequency Assignments to Stations in the Broadcasting-Satellite Service in Region 2 |
| SUP | RESOLUTION No. 504 | Relating to the Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, with Respect to Region 2 |
| SUP | RESOLUTION No. 700 | Relating to Sharing Between the Fixed-Satellite Service in Regions 1 and 3 and the Broadcasting-Satellite Service in Region 2 in the Band 12.2 - 12.7 GHz |
| SUP | RESOLUTION No. 701 | Relating to the Convening of a Regional Administrative Radio Conference for the Detailed Planning of the Broadcasting-Satellite Service in the 12 GHz Band and Associated Feeder Links in Region 2 |
-

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/37-E

23 August 1985

Original: English

SUB-WORKING GROUP PL/A-1

Note by the Chairman of Sub-Working Group PL/A-1

Terms of Reference of Sub-Working Group PL/A-1

Based on the results of the work of Committees 4, 5 and 6, and taking into account the advice of Committee 3, to specify the preparatory actions required to be completed before the commencement of the Second Session of the Conference (agenda item 5.2).

PROPOSALS (Documents 1 to 146)	
URS/9/8 G/18, paras 15 to 20 G/18, para 53 CHN/26/14 S/33/10 and 11 CAN/35/30 J/40/10 J/41 SG/44 CVA/F/G/GRC/MCO/POR/S - COMP/51/1 MEX/60/6	MEX/61/15 CLM/67/3 CLM/70/8 GRC/74/6 GHA/77/8 YUG/78/8 EQA/81/2 IRQ/87/18 USA/88/52 CTI/95/5 EGY/99/2
These proposals are contained in the <u>Annex</u> .	

J.R. MARCHAND
Chairman

A N N E X

URS/9/8 During the inter-sessional period, technical criteria should be developed for sharing between feeder links and terrestrial services in the frequency band 17.3 - 18.1 GHz, and for sharing between feeder links and FSS systems (space-to-Earth) in the 17.7 - 18.1 GHz band.

 The standards for the technical characteristics of terrestrial services should be maintained as in Article 27 of the Radio Regulations.

G/18/15 The first session of the WARC-ORBIT should initiate a study and develop recommendations leading to a resolution of any problems of introducing reverse-band working⁸;

G/18/16 This study should be limited to the main pairs of frequency bands allocated to the FSS at 4/6 GHz and 11-12/14 GHz and should concentrate particularly on the new (WARC 1979) FSS bands;

G/18/17 The study should be further limited to fixed-satellite systems of a national and regional character which might be introduced during the next 10 year period;

G/18/18 The study should seek means of effectively isolating two communities of fixed-satellite systems from each other, ie. those operating in the conventional directions and those operating in the same bands but in the reverse directions;

G/18/19 The study should also consider whether there would be any benefit from orbit sectorisation and/or band segmentation for the purposes of isolating national and regional systems using reverse-band working in one ITU Region from similar systems in other ITU Regions;

G/18/20 The study should include the following aspects:-

 a. any further requirements (additional to Appendix 29, Case 2) for space station - space station coordination;

 b. any requirements for earth station - earth station coordination⁹;

⁸ The results of the UK studies of reverse band working are at Annex B of Document 18.

⁹ See for example CPM Report, Annex 8, CCIR Report 557-1 and CCIR Draft report AF/4.

G/18/

INTER-SESSIONAL WORK ON SHARING
CRITERIA FOR BSS FEEDER LINKS BANDS (AGENDA ITEM 3.3)

53. In view of the United Kingdom proposal under item 3.1 of the agenda (G/18/29) relating to the choice of the band 17.3 - 18.1 GHz for the establishment of feeder link plans for BSS in Regions 1 and 3 this is the only band upon which the UK offers comments. No sharing criteria are required as between the fixed-satellite service (limited by RR869 to BSS feeder links) on a primary basis and the radio location service on a secondary basis in the band 17.3 - 17.7 GHz. In the same band for the countries mentioned in RR 868 and in the higher band 17.7 - 18.1 GHz the CPM Report deals with existing sharing criteria or correctly points out the need for additional criteria to be developed (see CPM Sections 8.4, 9 and Annex 6 6.1.3.4).

CHN/26/14 2.3 Computer optimization

The main function of computer optimization is to find the best satellite orbital positions, satellite antenna beam shapes and frequency assignments for all requirements. The best package of computer programs should therefore be selected.

- Optimizing techniques for satellite positions have been studied in certain countries and some good results have been achieved (various descriptions are given in the appendices to CCIR CPM reports). The optimizing method selected by the Conference could be based on further studies.
- Satellite antenna beam shapes could be optimized by shaped beam or elliptical beam techniques. At present however, it would be suitable for planning purposes to adopt the optimum elliptical beam in most countries.
- Frequency assignment optimization should reduce the heterogeneity of satellite systems, and also result in flexibility for the arrangement of carriers with various spectral power densities. One possible method of frequency assignment optimization is to divide the planned frequency band into frequency segments to be arranged according to power density; satellite spacing could be determined by the largest value of isolation at co-frequency segments.

S/33/10

RECOMMENDATION S-A

Relating to studies for the introduction of high definition television broadcasting via satellites.

The WARC ORB, Geneva, 1985

recommends

1. that the CCIR study:
 - which frequency bands would be possible and appropriate from the point of view of propagation and
 - what necessary bandwidth would be appropriate,
2. that administrations study the possibilities to suggest the allocation of a suitable frequency band, taking due account to the needs of other services,
3. that the next world administrative radio conference dealing with space radiocommunications shall be authorized to take appropriate decisions regarding the allocation of a suitable frequency band.

S/33/11

The Swedish Administration proposes that the WARC-ORBIT 1 should:

- a. Agree to defer definitive action on agenda item 6.1 to WARC-ORBIT 2;
- b. Identify all actual and foreseen incompatibilities between the 1977 BC plan for Regions 1 and 3 and the 1983 plan for Region 2;
- c. Initiate inter-sessional work leading to a resolution of those incompatibilities and to the other problems identified by the CPM;
- d. Take all other preparatory actions required to enable the WARC-ORBIT 2 to complete the content of WARC-ORBIT 1 agenda item 6.

CAN/35/30

DRAFT

RESOLUTION

Relating to the Establishment of Maximum
Permitted Spurious Emission Power Levels
for Stations in the Space Services

The World Administrative Radio Conference, Geneva, 1985

resolves

that the Second Session of WARC-ORB having regard to noting (d), establish, where feasible, maximum permitted spurious emission power levels for stations of space services, which would be applicable only outside the allocated frequency band used by such stations;

requests the CCIR

to study spurious emissions from stations in the space services, particularly with regard to the technical, operational, and economic impact of specifying permitted spurious emission levels occurring outside the allocated frequency band, with the aim of providing the Second Session of WARC-ORB with the necessary information.

J/40/10

Proposal B (Outline of planning procedure)

- 1) The first session shall establish technical criteria and the principles for the planning.
- 2) The administrations and the IFRB shall perform the following in the intersessional period.
 - The IFRB shall lay down the form to be used for the submission of requirements and inform it all administrations of these by the date specified in the first session.
 - The administrations shall submit their requirements by the use of the form to the IFRB by the specified date.
 - The IFRB shall prepare a draft plan in compliance with planning method adopted in the first session by the specified date and inform all administrations of this.
- 3) During the second session, if necessary, a draft plan shall be amended and adopted.
- 4) An automatic processing system shall be used for preparing a draft plan in the intersessional period and for amending it during the second session. This processing system should be developed by the IFRB in cooperation with the administrations.

J/41/

**Relating to Agenda Item 2.3:
Necessity for Automated Planning Softwares and
Proposal of Establishing a Panel of Experts to Develop Them**

This document foresees the need for two kinds of software : synthesis and analysis computer programs. **Objectives of the former might be to compute preferred locations of satellites, to determine the need of coordination between systems and to derive a favorable carrier frequency assignments, at the stages of planning. The purpose of the latter is for recalculating accurate interference values from the approximate solutions provided by Synthesis Software. Programs so far reported at CCIR meetings such as ORBIT-II, CAP-N and SOAP might be used with proper modifications for the new planning or coordination purposes. In developing and utilizing these programs we need common standards, which will enable decisions to be made on the same bases internationally and facilitate to achieve our final goal of this Conference.** The document also proposes that a Panel of Experts be established to develop this software.

SG/44/

Note by the Secretary-General

FINANCIAL RESPONSIBILITIES OF ADMINISTRATIVE CONFERENCES

The Conference will wish to keep in mind the relevant decisions of the Plenipotentiary Conference (Nairobi, 1982) now embodied in Article 80 of the Convention, as well as Resolution No. 48 of that Conference. Copies of the relevant provisions of the Convention and the Resolution in full are attached for reference.

In view of the timing of the Conference and the period until the scheduling of the next session (41st) of the Administrative Council (June 1986) the Administrative Council (July 1985) was asked to make some financial provision for any intersessional work initiated by this Conference (see extract of Administrative Council Document 6327, enclosed).

The Council has approved a single lump sum of 900,000 Swiss francs in the 1986 budget. This amount can only be used by a decision of the Conference through the Budget Control Committee pending the 41st session of the Administrative Council in 1986. Credits for computing power resources have not been foreseen in this lump sum.

It will be observed that the provision made by the Administrative Council falls considerably short of the sum which had been proposed in the draft budget.

R.E. BUTLER
Secretary-General

COMP/ 51 /1. WARC-ORBIT 1 should:-

- a. Agree to defer definitive action on agenda item 6.1 to WARC-ORBIT 2;
- b. Identify all actual and foreseen incompatibilities between the 1977 BC plan for Regions 1 and 3 and the 1983 plan for Region 2;
- c. Initiate inter-sessional work leading to a resolution of those incompatibilities and to the other problems identified by the CPM;
- d. Take all other preparatory actions required to enable the WARC-ORBIT 2 to complete the content of WARC-ORBIT 1 agenda item 6.

MEX/60/6

Sound broadcasting-satellite service (agenda item 4)

Owing to the major difficulty of sharing between the sound broadcasting-satellite service and other services, it may be necessary to allocate a suitable frequency band on an exclusive basis and for the CCIR to continue its studies to determine the proper value of the bandwidth to be estimated for allocating a frequency band to the sound broadcasting-satellite service. We therefore consider that the Second Session of the Conference should instruct the CCIR to continue its studies in this connection.

In view of the use being made in Mexico of the frequency bands 470 - 806 MHz, 806 - 890 MHz, 890 - 960 MHz, 1 429 - 1 525 MHz and 1 710 - 2 290 MHz, it would be extremely difficult for Mexico to transfer the services currently operating in them to other bands.

MEX/61/15

The CCIR should pursue the studies aimed at determining an adequate value of bandwidth to be applied in allocating a frequency band to the sound broadcasting-satellite service.

CLM/67/3

WARC-ORB(1) is invited to take steps to ensure that studies are conducted in the intersessional period on the thresholds for engaging in a priori planning of initially unplanned services, based on the level of congestion reached.

CLM/70/8

- 3) A Group of Experts should be established to proceed, before WARC-ORB(2), with a preliminary OSR assignment plan as well as a preliminary harmonization, both being based on the planning elements adopted by WARC-ORB(1), for submission to the second session of the Conference for review and approval;

GRC/74/6

WARC-ORB 1 should:

- a) agree to defer definitive action on agenda item 6.1 to WARC-ORB 2;
- b) identify all actual and foreseen incompatibilities between the 1977 BC plan for Regions 1 and 3 and the 1983 plan for Region 2;
- c) initiate inter-sessional work leading to a resolution of those incompatibilities and to the other problems identified by the CPM;
- d) take all other preparatory actions required to enable the WARC-ORB 2 to complete the content of WARC-ORB 1 agenda item 6.

GHA/77/8

Sharing criteria between services (agenda item 2.6)

Ghana proposes that this task be referred to the CCIR which should submit its Recommendations to WARC-ORB-88 for approval.

YUG/78/8

The Socialist Republic of Yugoslavia proposes that sharing criteria be established between all services to which the bands selected for the plan have been allocated on equal right basis (Agenda item 3.3).

EQA/81/2

Ecuador proposes that :

before the second session, upper limits of congestion should be defined and the need for a priori planning of the services and bands initially unplanned should be determined. This would preclude any continued application of the "first come first served" principle which has led to the inequitable use of the OSR.

IRQ/87/18

the Conference should adopt a Recommendation that a comprehensive study should be started by the ITU with regard to the legal and the financial aspects of such collisions and to coordinate its efforts with the specialized committees of the United Nations dealing with space international law.

USA/88/52 There is currently no other calculation technique which would be capable of addressing quantitatively all concerns that are expected to arise in connection with a broad range of orbit utilization and management approaches including that proposed by the United States of America. It is considered that the isolation concept should be carefully evaluated and refined for practical application. This work should be undertaken during the intersessional period.

CTI/95/5 Agenda item 3

For Regions 1 and 3 the Conference shall establish a frequency plan relating to feeder links to broadcasting satellites in the band 17.3 - 18.1 GHz.

Sharing criteria must be developed in the intersessional period in the 17.7 - 18.1 GHz portion of this band.

EGY/99/2 Identification of the bands needing sharing criteria
(agenda item 3.3)

With reference to Table 9-1, and Annex 5, section 5.4 of the CPM Report, the bands for which sharing criteria between services (space or terrestrial) need to be developed can be identified as follows:

a) 14.5 - 14.8 GHz band

Sharing criteria between the FSS (Earth-to-space), FIXED, and MOBILE except aeronautical mobile services should be developed.

b) 17.3 - 17.7 GHz band

Sharing criteria between the FSS (Earth-to-space), and FIXED services should be developed.

c) 17.7 - 18.1 GHz band

Sharing criteria between the FSS (Earth-to-space), FSS (space-to-Earth), and FIXED services should be developed.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/38-E
23 August 1985
Original: English

SUB-WORKING GROUP PL/A-2

Note by the Chairman of Sub-Working Group PL/A-2

Terms of Reference of Sub-Working Group PL/A-2

To recommend a draft agenda for the Second Session of the Conference for consideration by the Administrative Council (agenda item 5.3).

PROPOSALS (Documents 1 to 146)	
AUS/7/10 URS/9/9 to 10 F/13/8 + page 2 G/18, paras 54 to 56 G/18, para 58 HOL/21/1, para 3 HOL/22/3 HOL/23/4 HOL/24/5 D/31/23 and 25 S/33/10 and 11 E/34/7 CAN/35/30 B/37/19 and 22	J/40/10 E/42/8 CVA/F/G/GRC/MCO/POR/S - COMP/51/1 CVA/D/F/G/MCO/POR/SUI - COMP/53, para 3 MEX/60/6 and 12 GRC/74/6 F/76/20 EQA/81/4 CTI/95/7 and 8 AUS/98 CLM/106/57 URS/137
These proposals are contained in the <u>Annex</u> .	

M.J. BATES
Chairman

A N N E X

AUS/7/10

recommends to the Administrative Council

1. The following draft agenda for the Second Session:

On the basis of the report of the First Session and taking into account the reports on the intersessional work carried out by expert groups of the IFRB and the CCIR:

- 1.1 carry out the planning according to the principles and the method established at the First Session;

- 1.2 review, and, where necessary, revise the relevant provisions of the Radio Regulations relating to the use of the geostationary satellite orbit for space services and for feeder links to broadcasting satellites;

- 1.3 adopt the technical standards, parameters, and criteria recommended in the report of the First Session.

URS/9/10

In the opinion of the USSR Administration, the agenda for the Second Session of the Conference should include the following items:

- establishment of a Plan for national FSS systems;
- establishment of a Plan for feeder links for the BSS in Regions 1 and 3.

F/13/8

Proposal: To recommend to the second session the following amendment to No. 109 of the Radio Regulations:

109 4.52 Feeder link (F: liaison de connexion; S: enlace de connexion):
MOD

A radio link from an earth station at a specified fixed point to a space station, or vice versa, conveying information for a space radiocommunication service other than ~~for the fixed-satellite service~~ those established between earth stations located at specified fixed points

A feeder link may be:

- a one-way up-link, or
- a one-way down-link, or
- a two-way link.

Proposal: To recommend to the second session the addition of the three following definitions to Section VIII:

F/13/9

173 A 8.4.a Data relay satellite (F: satellite relais de données,
ADD S: satélite de retransmision de datos)

A satellite whose main purpose is the relay of data from one or more mission satellites or space probes to one or more earth stations. It may also provide for communication in the other direction.

Data relay satellites are generally in the geostationary satellite orbit.

F/13/10

173 B 8.4.b Data collection satellite (F: satellite de collecte de
ADD données, S: satélite de adquisicion de datos)

A satellite whose main purpose is the collection of data from stations on the Earth or in the atmosphere of the Earth, and subsequent forwarding of those data to one or more earth stations. It may also provide for communication in the other direction.

F/13/11

173 C 8.4.c Remote sensing satellite (F: satellite de télédétection,
ADD S: satélite de teledeteccion)

A satellite whose main purpose is remote observation by reception of radio waves using passive or active sensors.

G/18/

SATELLITE SOUND BROADCASTING - RESOLUTION 505 (AGENDA ITEM 4)

54. Resolution No 505 of the WARC 1979 resolved in effect that, on the basis of studies to be undertaken by administrations and by the CCIR, the next WARC should be authorised "to take appropriate decisions regarding the allocation of a suitable frequency band" for satellite sound broadcasting in the frequency range 0.5 GHz to 2 GHz. Item 4 of the agenda for the WARC-ORBIT 1 requires the conference to consider the matter and make appropriate recommendations for the attention of WARC-ORBIT 2.

55. The Report of the CPM, specifically Chapter 11, paragraph 11.4, concludes that "due to sharing difficulties (in the frequency range examined, ie 0.5 GHz to 2 GHz) the implementation of such a service will not be possible unless an appropriate frequency band is allocated for it on an exclusive basis". Annex 7 to the Report of the CPM suggests that the overall bandwidth requirement for a new allocation for this type of service would be in the range 9 to 26 MHz depending upon the Region, the number of channels per country in that Region and whether the transmissions are monophonic or stereophonic (another source, the European Broadcasting Union has suggested with respect to Region 1 that a bandwidth "needed to produce five programmes per country is no greater than 45 MHz"). On these bases the United Kingdom has examined its own existing and projected use of each frequency band within the range specified by Resolution 505 and has, at this time, found none that could be cleared to permit of an exclusive allocation for satellite sound broadcasting.

56. Despite this adverse conclusion the United Kingdom would wish to keep open the possibilities of finding some spectrum suitable for this service, possibly by sharing on a geographical basis or by the use of more sophisticated techniques for satellite sound broadcasting (possibly reducing the bandwidth required or reducing spectral power flux densities) which might facilitate sharing with other radio services in the same Region or area. Accordingly while the United Kingdom makes no proposals on this subject, we believe that the WARC-ORBIT 1, in accordance with the spirit of Resolution 505 of the WARC 1979 and in accordance with item 4 of the agenda, should continue the study of whether and how provision could be made by the WARC-ORBIT 2 for the introduction of a service of sound broadcasting by satellite.

DRAFT AGENDA RECOMMENDED FOR THE WARC-ORBIT 2 (AGENDA ITEM 5.3)

58. It is evident that the detailed contents of the agenda for the second session of the WARC will depend very much upon the outcome of the first session, therefore the United Kingdom makes no proposals under this agenda item. Four points merit a mention at this stage:

- a) It is essential that the principal task of the second session must be derived from the instrument which originated the WARC-ORBIT, ie Resolution No 3 of the WARC 1979.
- b) Another point which merits careful consideration is the extent to which the second session may be authorised to make changes to the International Table of Frequency Allocations in Article 8 of the Radio Regulations. On this matter the United Kingdom takes the view that any such authorisation must safeguard the position for terrestrial radio services and ensure that any changes made to the Table concerning space radio services shall have no adverse impact on terrestrial services.
- c) A third point which can already be foreseen is that, because the agenda for the WARC-ORBIT 1 does not provide for the preparation of a BSS feeder link plan for Regions 1 and 3, the agenda for the WARC-Orbit 2 must provide for this to be done by the second session.
- d) Similarly, the question of whether the WARC-ORBIT 1 can and should identify the bands to be used for feeder links for DBS allocations other than that at 12 GHz will also need to be considered. (For example, the feeder links for the BSS band at 40.5-42.5 GHz are dealt with in RR 901 but there is no parallel provision for feeder links for the BSS band at 84.86 GHz).

HOL/21/

The Netherlands administration has developed a procedural planning method which effectively combines the major advantages of a flexible regime with a solid guarantee for access for every administration at any time. This method is described in Document 21.

3. The agenda for the 2nd session should offer the possibility of the procedure being applied for the first time.

The 2nd session of the Conference should have such terms of reference that deficiencies in the procedure, if any, may be corrected.

HOL/22/3

The Netherlands Administration proposes that an a priori frequency assignment plan for the feeder-links to the broadcasting satellites of the countries in Regions 1 and 3 should be established at the second session of this conference.

HOL/23/4

Resolves

That the agenda of the second session of this Conference should permit a revision of the Table of Frequency Allocations concerning only the bands between the 22.5 - 23 GHz and the 27 - 27.5 GHz in order to allocate these bands also in Region 1 to the Broadcasting-Satellite Service and the Fixed-Satellite Service (feeder-links);

HOL/24/5

Resolves

1. That the second session of this Conference should be authorized to take appropriate decisions regarding the allocation of a suitable frequency band for the broadcasting-satellite service (sound).
2. That the second session should have the authority to take appropriate decisions consequential to this future re-allocation.

D/ 31 /25

The Administration of the Federal Republic of Germany does not consider it possible at present to introduce and plan a broadcasting-satellite service (sound) within the band 0.5 - 2 GHz.

S/33/10

recommends

3. that the next world administrative radio conference dealing with space radiocommunications shall be authorized to take appropriate decisions regarding the allocation of a suitable frequency band for the introduction of high definition television broadcasting via satellites.

S/33/11

With these points in mind the Swedish Administration proposes that the WARC-ORBIT 1 should:

- a. Agree to defer definitive action on agenda item 6.1 to WARC-ORBIT 2;
- b. Identify all actual and foreseen incompatibilities between the 1977 BC plan for Regions 1 and 3 and the 1983 plan for Region 2;
- c. Initiate inter-sessional work leading to a resolution of those incompatibilities and to the other problems identified by the CPM;
- d. Take all other preparatory actions required to enable the WARC-ORBIT 2 to complete the content of WARC-ORBIT 1 agenda item 6.

E/34/7

BROADCASTING-SATELLITE SERVICE IN THE BAND 22.5 - 23 GHz IN REGION 1

the Spanish Administration proposes the following:

that WARC-ORB-85 should examine the position with regard to allocations in the band 22.5 - 23 GHz and contemplate including in the agenda of the Second Session of the Conference an item relating to the possibility of allocating this band to the broadcasting-satellite service in Region 1 on a primary basis, as well as on a shared basis with those currently authorized under the Radio Regulations.

CAN/35/30

resolves

that the Second Session of WARC-ORB having regard to noting (d), establish, where feasible, maximum permitted spurious emission power levels for stations of space services, which would be applicable only outside the allocated frequency band used by such stations .

- B/37/22 5. Regarding the provisions and associated plan for feeder links of the BSS in the band 17.3-17.8 GHz in Region 2, it is proposed that they be incorporated into the Radio Regulations as a new Appendix 30A. In fact, if WARC-ORB(2), in 1988, decides to plan the feeder links of the BSS in Regions 1 and 3, a consolidated text for all Regions would be prepared at that time.

J/40/10

Proposal B (Outline of planning procedure)

- 1) The first session shall establish technical criteria and the principles for the planning.
- 2) The administrations and the IFRB shall perform the following in the intersessional period.
 - The IFRB shall lay down the form to be used for the submission of requirements and inform it all administrations of these by the date specified in the first session.
 - The administrations shall submit their requirements by the use of the form to the IFRB by the specified date.
 - The IFRB shall prepare a draft plan in compliance with planning method adopted in the first session by the specified date and inform all administrations of this.
- 3) During the second session, if necessary, a draft plan shall be amended and adopted.
- 4) An automatic processing system shall be used for preparing a draft plan in the intersessional period and for amending it during the second session. This processing system should be developed by the IFRB in cooperation with the administrations.

E/42/8

STUDY OF THE IMPLICATIONS OF USING HYBRID SATELLITES

The Spanish Administration proposes:

- 1) that WARC-ORB-85 should establish the principles and consider the technical requirements for the type of sharing between services discussed in this document, having due regard to the rational use of the orbit-spectrum resource;
- 2) that, as an alternative to the bands 10.7 - 11.7 GHz or 12.5 - 12.75 GHz, WARC-ORB-85 should see whether any FSS frequency bands other than 4/6 and 11-12/14 GHz can be found which would improve FSS payloads on this type of platform,
- 3) that, if appropriate, this subject should be included in the draft agenda of the Second Session of the Conference.

COMP/ 51 /1.

That the WARC-ORBIT 1 should:-

- a. Agree to defer definitive action on agenda item 6.1 to WARC-ORBIT 2;
- b. Identify all actual and foreseen incompatibilities between the 1977 BC plan for Regions 1 and 3 and the 1983 plan for Region 2;
- c. Initiate inter-sessional work leading to a resolution of those incompatibilities and to the other problems identified by the CPM;
- d. Take all other preparatory actions required to enable the WARC-ORBIT 2 to complete the content of WARC-ORBIT 1 agenda item 6.

COMP/53/2

3. There is one specific exception to proposal No 2 above, and concerns feeder links for BC-Sat services. Items 3.1 and 3.2 of the agenda empower the WARC-ORBIT 1 to choose the bands to be planned and to "define the most suitable technical characteristics". The agenda does not however require or authorise the first session to prepare a feeder link plan for BC-Sat services in Regions 1 and 3, and this must therefore be left to the WARC-ORBIT 2. This question is further considered in the proposal contained in document 52 , COMP/ 52 /1.

MEX/60/12

recommends to the Administrative Council

1. the following draft agenda for the Second Session:
 - 1.1 establishment of a plan of frequency assignments and orbital positions for the [] services in the bands [];
 - 1.2 planning of the necessary feeder links in the bands [];
 - 1.3 planning in accordance with the principles of the method established at the First Session;
 - 1.4 adoption of the technical standards, parameters and criteria recommended in the Report of the First Session;
 - 1.5 establishment of procedures for regulating the use of the bands specified in item 1.1 of this draft agenda and the procedures for the corresponding feeder links;
 - 1.6 that the Plan should contain provisions to ensure that any new requirements or changes in those submitted to the Conference may be introduced appropriately and in good time.

GRC/74/6

That the WARC-ORB 1 should:

- a) agree to defer definitive action on agenda item 6.1 to WARC-ORB 2;
- b) identify all actual and foreseen incompatibilities between the 1977 BC plan for Regions 1 and 3 and the 1983 plan for Region 2;
- c) initiate inter-sessional work leading to a resolution of those incompatibilities and to the other problems identified by the CPM;
- d) take all other preparatory actions required to enable the WARC-ORB 2 to complete the content of WARC-ORB 1 agenda item 6.

F/76/20

The French Administration considers that incompatibilities must be resolved before the incorporation of the Final Acts of CARR-SAT-R2 in Appendix 30 of the Radio Regulations can be contemplated; consequently, the only possible course seems to be to defer final action on this matter until the second session of the ORB Conference. See proposal [] COMP/51/1 [].

EQA/81/4

The Ecuadorian Administration therefore proposes:

that the sound broadcasting service in the band 0.5 - 2 GHz should not be planned by WARC-ORB (2) and that, if necessary, the relevant studies should be continued. In the light of the proposals made at the first session it might even be possible to adopt different Resolutions for the Regions, since their interests may differ as regards that service.

CTI/95/7

The agenda of the second session of the Conference should include the following items:

1. On the basis of the report of the first session and the sharing criteria established by the CCIR in the intersessional period, to draw up an allotment plan for orbital arcs and associated frequencies for the fixed-satellite service in the bands:

3 400 - 4 200 MHz

4 500 - 4 800 MHz

5 925 - 7 075 MHz

10 700 - 11 700 MHz (space-to-Earth)

12 750 - 13 250 MHz

14 000 - 14 800 MHz
2. To establish the access procedures associated with the Plan as well as those applicable to the other non-planned services in the above bands.
3. To draw up a frequency plan for feeder links to broadcasting satellites in the band 17.3 - 18.1 GHz in Regions 1 and 3.
4. To examine the Recommendations of the first session concerning sound broadcasting by satellite between 0.5 and 2 GHz and adopt appropriate measures.
5. To revise the Radio Regulations, as necessary, so as to incorporate the decisions of the RAC for the Planning of the Broadcasting-Satellite Service in Region 2 (Geneva, 1983).
6. To assess the financial impact of the decisions of the Conference on the budget of the Union, in accordance with No. 627 and other relevant provisions of the Nairobi Convention.

CTI/95/8

The decisions of the RAC for the Planning of the Broadcasting-Satellite Service in Region 2 should be incorporated in the Radio Regulations at the second session.

Proposal

AUS/98/1 With regard to feeder links for Region 3, the first session of this conference should only determine:

- . which frequency bands should be planned;
- . the technical criteria for planning;
- . the planning approach to be adopted.

AUS/98/2 The second session of this conference should be requested to study the question of empowering a later competent administrative radio conference to develop a feeder link plan for Region 3.

URS/9/9 The latest CCIR studies, the results of which are set out in the Report of the CCIR CPM, show that the satellite sound broadcasting service is incompatible with the terrestrial services operating in the frequency band concerned.

The USSR Administration has conducted technical and economical studies into possible satellite sound broadcasting systems to serve a number of the USSR's Union Republics in various locations displaying different geographical characteristics. This research has shown that the cost of establishing such systems is many times greater than the cost of setting up a terrestrial VHF-FM broadcasting network providing high quality stereo reception throughout the whole of the area to be served. Investigations into the technical parameters of the satellite systems confirmed the conclusion that satellite sound broadcasting systems are incompatible with the terrestrial services operating in the 0.5 - 2 GHz band. The results of our studies are presented in a separate document.

In the light of the above, the USSR Administration considers it essential for the Report to the Second Session of the Conference to stipulate that frequency bands should not be allotted for satellite sound broadcasting between 0.5 and 2 GHz.

B/37/19 4. Therefore, the Brazilian administration thinks that a solution can be achieved through the adoption of a footnote to the Table of Frequency Allocations in Article 8 of the Radio Regulations, referring to a portion of the 500-2000 MHz band, in accordance with Resolution no. 505, the use of which should be subjected to agreement obtained under the procedures set forth in Article 14 of the RR. For this purpose, the Second Session of the Conference shall take appropriate decisions regarding the allocation of a specific frequency band for the broadcasting-satellite service (sound).

D/ 31/23

The Administration of the Federal Republic of Germany proposes that WARC-ORB(2) should plan the feeder links to the broadcasting satellites, whose down-links are in the band 11.7 - 12.5 GHz in Region 1, in the band 17.3 - 18.1 GHz for Region 1 in 1988. The feeder links of satellite systems in operation which have been notified to the IFRB and are operating for the broadcasting-satellite service in Region 1 under the WARC-77 plan must be included in a plan for feeder links as an integral part of it when such a plan is drawn up.

D/ 31/25

The Administration of the Federal Republic of Germany does not consider it possible at present to introduce and plan a broadcasting-satellite service (sound) within the band 0.5 - 2 GHz.

MEX/60/6

Owing to the major difficulty of sharing between the sound broadcasting-satellite service and other services, it may be necessary to allocate a suitable frequency band on an exclusive basis and for the CCIR to continue its studies to determine the proper value of the bandwidth to be estimated for allocating a frequency band to the sound broadcasting-satellite service. We therefore consider that the Second Session of the Conference should instruct the CCIR to continue its studies in this connection.

CLM/106/57

Since the period between conferences is not excessive (greater than the technological life of a generation of satellites), it is desirable that the technical parameters and criteria relating to interference should be fixed for the life of the Plan, despite the fact that technological progress over this period can give rise to unnecessarily large orbital separations.

At the WARC-ORB(1) it will accordingly be necessary to take a decision on the possibility of the WARC-ORB(2) adopting new parameters and criteria to enter into force at the same time as the Plan.

URS/137/

Conclusion

In view of the fact that sound broadcasting-satellite systems are not economically justified, the USSR Administration considers it inappropriate to allot frequency bands for satellite broadcasting (sound) in the 0.5 - 2 GHz range.

SUB-WORKING GROUP 6A-2

Draft

First Report of Sub-Working Group 6A2 to Working Group 6A

At its first meeting on Wednesday, 21 August 1985, Sub-Working Group 6A2 considered Document DT/36 on the consequential modifications to the Radio Regulations contained in Part III of the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983 (see Annex 1).

The Sub-Working Group also started to consider the consolidated version of Appendix 30 to the Radio Regulations, prepared by the General Secretariat in Document 16, together with the comments from administrations in Document DT/29. Agreement was reached on Articles 1 and 2 (see Annex 2).

It should be borne in mind that the texts in Annexes 1 and 2 have been adopted on the understanding that they are still subject to any decisions emanating from discussions in Working Group 6A and Committee 6.

J.F. BROERE
Chairman

Annexes : 2

ANNEX 1

Consequential modifications to the Radio Regulations

1. Modifications to the provisions of Article 8 of the Radio Regulations

ARTICLE 8

Table of Frequency Allocations

GHz 11.7 — 12.75			
Allocation to Services			
	Region 1	Region 2	Region 3
SUP MOD SUP MOD	11.7 — 12.5 FIXED BROADCASTING BROADCASTING-SATELLITE Mobile except aeronautical mobile	11.7 — 12.1 FIXED 837 FIXED-SATELLITE (space-to-Earth) Mobile except aeronautical mobile 836 839	11.7 — 12.2 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE
		12.1 — 12.2 FIXED-SATELLITE (space-to-Earth) 836 839 842	
		12.2 — 12.7 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE	
	838	839 844 846	838 845
SUP SUP	12.5 — 12.75 FIXED-SATELLITE (space-to-Earth) (Earth-to-space)	12.7 — 12.75 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE except aeronautical mobile	12.5 — 12.75 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile BROADCASTING-SATELLITE 847
SUP		848 849 850	

- MOD 836 In Region 2, in the band 11.7 - 12.2 GHz, transponders on space stations in the fixed-satellite service may be used additionally for transmissions in the broadcasting-satellite service, provided that such transmissions do not have a maximum e.i.r.p. greater than 53 dBW per television channel and do not cause greater interference or require more protection from interference than the coordinated fixed-satellite service frequency assignments. With respect to the space services, this band shall be used principally for the fixed-satellite service.
- MOD 837 Different category of service: in Canada, Mexico and the United States, the allocation of the band 11.7 - 12.1 GHz to the fixed service is on a secondary basis (see No. 424).
- MOD 839 The use of the band 11.7 - 12.7 GHz in Region 2 by the fixed-satellite and broadcasting-satellite services is limited to national and sub-regional systems. The use of the band 11.7 - 12.2 GHz by the fixed-satellite service in Region 2 is subject to previous agreement between the administrations concerned and those having services, operating or planned to operate in accordance with the Table, which may be affected (see Articles 11, 13 and 14). For the use of the band 12.2 - 12.7 GHz by the broadcasting-satellite service in Region 2, see Article 15.
- SUP 840
- SUP 841
- MOD 842 Additional allocation: the band 12.1 - 12.2 GHz in Brazil and Peru, is also allocated to the fixed service on a primary basis.
- SUP 843
- MOD 844 In Region 2, in the band 12.2 - 12.7 GHz, existing and future terrestrial radiocommunication services shall not cause harmful interference to the space services operating in conformity with the Broadcasting-Satellite Plan for Region 2 contained in Appendix 30.

MOD 846

In Region 2, in the band 12.2 - 12.7 GHz, assignments to stations of the broadcasting-satellite service in the Plan for Region 2 contained in Appendix 30 may also be used for transmissions in the fixed-satellite service (space-to-Earth), provided that such transmissions do not cause more interference or require more protection from interference than the broadcasting-satellite service transmissions operating in conformity with the Region 2 Plan. With respect to the space services, this band shall be used principally for the broadcasting-satellite service.

MOD 847

The broadcasting-satellite service in the band 12.5 - 12.75 GHz in Region 3 is limited to community reception with a power flux-density not exceeding -111 dB(W/m²) as defined in Annex 8 of Appendix 30. See also Resolution 34.

MOD 869

The use of the band 17.3 - 18.1 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service. For the use of the band 17.3 - 17.8 GHz in Region 2 by the feeder links for the broadcasting-satellite service in the band 12.2 - 12.7 GHz, see Article 15A.

2. Modifications to the provisions of Article 11 of the Radio Regulations

ARTICLE 11

NOC

**Coordination of Frequency Assignments to Stations
in a Space Radiocommunication Service Except Stations
in the Broadcasting-Satellite Service
and to Appropriate Terrestrial Stations¹**

MOD A.11.1

¹For the coordination of frequency assignments to stations in the broadcasting-satellite service and other services in the frequency band 11.7 - 12.2 GHz (in Region 3), 11.7 - 12.5 GHz (in Region 1) and 12.2 - 12.7 GHz (in Region 2) [as well as the coordination of frequency assignments to feeder link stations utilizing the fixed-satellite service (Earth-to-space) in the frequency band 17.3 - 17.8 GHz (in Region 2)] and other services in [these bands] in Region 2, see also Article 15 [and Article 15A respectively].

3. Modifications to the provisions of Article 12 of the Radio Regulations

ARTICLE 12

MOD (Title) Notification and Recording in the Master
International Frequency Register of Frequency
Assignments¹ to Terrestrial
Radiocommunication Stations^{2,3,[4]}

MOD A.12.3 ³For the notification and recording of frequency
assignments to terrestrial stations in the frequency bands
11.7 - 12.2 GHz (in Region 3), 12.2 - 12.7 GHz (in Region 2)
and 11.7 - 12.5 GHz (in Region 1), so far as their relationship
to the broadcasting-satellite service in these bands is
concerned, see also Article 15.

ADD A.12.4 ⁴For the notification and recording of frequency
assignments to terrestrial stations in the frequency band
17.7 - 17.8 GHz (in Region 2), so far as their relationship to
the fixed-satellite service (Earth-to-space) in this band is
concerned, see also Article 15A.

4. Modifications to the provisions of Article 13 of the Radio Regulations

ARTICLE 13

NOC Notification and Recording in the Master
International Frequency Register of Frequency
Assignments¹ to Radio Astronomy and Space
Radiocommunication Stations Except Stations
in the Broadcasting-Satellite Service²

MOD A.13.2 ²For notification and recording of frequency
assignments to stations in the broadcasting-satellite service
and other services in the frequency bands 11.7 - 12.2 GHz
(in Region 3), 11.7 - 12.5 GHz (in Region 1) and 12.2 - 12.7 GHz
(in Region 2), [as well as the notification and recording of
frequency assignments to feeder-link stations in the fixed-
satellite service (Earth-to-space) in the frequency band 17.3 -
17.8 GHz (in Region 2)] and other services in [these bands] in
Region 2, see also Article 15 [and Article 15A respectively].

5. Modifications to the provisions of Article 15 of the Radio Regulations

ARTICLE 15

- | | | |
|-----|---------|--|
| MOD | (Title) | <p>Coordination, Notification and Recording of
Frequency Assignments to Stations of the
Broadcasting-Satellite Service in the
Frequency Bands 11.7 - 12.2 GHz (in Region 3),
12.2 - 12.7 GHz (in Region 2) and
11.7 - 12.5 GHz (in Region 1) and to the
Other Services to Which These Bands Are Allocated,
so far as Their Relationship to the Broadcasting-
Satellite Service in These Bands is Concerned</p> |
| MOD | 1656 | <p>The provisions and associated Plan for the
broadcasting-satellite service in the frequency bands
11.7 - 12.5 GHz (in Region 1), 12.2 - 12.7 GHz (in Region 2) and
11.7 - 12.2 GHz (in Region 3), as contained in Appendix 30 to
the Radio Regulations, shall apply to the assignment and use of
frequencies by stations of the broadcasting-satellite service in
these bands and to the stations of other services to which these
bands are allocated so far as their relationship to the
broadcasting-satellite service in these bands is concerned. For
the broadcasting-satellite service in Region 2, Resolution No. 2
(SAT-R2) is also applicable.</p> |

6. New Article 15A of the Radio Regulations

ADD

ARTICLE 15A

Coordination, Notification and Recording of Frequency Assignments to Stations in the Fixed-Satellite Service (Earth-to-Space) in the Frequency Band 17.3 - 17.8 GHz (Region 2) Providing Feeder Links for the Broadcasting-Satellite Service and also to Stations of Other Services to Which this Band is Allocated in Region 2, so far as Their Relationship to the Fixed-Satellite Service (Earth-to-space) in this Band is Concerned in Region 2

1668

The provisions and associated Plan for feeder links associated with the broadcasting-satellite service utilizing the fixed-satellite service (Earth-to-space) in the band 17.3 - 17.8 GHz (Region 2), as contained in [...], shall apply to the assignment to and use by feeder links of frequencies in this band and to stations of other services to which this band is allocated in Region 2 so far as the relationship of these other services to the fixed-satellite service (Earth-to-space) in this band is concerned in Region 2.

7. Modifications to the provisions of Appendix 3 to the Radio Regulations

APPENDIX 3

MOD (Title)

Notices Relating to Space Radiocommunications and Radio Astronomy Stations^[1]

(See Articles 11 and 13)

ADD

¹ For notices of assignments to feeder links (other than those for telecommand and tracking) in the band 17.3 - 17.8 GHz for the broadcasting-satellite service in the frequency band 12.2 - 12.7 GHz in Region 2, the basic characteristics to be furnished are prescribed in [...]

8. Action on Resolutions of WARC-79

[DRAFT] RESOLUTION No. 91 (ORB-85)

**Relating to the Abrogation
of Resolutions of the World
Administrative Radio Conference, Geneva, 1979**

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, First Session, Geneva, 1985,

considering

its agenda (Conference Document 1), in particular agenda item 6.1 and the action taken on a number of Resolutions of the World Administrative Radio Conference, Geneva, 1979;

further considering

that all necessary action has been taken on the following Resolutions:

- | | |
|--------------------|--|
| RESOLUTION No. 31 | Relating to the Application of Certain Provisions of the Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, to Take into Account Changes Made by the World Administrative Radio Conference, Geneva, 1979 to the Table of Frequency Allocations for Region 2 in the Band 11.7 - 12.7 GHz |
| RESOLUTION No. 100 | Relating to the Coordination, Notification and Recording in the Master International Frequency Register of Assignments to Stations in the Fixed-Satellite Service with Respect to Stations in the Broadcasting-Satellite Service in Region 2 |
| RESOLUTION No. 503 | Relating to the Coordination, Notification and Recording in the Master International Frequency Register of Frequency Assignments to Stations in the Broadcasting-Satellite Service in Region 2 |
| RESOLUTION No. 504 | Relating to the Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, with Respect to Region 2 |

RESOLUTION No. 700 Relating to Sharing Between the Fixed-Satellite Service in Regions 1 and 3 and the Broadcasting-Satellite Service in Region 2 in the Band 12.2 - 12.7 GHz

RESOLUTION No. 701 Relating to the Convening of a Regional Administrative Radio Conference for the Detailed Planning of the Broadcasting-Satellite Service in the 12 GHz Band and Associated Feeder Links in Region 2

resolves

that all the said Resolutions of the World Administrative Radio Conference, Geneva, 1979, are abrogated.

ANNEX 2

ARTICLE 1

General Definitions

1.1 For the purposes of this Appendix the following terms shall have the meanings defined below:

1977 Conference: World Administrative Radio Conference for the Planning of the Broadcasting-Satellite Service in Frequency Bands 11.7 - 12.2 GHz (in Regions 2 and 3) and 11.7 - 12.5 GHz (in Region 1), called in short World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977;

1983 Conference: Regional Administrative Radio Conference for the Planning in Region 2 of the Broadcasting-Satellite Service in the Frequency Band 12.2 - 12.7 GHz and Associated Feeder Links in the Frequency Band 17.3 - 17.8 GHz, called in short Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, (Sat-R2), Geneva, 1983.

Regions 1 and 3 Plan: The Plan for the Broadcasting-Satellite Service in the Frequency Bands 11.7 - 12.2 GHz in Region 3 and 11.7 - 12.5 GHz in Region 1 contained in this Appendix, together with any modifications resulting from the successful application of the procedures of Article 4 of this Appendix.

Region 2 Plan: The Plan for the Broadcasting-Satellite Service in the Frequency Band 12.2 - 12.7 GHz in Region 2 contained in this Appendix, together with any modifications resulting from the successful application of the procedures of Article 4 of this Appendix.

Frequency assignment in conformity with the Plan: Any frequency assignment which appears in the Regions 1 and 3 Plan or the Region 2 Plan or for which the procedure of Article 4 of this Appendix has been successfully applied.

ARTICLE 2

Frequency Bands

2.1 The provisions of this Appendix apply to the broadcasting-satellite service in the frequency bands between 11.7 GHz and 12.2 GHz in Region 3, between 11.7 GHz and 12.5 GHz in Region 1 and between 12.2 GHz and 12.7 GHz in Region 2 and to the other services to which these bands are allocated in Regions 1, 2 and 3, insofar as their relationship to the broadcasting-satellite service in these bands is concerned.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

Document DT/39-E
21 August 1985
Original: English

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

SUB-WORKING GROUP 6A-2

Draft

First Report of Sub-Working Group 6A2 to Working Group 6A

At its first meeting on Wednesday, 21 August 1985, Sub-Working Group 6A2 considered Document DT/36 on the consequential modifications to the Radio Regulations contained in Part III of the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983 (see Annex 1).

The Sub-Working Group also started to consider the consolidated version of Appendix 30 to the Radio Regulations, prepared by the General Secretariat in Document 16, together with the comments from administrations in Document DT/29. Agreement was reached on Articles 1 and 2 (see Annex 2).

It should be borne in mind that the texts in Annexes 1 and 2 have been adopted on the understanding that they are still subject to any decisions emanating from discussions in Working Group 6A and Committee 6.

J.F. BROERE
Chairman

Annexes : 2

ANNEX 1

Consequential modifications to the Radio Regulations

1. Modifications to the provisions of Article 8 of the Radio Regulations

ARTICLE 8

Table of Frequency Allocations

GHz
11.7 — 12.75

Allocation to Services			
	Region 1	Region 2	Region 3
SUP MOD SUP MOD SUP SUP	11.7 — 12.5 FIXED BROADCASTING BROADCASTING-SATELLITE Mobile except aeronautical mobile	11.7 — 12.1 FIXED 837 FIXED-SATELLITE (space-to-Earth) Mobile except aeronautical mobile 836 839 840	11.7 — 12.2 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE
		12.1 — 12.2 FIXED-SATELLITE (space-to-Earth) 836 839 840 842	
		12.2 — 12.7 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE	12.2 — 12.5 FIXED MOBILE except aeronautical mobile BROADCASTING
	838 840		838 840 845
SUP	12.5 — 12.75 FIXED-SATELLITE (space-to-Earth) (Earth-to-space)	839 840 844 846	12.5 — 12.75 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile BROADCASTING-SATELLITE 847
		12.7 — 12.75 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE except aeronautical mobile	
SUP	840 848 849 850	840	840

- MOD 836 In Region 2, in the band 11.7 - 12.2 GHz, transponders on space stations in the fixed-satellite service may be used additionally for transmissions in the broadcasting-satellite service, provided that such transmissions do not have a maximum e.i.r.p. greater than 53 dBW per television channel and do not cause greater interference or require more protection from interference than the coordinated fixed-satellite service frequency assignments. With respect to the space services, this band shall be used principally for the fixed-satellite service.
- MOD 837 Different category of service: in Canada, Mexico and the United States, the allocation of the band 11.7 - 12.1 GHz to the fixed service is on a secondary basis (see No. 424).
- MOD 839 The use of the band 11.7 - 12.7 GHz in Region 2 by the fixed-satellite and broadcasting-satellite services is limited to national and sub-regional systems. The use of the band 11.7 - 12.2 GHz by the fixed-satellite service in Region 2 is subject to previous agreement between the administrations concerned and those having services, operating or planned to operate in accordance with the Table, which may be affected (see Articles 11, 13 and 14). For the use of the band 12.2 - 12.7 GHz by the broadcasting-satellite service in Region 2, see Part I of the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting Satellite Service in Region 2. Article 15.
- SUP
~~MOD~~ 840 ~~For the use of the band 11.7-12.75 GHz in Regions 1, 2 and 3, see Resolution 34.~~
- SUP 841
- MOD 842 Additional allocation: the band 12.1 - 12.2 GHz in Brazil and Peru, is also allocated to the fixed service on a primary basis.
- SUP 843
- MOD 844 In Region 2, in the band 12.2 - 12.7 GHz, existing and future terrestrial radiocommunication services shall not cause harmful interference to the space services operating in accordance conformity with the Broadcasting-Satellite Plan ~~prepared at the Regional Administrative Conference for the Planning of the Broadcasting Satellite Service in Region 2.~~ for Region 2 contained in Appendix 30.

MOD 846 In Region 2, in the band 12.2 - 12.7 GHz, assignments to stations of the broadcasting-satellite service ~~made available in the Plan established by the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2~~ in the Plan for Region 2 contained in Appendix 30 may also be used for transmissions in the fixed-satellite service (space-to-Earth), provided that such transmissions do not cause more interference or require more protection from interference than the broadcasting-satellite service transmissions operating in ~~accordance with that~~ conformity with the Region 2 Plan. With respect to the space services, this band shall be used principally for the broadcasting-satellite service.

MOD 847 The broadcasting-satellite service in the band 12.5 - 12.75 GHz in Region 3 is limited to community reception with a power flux-density not exceeding -111 dB(W/m²) as defined in Annex 8 of Appendix 30. See also Resolution 34.

MOD 869 The use of the band 17.3 - 18.1 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service. For the use of the band 17.3 - 17.8 GHz in Region 2 by the feeder links for the broadcasting-satellite service in the band 12.2 - 12.7 GHz, see ~~Part II of Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2.~~ Article 15A.

2. Modifications to the provisions of Article II of the Radio Regulations

ARTICLE 11

NOC **Coordination of Frequency Assignments to Stations
in a Space Radiocommunication Service Except Stations
in the Broadcasting-Satellite Service
and to Appropriate Terrestrial Stations¹**

MOD A.11.1 ¹For the coordination of frequency assignments to stations in the broadcasting-satellite service and other services in the frequency band 11.7 - 12.2 GHz (in Region 3), 11.7 - 12.5 GHz (in Region 1) and 12.2 - 12.7 GHz (in Region 2) [as well as the coordination of frequency assignments to feeder link stations utilizing the fixed-satellite service (Earth-to-space) in the frequency band 17.3 - 17.8 GHz (in Region 2)] and other services in ~~this band~~ these bands in Region 2, see also Article 15 [and Article 15A respectively.]

3. Modifications to the provisions of Article 12 of the Radio Regulations

ARTICLE 12

MOD (Title) Notification and Recording in the Master
International Frequency Register of Frequency
Assignments¹ to Terrestrial
Radiocommunication Stations^{2,3,[4]}

MOD A.12.3 ³For the notification and recording of frequency assignments to terrestrial stations in the frequency bands 11.7 - 12.2 GHz (in Region 3), 12.2 - 12.7 GHz (in Region 2) and 11.7 - 12.5 GHz (in Region 1), so far as their relationship to the broadcasting-satellite service in these bands is concerned, see also Article 15.

ADD A.12.4 ⁴For the notification and recording of frequency assignments to terrestrial stations in the frequency band 17.7 - 17.8 GHz (in Region 2), so far as their relationship to the fixed-satellite service (Earth-to-space) in this band is concerned, see also Article 15A.

4. Modifications to the provisions of Article 13 of the Radio Regulations

ARTICLE 13

NOC Notification and Recording in the Master
International Frequency Register of Frequency
Assignments¹ to Radioastronomy and Space
Radiocommunication Stations Except Stations
in the Broadcasting-Satellite Service²

MOD A.13.2 ²For notification and recording of frequency assignments to stations in the broadcasting-satellite service and other services in the frequency bands 11.7 - 12.2 GHz (in Region 3), 11.7 - 12.5 GHz (in Region 1) and 12.2 - 12.7 GHz (in Region 2), [as well as the notification and recording of frequency assignments to feeder-link stations in the fixed-satellite service (Earth-to-space) in the frequency band 17.3 - 17.8 GHz (in Region 2)] and other services ~~in this band~~ in [these bands] in Region 2, see also Article 15 [and Article 15A respectively].

5. Modifications to the provisions of Article 15 of the Radio Regulations

ARTICLE 15

MOD (Title) Coordination, Notification and Recording of
Frequency Assignments to Stations of the
Broadcasting-Satellite Service in the
Frequency Bands 11.7 - 12.2 GHz (in Region 3),
12.2 - 12.7 GHz (in Region 2) and
11.7 - 12.5 GHz (in Region 1) and to the
Other Services to Which These Bands Are Allocated,
so far as Their Relationship to the Broadcasting-
Satellite Service in These Bands is Concerned

MOD 1656 The provisions and associated Plan for the broadcasting-
satellite service in the frequency bands 11.7 - 12.5 GHz (in
Region 1) 12.2 - 12.7 GHz (in Region 2) and 11.7 - 12.2 GHz (in
Region 3) ~~adopted by the World Broadcasting-Satellite~~
~~Administrative Radio Conference, Geneva, 1977, as contained in~~
~~Appendix 30 to the Radio Regulations, and the provisions and~~
~~associated Region 2 Plan for the broadcasting-satellite service~~
~~in the frequency band 12.2 - 12.7 GHz adopted by the Regional~~
~~Administrative Conference for the Planning of the Broadcasting-~~
~~Satellite Service in Region 2, Geneva 1983, as contained in Part~~
~~1 of the Final Acts of the latter Conference,~~ shall apply to the
assignment and use of frequencies by stations of the
broadcasting-satellite service in these bands and to the stations
of other services to which these bands are allocated so far as
their relationship to the broadcasting-satellite service in these
bands is concerned. For the broadcasting-satellite service in
Region 2, Resolution No. 2 (SAT-R2) is also applicable.

6. New Article 15A of the Radio Regulations

ADD

ARTICLE 15A

Coordination, Notification and Recording of Frequency Assignments to Stations in the Fixed-Satellite Service (Earth-to-Space) in the Frequency Band 17.3 - 17.8 GHz (Region 2) Providing Feeder Links for the Broadcasting-Satellite Service and also to Stations of Other Services to Which this Band is Allocated in Region 2, so far as Their Relationship to the Fixed-Satellite Service (Earth-to-space) in this Band is Concerned in Region 2

1668

The provisions and associated Plan ~~adopted by the Regional Administrative Conference for the Planning of the Broadcasting Satellite Service in Region 2, Geneva, 1983,~~ for feeder links associated with the broadcasting-satellite service utilizing the fixed-satellite service (Earth-to-space) in the band 17.3 - 17.8 GHz (Region 2) as contained in ~~Part II [...] of the Final Acts of the said conference,~~ shall apply to the assignment to and use by feeder links of frequencies in this band and to stations of other services to which this band is allocated in Region 2 so far as the relationship of these other services to the fixed-satellite service (Earth-to-space) in this band is concerned in Region 2.

7. Modifications to the provisions of Appendix 3 to the Radio Regulations

APPENDIX 3

MOD (Title)

Notices Relating to Space Radiocommunications and Radioastronomy Stations^[1]

(See Articles 11 and 13)

ADD

¹ For notices of assignments to feeder links (other than those for telecommand and tracking) in the band 17.3 - 17.8 GHz for the broadcasting-satellite service in the frequency band 12.2 - 12.7 GHz in Region 2, the basic characteristics to be furnished are prescribed in ~~Annex 2, Part II of the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting Satellite Service, Region 2, Geneva, 1983 [...]~~

8. Action on Resolutions of WARC-79

~~RES90-1~~

[DRAFT] RESOLUTION No. ~~90 (Mob-83)~~ 91 (ORB-85)

**Relating to the ~~Revision, Replacement and~~ Abrogation
of ~~Resolutions and Recommendations~~ of the World
Administrative Radio Conference, Geneva, 1979**

The World Administrative Radio Conference ~~for the Mobile Services,~~
~~Geneva, 1983,~~ on the Use of the Geostationary-Satellite Orbit and the Planning
of Space Services Utilizing It, First Session, Geneva, 1985,

considering

its agenda (Conference Document 1), in particular agenda item ~~2~~ 6.1 and
the action taken on a number of Resolutions ~~and Recommendations~~ of the World
Administrative Radio Conference, Geneva, 1979;

further considering

that all necessary action has been taken on the following Resolutions ~~and~~
~~Recommendations~~:

- | | |
|--------------------|--|
| RESOLUTION No. 31 | Relating to the Application of Certain Provisions of the Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, to Take into Account Changes Made by the World Administrative Radio Conference, Geneva, 1979 to the Table of Frequency Allocations for Region 2 in the Band 11.7 - 12.7 GHz |
| RESOLUTION No. 100 | Relating to the Coordination, Notification and Recording in the Master International Frequency Register of Assignments to Stations in the Fixed-Satellite Service with Respect to Stations in the Broadcasting-Satellite Service in Region 2 |
| RESOLUTION No. 503 | Relating to the Coordination, Notification and Recording in the Master International Frequency Register of Frequency Assignments to Stations in the Broadcasting-Satellite Service in Region 2 |
| RESOLUTION No. 504 | Relating to the Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, with Respect to Region 2 |

- RESOLUTION No. 700 Relating to Sharing Between the Fixed-Satellite Service in Regions 1 and 3 and the Broadcasting-Satellite Service in Region 2 in the Band 12.2 - 12.7 GHz
- RESOLUTION No. 701 Relating to the Convening of a Regional Administrative Radio Conference for the Detailed Planning of the Broadcasting-Satellite Service in the 12 GHz Band and Associated Feeder Links in Region 2

resolves

that all the said Resolutions ~~and Recommendations~~ of the World Administrative Radio Conference, Geneva, 1979, ~~listed under a), b) and c)~~ ~~above~~, are abrogated.

ANNEX 2

ARTICLE 1

General Definitions

1.1 For the purposes of this Appendix the following terms shall have the meanings defined below:

1977 Conference: World Administrative Radio Conference for the Planning of the Broadcasting-Satellite Service in Frequency Bands 11.7 - 12.2 GHz (in Regions 2 and 3) and 11.7 - 12.5 GHz (in Region 1), called in short World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977;

1983 Conference: Regional Administrative Radio Conference for the Planning in Region 2 of the Broadcasting-Satellite Service in the Frequency Band 12.2 - 12.7 GHz and Associated Feeder Links in the Frequency Band 17.3 - 17.8 GHz, called in short Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, (Sat-R2), Geneva, 1983.

Regions 1 and 3 Plan: The Plan for the Broadcasting-Satellite Service in the Frequency Bands 11.7 - 12.2 GHz in Region 3 and 11.7 - 12.5 GHz in Region 1 contained in this Appendix, together with any modifications resulting from the successful application of the procedures of Article 4 of this Appendix.

Region 2 Plan: The Plan for the Broadcasting-Satellite Service in the Frequency Band 12.2 - 12.7 GHz in Region 2 contained in this Appendix, together with any modifications resulting from the successful application of the procedures of Article 4 of this Appendix.

Frequency assignment in conformity with the Plan: Any frequency assignment which appears in the Regions 1 and 3 Plan or the Region 2 Plan or for which the procedure of Article 4 of this Appendix has been successfully applied.

ARTICLE 2

Frequency Bands

2.1 The provisions of this Appendix apply to the broadcasting-satellite service in the frequency bands between 11.7 GHz and 12.2 GHz in Region 3, between 11.7 GHz and 12.5 GHz in Region 1 and between 12.2 GHz and 12.7 GHz in Region 2 and to the other services to which these bands are allocated in Regions 1, 2 and 3, insofar as their relationship to the broadcasting-satellite service in these bands is concerned.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/40-E

22 August 1985

Original: English

SUB-WORKING GROUP 6A-1

Note by the Chairman of Sub-Working Group 6A-1

Following discussions in Sub-Working Group 6A-1 concerning the use of Energy Dispersal in the Region 2 BSS Plan, a small Drafting Group consisting of participants from Canada, the United Kingdom and the United States was set up to prepare recommendations to Working Group 6A on this issue.

The report of this Drafting Group is reproduced in Annex 1.

G.H. RAILTON

Chairman of Sub-Working Group 6A-1

Annex: 1

ANNEX 1

Use of energy dispersal
in the 12 GHz broadcasting-satellite plans
for Regions 1, 2 and 3

1. Introduction

The 1977 Plan for the broadcasting-satellite service (BSS) of Regions 1 and 3 requires a fixed amount of energy dispersal for all of its assignments (see Appendix 30, Annex 8, section 3.18). The required energy dispersal reduces by 22 dB the spectral power flux density (pfd) maintained in any 4 kHz bandwidth in relation to that measured in the entire bandwidth of 27 MHz.

The 1983 Plan for the BSS of Region 2 requires an equivalent fixed amount of energy dispersal for all of its assignments except those for which the highest pfd produced in any Region 1 or 3 territory is too low to affect any terrestrial or satellite service in that territory (see Final Acts of SAT-83, Part I, Annex 5, section 3.18). With this exception, the required energy dispersal reduces by 12 dB the spectral pfd maintained in a 40 kHz bandwidth in relation to that measured in the entire bandwidth of 24 MHz.

A Region 1 or 3 administration is considered as "not affected" when an assignment in the Region 2 Plan gives a pfd of less than -138 dB ($W/m^2/24$ MHz) anywhere in its territory. In this case, energy dispersal is still required but only in the amount necessary to bring the spectral pfd down to the level -150 dB ($W/m^2/40$ kHz).

2. Discussion

The reference bandwidth of 40 kHz used in specifying the amount of energy dispersal to be used for assignments in the Region 2 Plan was chosen for the protection of fixed-satellite service (FSS) networks in Regions 1 and 3. However, some of the administrations at ORB(1) would prefer to use the same 4 kHz reference bandwidth that was used in developing the Plan for Regions 1 and 3.

It is believed that the reference bandwidth for the Region 2 energy dispersal requirement could be changed in this way without adverse effects on Region 2 administrations. Accordingly, the amount of energy dispersal to be applied to most Region 2 assignments would be changed from 12 dB relative to a 40 kHz band to 22 dB relative to a 4 kHz band. Similarly, in cases where the total pfd is less than -138 dB ($W/m^2/24$ MHz), energy dispersal would be maintained as necessary to reduce the spectral pfd to -160 dB ($W/m^2/4$ kHz) rather than -150 dB ($W/m^2/40$ kHz).

Finally, because some assignments in the Region 2 Plan would require less than the full 22 dB of energy dispersal, a few Region 1 administrations have proposed that a note be added to each of these assignments indicating the amount of energy dispersal to be applied if the assignment were to be implemented using the values for the technical parameters specified in the Region 2 Plan. The amount of energy dispersal to be applied in practice depends on the system parameters actually used for implementation rather than those used for planning.

3. Conclusion

It is recommended that Working Group 6A take appropriate action to specify the amount of energy dispersal to be used on assignments in the Region 2 Plan relative to a 4 kHz band, as described in section 2 above. One possibility for accomplishing this objective would be to adopt the following new text:

"An energy dispersal value has been adopted for the assignments in all three regions which reduces by 22 dB the spectral power flux density (pfd) measured in any 4 kHz bandwidth with the following exception: When the emission from a broadcasting satellite of Region 2 produces a pfd of less than -138 dB ($W/m^2/24$ MHz) within the territory of an administration of Regions 1 or 3, energy dispersal need only be maintained to the extent that, in any 4 kHz band, a spectral pfd of -160 dB ($W/m^2/4$ kHz) is not exceeded."

It is also recommended that the IFRB be requested to carry out an analysis of the Region 2 down link plan described in Part 1 of the Final Acts of RARC-83 to determine which assignments produce a pfd of less than -138 dB ($W/m^2/24$ MHz) within the territory of any administration of Regions 1 or 3. For these assignments, the IFRB would also determine the amount of energy dispersal to be used in accordance with section 3.18 (as revised) in the event the assignment were implemented with the technical parameters specified in the Region 2 Plan.

WORKING GROUP 6B

Report of Ad hoc Group 6B to Working Group 6B

SELECTION OF FREQUENCY BANDS FOR WHICH THE FREQUENCY PLAN
SHOULD BE ESTABLISHED FOR FEEDER LINKS

1. Introduction

Agenda item 3.1 of WARC-ORB 85 requests the present session of the Conference to select from among the frequency bands listed in resolves 1 of Resolution No. 101 of WARC-79 those bands for which frequency plans should be established for feeder links.

2. Recapitulation of available frequency bands for planning

The following frequency bands are available for planning the broadcasting-satellite feeder links (see Resolution No. 101).

Region 1

Region 3

10.7 - 11.7 GHz

14.5 - 14.8 GHz limited to countries
outside Europe and to Malta

14.5 - 14.8 GHz

17.3 - 18.1 GHz

17.3 - 18.1 GHz

3. Conclusions of Working Group 6B

3.1 Working Group 6B proposes, with reference to agenda item 3.1, the following selection of bands to be planned for feeder links:

- a priori planning of bands 14.5 - 14.8 GHz (outside Europe and for Malta) and 17.3 - 18.1 GHz;
- no planning for the band 10.7 - 11.7 GHz.

3.2 Working Group 6B also proposes the inclusion of Recommendations in the report of the first session with a view to:

- advising administrations in preparing their requirements;
- giving guidelines for the second session of the Conference for the elaboration of the Plan.

3.3 These Recommendations are as follows:

3.3.1 In formulating their requirements, administrations are urged to use the band 17.3 - 18.1 GHz as far as possible, in the light of the following factors:

3.3.1.1 The 14.5 - 14.8 GHz band which has a width of 300 MHz would probably be inadequate to provide feeder links for all the channels in Appendix 30.

3.3.1.2 It would be uneconomical for a given country to have some of its feeder links in one band and the rest in another. This may be irrelevant if an administration wishes to set up only some of its feeder links.

3.3.1.3 Exclusive use of the band 17.3 - 18.1 GHz for feeder links leaves more scope for the fixed and mobile services sharing the band 14.5 - 14.8 GHz on a primary basis with the FSS. It would be advantageous to concentrate all feeder links (or as many as possible) in one band. This is only possible in the band 17.3 - 18.1 GHz, which was also selected by Region 2 in the RABC-83 Plan.

3.3.1.4 Recent estimates supplied by one administration show that on average the signal-to-noise ratio of a feeder-link carrier for the band 14.5 - 14.8 GHz is 1.5 dB higher than for systems in the band 17.3 - 18.1 GHz.

3.3.1.5 Administrations are urged to restrict their requirements as far as possible to one feeder-link assignment per down-link assignment. Where operational requirements justify more feeder links, these should be established wherever possible by re-use of the feeder link frequencies.

3.3.2 For planning, the second session of the Conference should follow the following guidelines:

3.3.2.1 For countries requesting to use the band 17.3 - 18.1 GHz and countries not expressing any choice of frequencies, planning should start by using only the band 17.3 - 18.1 GHz in Region 1 and 17.3 - 17.8 GHz in Region 3.

3.3.2.2 The band 14.5 - 14.8 GHz should be planned for Region 3 and Region 1 (outside Europe and for Malta) countries which specifically request to use it and for requirements formulated in the band 17.3 - 18.1 GHz which could not be planned satisfactorily with the adopted technical characteristics.

The band 17.8 - 18.1 GHz may be used in Region 3 if the band 17.3 - 17.8 GHz should prove insufficient and in order to provide additional planning flexibility.

3.3.2.3 In the band 14.5 - 14.8 GHz, the number of channels per beam should be restricted to a number less than in the down-link Plan whenever necessary because of the limited bandwidth.

3.3.2.4 Account should be taken of the protection of the fixed and mobile services sharing the bands, particularly in Regions where the band 14.5 - 14.8 GHz is used most intensively.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/42-E
20 August 1985
Original: English

WORKING GROUP 5B

SIMPLIFIED HANDBOOKS

At the request of Working Group 5B the Board considered the subject of simplified handbooks on regulatory procedures as contained in USA proposal N° 30/46.

The Board noted that

- (a) the IFRB Handbook on Regulatory Procedures has only recently been completed and that the last Chapter (Chapter 3) will be circulated shortly. Consequently, administrations will not have had sufficient opportunity to consider whether this handbook meets the needs of their staff at the working level;
- (b) that the Radio Regulations can be the only authoritative document in the applications of these Regulations and any handbook can provide guidance material only;
- (c) revision of handbooks is an essential ongoing task if the handbooks are to provide up-to-date guidance;
- (d) the second session of WARC-ORB is likely to make further changes to the Radio Regulations;
- (e) a simplified version of a Handbook may not be entirely satisfactory bearing in mind that the terminology used in the Radio Regulations has very specific meanings and confusion may be caused through adoption of simplifications.

The Board expressed the view that it would be preferable to consider the matter at the second session of WARC-ORB after administrations have had time to consider the usefulness of the IFRB Handbook on Regulatory Procedures and in the light of changes made to the Radio Regulations as a result of the Final Acts of WARC-ORB (1988). Meantime documents prepared by the Board for its seminars may be circulated to administrations as a simplified description of the regulatory procedures.

S.M. CHALLO
Chairman of Working Group 5B

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/43-E
22 August 1985
Original: English

Source: Documents DL/10, DL/11, DL/12, DL/13

COMMITTEE 4

FIRST REPORT OF WORKING GROUP 4C TO COMMITTEE 4 ON TECHNICAL PARAMETERS AND CRITERIA FOR THE FSS

Working Group 4C has come to provisional conclusions on several aspects of the technical parameters and criteria for the FSS; the text is contained in the attachment to this document. These conclusions are subject to review when Committee 5 has come to decisions of principle. The aspects covered in this document are as follows:

- 1) efficiency of use of the orbit and spectrum,
- 2) multi-band and multi-service factors,
- 3) homogeneity and orbit sectorization,
- 4) systematic use of frequency bands.

Other texts agreed in the Working Group on this basis will be made available in further temporary documents as they are agreed. The optimum order for the presentation of these elements and the suitability of the various headings and sub-headings will be considered at a later stage.

The following documents have been taken into account in coming to the provisional conclusions contained in the attachment:

Document 3	(CPM Report)	Document 26	(China)
Document 5	(USA)	Document 30	(USA)
Document 9	(USSR)	Document 31	(FRG)
Document 10	(Spain)	Document 37	(Brazil)
Document 17	(Senegal)	Document 42	(Spain)
Document 18	(UK)	Document 54	(India)
Document 20	(Kenya)	Document 59	(Chile)
Document 21	(Netherlands)	Document 71	(Colombia)
Document 25	(China)	Document 106	(Colombia)

The Working Group concluded that the attention of Committee 5 should be drawn to the considerations given in section 4.4 of the attachment, which might bear on any choice the Committee might make of pairs of frequency bands for planning. Subject to the decisions reached by Committee 5, intersessional studies might be required on the potential value of frequency band pairing on the frequency bands that might be chosen, on technical grounds, as pairs. In addition the following other subjects have been identified for intersessional study:

- 1) Means by which constraints which might be applied to the characteristics of networks of the FSS, as part of the planning process, might be made less severe in some parts of the orbit or the spectrum, where the demand is small, in particular to give relief to networks of low capacity and complexity (section 1.3, sub-paragraph c) of the attachment).
- 2) The benefits and disadvantages of orbit sectorization, (section 3.5 of the attachment).

D.J. WITHERS
Chairman of Working Group 4C

Annex: 1

ANNEX

1. Efficiency of use of orbit and spectrum

1.1 The demand world-wide for fixed-satellite service facilities is growing rapidly and it is expected to continue to grow in the foreseeable future. The total capacity of the geostationary satellite orbit and of the frequency bands allocated to the FSS can be increased very greatly, by technical and administrative means, to meet this future demand. Many factors can contribute to this growth of available capacity; perhaps the most important are:

- the use of efficient planning procedures for regulating access to the radio spectrum for space services;
- effective harmonization of the characteristics of networks which use adjacent orbital locations, as one of the first stages of any planning method to be adopted;
- the adoption of guidelines applicable to the use of different frequency bands which will reduce the inhomogeneity of networks which interfere with one another;
- limitation of satellite antenna coverage to the required service area, accompanied by a rapid roll-off of antenna gain outside the coverage area;
- improvement in earth station antenna side-lobe suppression;
- limitation of the spectral radiation density outside the main beam of earth station antennas;
- good satellite station-keeping and satellite antenna beam pointing;
- the use of transmission techniques which carry a large amount of information per unit of bandwidth, which are relatively insensitive to interference and which produce a well-dispersed power spectrum;
- relatively high circuit interference noise within acceptable limits from other networks of the service within the overall noise budget;
- use of polarization discrimination within or between networks.

1.2 In general, these factors can give benefit only if all or most satellite networks operating in a frequency band support them; the burden must be shared. It is, however, of the greatest importance that any regulatory procedures that are required to achieve this burden-sharing are not so rigid that they prevent the development of the FSS to provide economically the very great diversity of user applications which it is a good medium for providing.

1.3 The technological advances considered for the establishment of satellite telecommunication systems should be aimed not only at a more effective use of the orbit and spectrum, but at acceptable economy, especially in the Earth segment. The stringent application of these factors will tend to increase system costs, and so it may make the benefits of space radio services less available. This may be particularly true for countries which exhibit certain special geographical situations. Thus, it is necessary to take economic factors carefully into account when deciding how, and to what degree, these factors which enhance orbit/spectrum capacity should be applied by the ITU. The following possible approaches to the optimization of the balance between the costs of individual networks and the total capacity of the orbit and spectrum have been identified:

- a) Given the necessary time, the cost of efficient harmonization of satellite networks within the framework of planning as discussed in the CPM Report is likely to be small relative to the cost of building and running the networks themselves, yet the benefits of efficient harmonization will be large.
- b) The technical performance of equipment would not be required to be needlessly stringent if the regulation of access to the radio spectrum in the geostationary satellite orbit were based on reasonably accurate forecasts of requirements.
- c) The demand for satellite networks will vary between different frequency band pairs and, in a given frequency band pair, in different arcs of the geostationary satellite orbit. Thus, where constraints are applied to satellite network characteristics, it may be feasible to set mild constraints for some frequency bands and orbital arcs, where the demand is low, even though more stringent constraints may have to be applied where the demand is high. Intersessional study is required to determine how this might be achieved, to give relief in particular to networks of low capacity and complexity.
- d) The Radio Regulations, Article 29, apply constraints on certain network characteristics, such as accuracy of satellite station-keeping and the CCIR establishes Recommendations on key network characteristics, such as antenna performance and carrier energy dispersal. These measures have done much to increase the efficiency of the use of the geostationary satellite orbit. Much more improvement will, no doubt, be achieved by such means in the

future. However, if it becomes necessary to impose new mandatory constraints on satellite networks, consideration should be given to constraining, not single characteristics, but the combined performance of groups of characteristics. In this way it would be possible to achieve the objective of limiting interference from one network to another, yet the designer of a network could conform to the constraint by whatever combination of these characteristics was most economic in the particular circumstances of the network in question.

- e) When it can be foreseen that it will be necessary to recommend more stringent performance for one major characteristic of networks or more stringent mandatory constraints, a long period of notice should be given, to give sufficient time for the necessary equipment to be developed and manufactured. Where a large improvement in performance is foreseen to be necessary over a long period, it may be desirable to introduce the improvement in two or more stages. It would be desirable for such changes to be determined at regular intervals, perhaps at the Plenary Assemblies of the CCIR or at periodic administrative radio conferences which might be scheduled to follow the CCIR Plenary Assemblies.
- f) It is essential that the introduction of more stringent mandatory constraints on network should provide for the continued use of equipment, already in service, which has not completed its economic working life, even though it may not achieve the new standards. Similar provision may be necessary for equipment which is in an advanced stage of manufacture at the time when the new constraints are agreed.

2. Multi-band and multi-service factors

2.1 In some satellite networks it may be technically necessary for two pairs of frequency bands to be used by the satellite. The use by maritime mobile satellites of FSS frequency bands for feeder links is a good example of this need. In the similar case of broadcasting satellites, it is necessary to use an FSS frequency band for feeder links also.

2.2 In other situations it may be economically advantageous or operationally desirable to use two or more pairs of frequency bands for one or more services on a satellite. For example:

- The working bandwidth of a satellite network can be increased in this way. The circuit and radio frequency channel connectivity would also be increased if cross-strapping between the frequency bands in use is provided.

- Cross-strapping between frequency bands provides added flexibility in network configuration.
- The technology and practice of combining several space services on a single satellite is attractive in certain cases and is emerging. It is particularly attractive for countries requiring several space services but where capacity requirements in any particular service are limited. Space stations serving two or more purposes may separately require only part of the minimum payload mass and power supply that is economically viable for a satellite. By putting both space stations on a single spacecraft, the total cost of the space segment may be significantly reduced, since heavier satellites tend to cost less per unit of payload mass and power to construct, put in orbit and control.

2.3 The use of several frequency bands on one satellite in such ways will, of course, have to be taken into account in coordination or planning. It may have little impact on the efficiency of use of the geostationary satellite orbit. This may be true, for example, when only one of the frequency bands which are used, or two conventionally-paired bands, are heavily loaded in the vicinity of the satellite in question and the services provided in lightly loaded bands are not closely constrained to a particular orbital position, by operational requirements or a frequency/orbital position allotment plan.

2.4 However, this practice may reduce the efficiency of orbit utilization in other situations. The minimum angular separation required in the different frequency bands to prevent inter-network interference exceeding the permissible value will probably be different, raising the possibility that full use will be made of the orbit in only one frequency band or pair of frequency bands. If different satellites were used for each pair of frequency bands or each different service, optimum orbital positions could be used for each of these satellites after coordination or planning. When a single satellite is carrying all of these facilities, a compromise orbital position must be used, and this is not likely to allow optimum coordination or planning with all other networks.

2.5 Two strategies have been suggested for reducing the impact of this problem where it could lead to inefficient usage, namely:

- for certain multiple-band configurations it is possible to adjust system parameters to minimize the overall orbit/spectrum capacity losses. This generally corresponds to equalizing the required separation angles in the various bands;
- it may be feasible to make room in between two multi-band satellites for an additional satellite operating in only one pair of frequency bands used on the multi-band satellites. This, however, may involve adjustment of the characteristics and parameters of the satellite networks.

It is recommended that these two possible strategies should be taken into account in determining the characteristics and parameters of satellite networks using more than one pair of frequency bands. In addition, it should be noted that the techniques of harmonization method M3 may be employed to optimize the utilization of the orbit in the vicinity of a complex satellite.

2.6 Nevertheless, such strategies may not be generally applicable, and it is recommended that administrations should give careful consideration to the advantages and disadvantages of this practice for applications in which it is technically avoidable.

3. Homogeneity and orbit sectorization

3.1 The most efficient orbit utilization would be obtained if all satellites utilizing the GSO, particularly those illuminating the same geographical area and using the same frequency bands, had the same characteristics, i.e. if they formed a homogeneous ensemble. However, in practice, satellite systems will have differences.

3.2 The extent to which inhomogeneity may represent an inefficient utilization of the GSO is dependent on many factors in the design of satellite systems. It is possible for the orbit to be more effectively utilized if inhomogeneity is taken into account during satellite system design. The system parameters in particular which should be given consideration are satellite and earth-station e.i.r.p.s, the service area, the transponder gain, the earth-station figure of merit (G/T), the relative immunity of the modulation method to interference, etc. Even when these basic parameters remain inhomogeneous it may be feasible to mitigate their effect on the orbital separation requirements of satellites by a careful trade-off between the e.i.r.p.s and receiver sensitivities of networks using adjacent satellites. Thus, inhomogeneity is to be reduced, where feasible, although the complete elimination of it is not compatible with the economic use of the FSS for the wide diversity of applications for which it is needed.

3.3 Studies have shown that, in principle, the impact of inhomogeneity can be reduced by segregating highly incompatible emissions by orbit sectorization or spectrum segmentation.

3.4 Orbit sectorization would probably permit a reduction of inhomogeneity without constraining system characteristics. However, it is likely to impose constraints on the choice of orbital locations for satellites. Such constraints may not be significant in arcs of the orbit where the demand for access is light, but severe problems might be raised for networks with very large service areas or those serving high latitudes, since such networks have narrow service arcs. Orbit sectorization might considerably reduce the benefits which might otherwise be obtained by the use of cross-beam geometry to enhance the capacity of the orbit for spot-beam satellites. In addition, to avoid severe inhomogeneity at the interfaces between sectors, there might be a need for guard arcs which would significantly reduce the benefits which would arise from the reduction of inhomogeneity within the sectors.

3.5 On the other hand, orbit sectorization might provide other benefits, in particular where the services required within a discrete geographical area are harmonious or where there are regional differences in frequency allocations. There is a need for further study of the benefits which orbit sectorization could provide and the disadvantages which it would raise. This study should be undertaken during the intersessional period in order that the results may be made available to the second session of this Conference.

3.6 Spectrum segmentation is also likely to permit a significant reduction in inhomogeneity. This subject is discussed further in section

3.7 Another possible approach is to apply constraints to certain system characteristics in some of the frequency bands allocated to the FSS, by the use of unified technical parameters and criteria as far as possible. The economic impact on systems of this approach could be reduced by combining it with orbit sectorization and/or spectrum segmentation.

4. Systematic use of frequency bands

4.1 Frequency band pairing

The typical fixed satellite service communication link involves transmission from an earth station to a space station and retransmission from the space station to another earth station. Accordingly, the ITU Table of Frequency Allocations allocates several frequency bands to the fixed satellite service for either Earth-to-space or space-to-Earth use. Although these frequency bands are used in pairs, the Radio Regulations do not require a satellite to use a specific Earth-to-space band with a specific space-to-Earth band. However, it is recognized that utilization of the GSO and the frequency spectrum would be more efficient, and coordination of networks would be facilitated, if specific Earth-to-space and space-to-Earth bands are designated in pairs.

Existing FSS systems show a high degree of standardization of frequency band pairing based mainly on frequency allocations as they existed before WARC-79, the difficulties of coordination with terrestrial services, and the requirements of the FSS themselves. It is clearly necessary that this existing situation be respected as much as possible and that due account is taken of the requirements of satellite networks for which other pairings are operationally essential.

Additional frequency bands newly allocated to the FSS at WARC-79 are being considered for the implementation of future satellite systems. Any band pairing arrangements in these additional frequency bands will have to take account of operational requirements of future fixed satellite systems, the different frequency allocations in the different regions, and the sharing constraints that exist in the relevant bands. Accordingly, any specific list of frequency pairings that can be developed should be used as a guide to be followed whenever feasible, and not as a regulatory requirement.

A number of technical considerations relating to the choice of bands for pairing are to be found in section [4.1].

4.2 Translation frequency for narrow-band satellites

Some satellites, for example satellites of the mobile-satellite services with feeder links in FSS bands, need to use only a part of the bandwidth of the allocated FSS band. In such cases the coordination of several narrow-band satellites occupying the same part of the GSO would be facilitated if all the satellites used the same effective translation frequency between the up-link and the down-link. In addition, it is desirable to keep to a minimum the number of translation frequencies.

4.3 Use of multiple frequency band pairs in satellites

In some satellite networks, it may be economically and operationally advantageous to use more than one pair of frequency bands; for example, to enable the working bandwidth of the network to be increased, to enable several different functions to be performed by one satellite, or to improve network connectivity by enabling communications to be established between users with different earth segments. Cross-strapping of transponders is essential for some applications and should not be prevented by any formal scheme of band pairing.

4.4 Conclusions and recommendations

The following list of technical considerations, to be taken into account when developing any list of frequency band pairings, should be drawn to the attention of Committee 5 for consideration in its studies of which frequency bands should be planned:

- The ratio of mid-band frequencies of up-link and down-link bands should preferably be not so great that antenna design is made difficult, nor so small that duplexer design is made difficult.
- The paired bands, which will not necessarily include the full bandwidth of frequency allocations, should in most cases have equal bandwidth, and the number of translation frequencies for the paired bands should be kept to a minimum.
- Where it is possible to avoid it, no frequency in one band should be a simple multiple of any frequency in its paired band.
- Pairings already well established in practice should be retained.
- To the extent that it is feasible and necessary, consideration should be given to feeder links, having due regard for present utilization by the FSS.

- Continuation of provision for the established practice of cross-strapping from one pair of bands to another in a multi-band satellite is necessary.
- ITU regional variations exist in the FSS allocations for Earth-to-space and space-to-Earth use.

Should Committee 5 so decide, additional studies may be undertaken during the intersessional period with a view to:

- 1) determining the potential value of frequency band pairings in the work of the Conference, and
- 2) providing, if possible, a specific list of FSS frequency band pairings which may be used as a guide for administrations to follow, to the extent possible, when designing and implementing future satellite systems,

for consideration by WARC ORB(2).

SUB-WORKING GROUP 6A2

Note by the Chairman of Sub-Working Group 6A2

The following text for paragraphs 3.4 and 3.5 of Article 3 of Appendix 30 is proposed:

3.4 The Region 2 Plan is based on the grouping of the space stations in nominal orbital positions of $+0.2^\circ$ and -0.2° [from the centre] of the cluster of satellites. Administrations may locate satellites within a cluster at any orbital position within the cluster, provided they obtain the agreement of administrations having assignments to space stations in the same cluster (see [...]).

3.5 SUP

J.F. BROERE
Chairman of Sub-Working Group 6A2

Note by the Chairman of Working Group 6BINTERSESSIONAL ACTIVITIES RELATING TO THE PLANNING OF THE
FEEDER LINKS FOR THE BSS IN REGIONS 1/31. Submission of requirements

A requirement is defined as the need to provide one programme channel from a specific location area(s) on Earth to a specified orbital position.

1.1 The feeder-link requirements should include the following information:

- a) country symbol and IFRB serial number of the broadcasting satellite assignment shown in column 1 of Appendix 30;
- b) frequency band preference for 14 GHz (for countries outside Europe and for Malta);
- c) service area (feeder link) - (defined by \sqrt{x} test points);
- d) boresight coordinates,
- e) antenna beamwidth,
- f) orientation of the ellipse,
- g) polarization,
- h) coordinates of the earth station - 14.5 - 14.8 GHz; 17.7 - 18.1 GHz (for those assignments in Appendix 30 using channels $\sqrt{25}$ to 40).

Note - This information is required for coordination with other services.

1.2 The Board shall prepare the appropriate form to be used by administrations in submitting their requirements.

1.3 The Board shall request before $\sqrt{\text{date}}$ administrations to submit their requirements to the Board prior to $\sqrt{\text{date}}$. The Board will prepare a consolidated list of requirements and submit a report to the second session of the Conference at least \sqrt{x} months before the start of the second session.

2. Computer software

The first session noted that the Board had developed computer software to analyze both the feeder link and down-links of the Region 2 BSS Plan and that this software could be modified with minimal effort. The Board shall prepare the appropriate software to enable the second session to analyze the feeder-link Plan

and provide an overall analysis of both the feeder links and the down-links. This software shall be based on the technical standards and parameters contained in [] of this report.

3. Planning exercise

Using the requirements referred to in 1. above, the computer software described in section [] and the technical criteria and planning approach contained in section [], the Board will carry out two planning exercises and present the results of these planning exercises to the second session. [x] months before the start of the second session.

The first planning exercise is to be based on using only the 17 GHz band for all feeder links and using a direct frequency translation of the Plan in Appendix 30.

The second planning exercise is to be based on using the 14 GHz band for those requirements for which administrations had indicated a preference for the 14 GHz band. The method of planning in the use of the 14 GHz band is covered in section [].

D. SAUVET-GOICHON
Chairman of Working Group 6B

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/46(Rev.2)-E

27 August 1985

Original: English

SUB-WORKING GROUP 6A-1

NOTE BY THE CHAIRMAN OF SUB-WORKING GROUP 6A-1 AD HOC 1

Following discussion in Sub-Working Group 6A-1 Ad Hoc 1 of the power flux-density limits proposed in Document DL/7 for determining potential incompatibilities between the BSS Plan for Region 2 and the terrestrial services of Regions 1 and 3, informal consultations among several administrations of Regions 1 and 2 had led to the suggestion described in the Annex.

G.H. RAILTON

Chairman of Sub-Working Group 6A-1

Annex: 1

ANNEX

Power flux-density limits to protect terrestrial
services in Regions 1 and 3 from assignments in
the SAT-83 Plan for Region 2

The table below describes power-flux density (pfd) limits proposed for determination of the potential incompatibilities between the SAT-83 Plan for Region 2 and each of four types of terrestrial systems encountered in Regions 1 and 3. After review by Sub-Working Group 6A-1, these criteria were approved. (Source: DL/7).

TABLE 1

Frequency band	Power flux-density limit	Territory where the limit is applied	Source
1. a) 12.2-12.5 GHz b) 12.5-12.7 GHz	-125 dB (W/m ² /4 kHz) -125 dB (W/m ² /4 kHz)	Regions 1 and 3 Region 3 and territories of countries in Region 1 enumerated in RR 848 and 850	Res. 31 (WARC-79) Final acts SAT-R2, Res. 31
2. 12.2-12.5 GHz	-132 dB (W/m ² /5 MHz); for $0 \leq \gamma \leq 10^\circ$ -132+4.2($\gamma-10$) dB (W/m ² /5 MHz); for $10^\circ \leq \gamma \leq 15^\circ$ -111 dB (W/m ² /5 MHz); for $15^\circ < \gamma \leq 90^\circ$	Regions 3 and part of Region 1 to the west of $30^\circ E$	WARC-77 WARC-79
3. 12.2-12.7 GHz	-134 dB (W/m ² /5 MHz); for $\gamma = 0^\circ$ -134+4.6975 γ^2 dB (W/m ² /5 MHz); for $0^\circ < \gamma \leq 0.8^\circ$ -128.5+25lg γ dB (W/m ² /5 MHz); for $\gamma > 0.8^\circ$	Part of Region 1 to the east of $30^\circ E$	CCIR preparatory meeting 1982 and Reports 789-1 and 631 Documents 9, 16
4. 12.5-12.7 GHz	-148 dB (W/m ² /4 kHz) for $\gamma = 0^\circ$ -148 + 4.6975 γ^2 dB (W/m ² /4 kHz); for $0^\circ < \gamma \leq 0.8^\circ$ -142.5 + 25lg γ dB (W/m ² /4 kHz); for $\gamma > 0.8^\circ$	Region 3 and territories of countries in Region 1 enumerated in RR 848 and 850	

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Corrigendum 1 to
Document DT/46(Rev.1)-E
27 August 1985
Original: English

SUB-WORKING GROUP 6A-1

Page 2

Table 1, item 4, modify column "Power flux-density limit" to read as follows:

-148	$\gamma = 0^\circ$
$-148 + 4,6975 \gamma^2$	$0^\circ < \gamma \leq 0,8^\circ$
$-142,5 + 25 \lg \gamma$	$\gamma > 0,8$

Delete "Radio Regulations" in item 4 (Source).

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/46(Rev.1)-E

26 August 1985

Original: English

SUB-WORKING GROUP 6A-1

Note by the Chairman of Sub-Working Group 6A-1 Ad Hoc 1

Following discussion in Sub-Working Group 6A-1 Ad Hoc 1 of the power flux-density limits proposed in Document DL/7 for determining potential incompatibilities between the BSS Plan for Region 2 and the terrestrial services of Regions 1 and 3, informal consultations among several administrations of Regions 1 and 2 had led to the suggestion described in the Annex.

G.H. RAILTON
Chairman of Sub-Working Group 6A-1

Annex: 1

ANNEX

Power flux-density limits to protect terrestrial services in Regions 1 and 3 from assignments in the SAT-83 Plan for Region 2

The table below describes power-flux density (pfd) limits proposed for determination of the potential incompatibilities between the SAT-83 Plan for Region 2 and each of four types of terrestrial systems encountered in Regions 1 and 3. After review by Sub-Working Group 6A-1, these criteria were approved. (Source: DL/7).

TABLE 1

Frequency band	Power flux-density limit	Territory where the limit is applied	Source
1. a) 12.2-12.5 GHz b) 12.2 - 12.7 GHz	-125 dB (W/m ² /4kHz) - 125 dB (W/m ² /4 kHz)	Region 1 and 3 Regions 1, 2 and 3	Res. 31 (WARC-70) Final acts SAT-R2, Res. 31
2. 12.2-12.5 GHz	-132 dB (W/m ² /5MHz); for $0 \leq \gamma \leq 10^\circ$ -132+4.2(γ -10)dB(W/m ² /5MHz); for $10^\circ \leq \gamma \leq 15^\circ$ -111 dB(W/m ² /5MHz); for $15^\circ \leq \gamma \leq 90^\circ$	Regions 3 and part of Region 1 to the west of 30° E	WARC-77 WARC-79
3. 12.2-12.7 GHz	-134 dB(W/m ² /5MHz); for $\gamma = 0^\circ$ -134+4.6975 γ^2 dB(W/m ² /5MHz); for $0^\circ \leq \gamma \leq 0.8^\circ$ -128.5+251 γ dB(W/m ² /5MHz); for $\gamma > 0.8^\circ$	Part of Region 1 to the east of 30° E	CCIR preparatory meeting 1982 and Reports 789-1 and 631 Documents 9, 16
4. 12.5-12.7 GHz	-148 dB(W/m ² /4kHz); for $0^\circ \leq \gamma \leq 5^\circ$ -148+0.5(γ -5)dB(W/m ² /4kHz); for $5^\circ \leq \gamma \leq 25^\circ$ -138 dB(W/m ² /4kHz); for $25^\circ \leq \gamma \leq 90^\circ$	Region 3 and territories of countries of Region 1 enumerated in RR 848 and 850,	Radio Regulations

The SAT-R2 Plan has been examined by the IFRB using the above criteria and the results are contained in Document 168.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/46-E

23 August 1985

Original: English

SUB-WORKING GROUP 6A-1

Note by the Chairman of Sub-Working Group 6A-1 Ad Hoc 1

Following discussion in Sub-Working Group 6A-1 Ad Hoc 1 of the power flux-density limits proposed in Document DL/7 for determining potential incompatibilities between the BSS Plan for Region 2 and the terrestrial services of Regions 1 and 3, informal consultations among several administrations of Regions 1 and 2 had led to the suggestion described in the Annex.

G.H. RAILTON
Chairman of Sub-Working Group 6A-1

Annex

ANNEX

Power flux-density limits to protect terrestrial
services in Regions 1 and 3 from assignments in
the SAT-83 Plan for Region 2

Table I of Document DL/7 describes power-flux density (pfd) limits proposed for determination of the potential incompatibilities between the SAT-83 Plan for Region 2 and each of four types of terrestrial systems encountered in Regions 1 and 3. The potential incompatibilities resulting from application of criteria 1 and 2 in Table I were described in Document 48. After review by Sub-Working Group 6A-1, these criteria were approved.

The potential incompatibilities resulting from application of criterion 3 were calculated by the IFRB and presented in an informal document "Calculation of the pfd produced by BSS beams of Region 2 on territories of Region 1 (Row 3 of DL/7)." After consideration of these potential incompatibilities, and estimation of those that would result from application of criterion 4, a group of the Regions 1 and 2 countries concerned or affected suggests that Sub-Working Group 6A-1 consider replacing criterion 4 by the following revised criterion:

<u>Frequency band (GHz)</u>	<u>Power flux-density limit dB(W/m²/4 kHz)</u>	<u>Territory where the limit is applied</u>
4. 12.5 - 12.7	-148 $\gamma = 0^\circ$ -148 + 4.6975 γ^2 $0^\circ < \gamma \leq 0.8^\circ$ -142.5 + 25 lg γ $\gamma > 0.8$	Region 3 and territories of countries in Region 1 enumerated in RR 848 and 850

SUB-WORKING GROUP 6A2

Draft

Second Report of Sub-Working Group 6A2 to Working Group 6A

At its second and third meetings on Thursday 22 and Saturday 24 August 1985, Sub-Working Group 6A2 continued to consider the consolidated version of Appendix 30 to the Radio Regulations, prepared by the General Secretariat in Document 16, together with the comments from administrations in Document DT/29, and the text proposed in Document DT/44. Agreement was reached on Articles 3, 6 and 8 (see Annex).

It should be borne in mind that the texts in the Annex have been adopted on the understanding that they are still subject to any decisions emanating from discussions in Working Group 6A and Committee 6.

J.F. BROERE
Chairman

Annex: 1

A N N E X

ARTICLE 3

Execution of the Provisions and Associated Plans

3.1 The Members of the Union in Regions 1, 2 and 3 shall adopt, for their broadcasting-satellite space stations¹ operating in the frequency bands referred to in this Appendix, the characteristics specified in the appropriate Regional Plan.

3.2 The Members of the Union shall not change the characteristics specified in the Regions 1 and 3 Plan or in the Region 2 Plan, or bring into use assignments to broadcasting-satellite space stations or to stations in the other services to which these frequency bands are allocated, except as provided for in the Radio Regulations and the appropriate Articles and Annexes of this Appendix.

¹ In Region 2, such stations may also be used for transmissions in the fixed-satellite service (space-to-Earth) in accordance with No. 846 of the Radio Regulations.

ARTICLE 6

**Coordination, Notification and Recording in the Master
International Frequency Register of Frequency Assignments
to Terrestrial Stations Affecting Broadcasting-Satellite Frequency
Assignments in the Bands 11.7 - 12.2 GHz (in Region 3),
11.7 - 12.5 GHz (in Region 1)
and 12.2 - 12.7 GHz (in Region 2)¹**

Section I. Coordination Procedure to Be Applied

6.1.1 Before an administration notifies to the Board a frequency assignment to a terrestrial transmitting station, it shall initiate coordination with any other administration having a frequency assignment to a broadcasting-satellite station in conformity with the appropriate Regional Plan if

- the necessary bandwidths of the two transmissions overlap; and
- the power flux-density which would be produced by the proposed terrestrial transmitting station exceeds the value derived in accordance with Annex 3 at one or more points on the edge of the service area which is within the coverage area of the broadcasting-satellite station of that administration.

6.1.2 For the purpose of effecting coordination, the administration responsible for the terrestrial station shall send to the administrations concerned, by the fastest possible means, a copy of a diagram drawn to an appropriate scale indicating the location of the terrestrial station and all other data of the proposed frequency assignment and the approximate date on which it is planned to bring the station into use.

¹ These procedures do not replace the procedures prescribed for terrestrial stations in Articles 11 and 12 of the Radio Regulations.

6.1.3 An administration with which coordination is sought shall acknowledge receipt of the coordination data immediately by telegram. If no acknowledgement is received within fifteen days of dispatch, the administration seeking coordination may dispatch a telegram requesting acknowledgement of receipt of the coordination data, to which the receiving administration shall reply. Upon receipt of the coordination data an administration with which coordination is sought shall promptly examine the matter with regard to interference¹ which would be caused to its frequency assignments in conformity with the appropriate Regional Plan and shall, within an overall period of two months from dispatch of the coordination data, either notify the administration requesting coordination of its agreement to the proposed assignment or, if this is not possible, indicate the reasons therefor and make such suggestions as it may be able to offer with a view to a satisfactory solution of the problem.

6.1.4 No coordination is required when an administration proposes to change the characteristics of an existing assignment in such a way as not to increase the level of interference to the service to be rendered by the broadcasting-satellite stations of other administrations[, in conformity with the appropriate Regional Plan].

6.1.5 An administration seeking coordination may request the Board to endeavour to effect coordination where:

- a) an administration with which coordination is sought fails to acknowledge receipt under paragraph 6.1.3 within one month of dispatch of the coordination data;
- b) an administration which has acknowledged receipt under paragraph 6.1.3 fails to give a decision within three months of dispatch of the coordination data;

¹ The criteria to be employed in evaluating interference levels shall be based on the relevant CCIR Recommendations or, in the absence of such Recommendations, shall be agreed between the administrations concerned.

- c) the administration seeking coordination and an administration with which coordination is sought disagree on the acceptable level of interference; or
- d) coordination between administrations is not possible for any other reason.

In so doing, it shall furnish the Board with the necessary information to enable it to endeavour to effect such coordination.

6.1.6 Either the administration seeking coordination or an administration with which coordination is sought, or the Board, may request any additional information which they may require to assess the level of interference to the services concerned.

6.1.7 Where the Board receives a request under paragraph 6.1.5a), it shall forthwith send a telegram to the administration concerned requesting immediate acknowledgement.

6.1.8 Where the Board receives an acknowledgement following its action under paragraph 6.1.7 or where the Board receives a request under paragraph 6.1.5b), it shall forthwith send a telegram to the administration concerned requesting an early decision in the matter.

6.1.9 Where the Board receives a request under paragraph 6.1.5d), it shall endeavour to effect coordination in accordance with the provisions of paragraph 6.1.2. Where the Board receives no acknowledgement of its request for coordination within the period specified in paragraph 6.1.3, it shall act in accordance with paragraph 6.1.7.

6.1.10 Where an administration fails to reply within one month of dispatch of the Board's telegram sent under paragraph 6.1.7 requesting an acknowledgement or fails to give a decision on the matter within 2 months of dispatch of the Board's telegram of request sent under paragraph 6.1.8, the administration with which coordination was sought shall be considered to have undertaken that no complaint will be made in respect of any harmful interference which may be caused by the terrestrial station being coordinated to the service rendered or to be rendered by its satellite-broadcasting station.

6.1.11 Where necessary, as part of the procedure under paragraph 6.1.5, the Board shall assess the level of interference. In any case, the Board shall inform the administrations concerned of the results obtained.

6.1.12 In the event of continuing disagreement between one administration seeking to effect coordination and one with which coordination has been sought, the administrations concerned may explore the possibility of reaching an agreement on the use of the proposed frequency assignment for a specified period.

Section II. Notification Procedure for Frequency Assignments

6.2.1 Any frequency assignment to a fixed, land or broadcasting station shall be notified to the International Frequency Registration Board if the use of the frequency concerned is capable of causing harmful interference to the service rendered or to be rendered by a broadcasting-satellite station of any other administration, or if it is desired to obtain international recognition of the use of the frequency¹.

6.2.2 For this notification, an individual notice for each frequency assignment shall be drawn up as prescribed in Section A of Appendix 1 to the Radio Regulations, which specifies the basic characteristics to be furnished as required. It is recommended that the notifying administration should also supply the additional data called for in that Section, together with such further data as it may consider appropriate.

6.2.3 Whenever practicable, each notice should reach the Board before the date on which the assignment is brought into use. The notice made in accordance with paragraph 6.2.2 must reach the Board not earlier than three years and not later than 3 months before the date on which the assignment is to be brought into use.

6.2.4 Any frequency assignment, the notice of which reaches the Board less than 3 months before it is brought into use, shall, where it is to be recorded, bear a remark in the Master Register to indicate that it is not in conformity with paragraph 6.2.3.

Section III. Procedure for the Examination of Notices and the Recording of Frequency Assignments in the Master Register

6.3.1 Whatever the means of communication, including telegraph, by which a notice is transmitted to the Board, it shall be considered complete if it contains at least the appropriate basic characteristics specified in Section A of Appendix 1 to the Radio Regulations.

6.3.2 Complete notices shall be considered by the Board in the order of their receipt.

6.3.3 Any notice which is incomplete shall be returned by the Board immediately, by airmail, to the notifying administration with the reasons therefor.

¹ The attention of administrations is specifically drawn to the provisions of Section I of this Article.

6.3.4 Upon receipt of a complete notice, the Board shall include the particulars thereof, with the date of receipt, in its weekly circular; this circular shall contain the particulars of all such notices received since publication of the previous circular.

6.3.5 The circular shall constitute the acknowledgement to the notifying administration of the receipt of a complete notice.

6.3.6 Complete notices shall be considered by the Board in the order specified in paragraph 6.3.2. The Board cannot postpone the formulation of a finding unless it lacks sufficient data to reach a decision; moreover, the Board shall not act upon any notice which has a technical bearing on an earlier notice still under consideration by the Board until it has reached a finding with respect to such earlier notice.

6.3.7 The Board shall examine each notice:

6.3.8 - with respect to its conformity with the Convention, the relevant provisions of the Radio Regulations and the provisions of this Appendix (with the exception of those relating to the coordination procedure and the probability of harmful interference);

6.3.9 - with respect to its conformity with the provisions of paragraph 6.1.1 relating to coordination of the use of the frequency assignment with the other administrations concerned;

6.3.10 - where appropriate, with respect to the probability of harmful interference to a broadcasting-satellite station whose frequency assignment is in conformity with the appropriate Regional Plan.

6.3.11 Depending upon the findings of the Board subsequent to the examination prescribed in paragraphs 6.3.8, 6.3.9 and 6.3.10, further action shall be as follows:

6.3.12 Finding unfavourable with respect to paragraph 6.3.8

6.3.13 Where the notice includes a specific reference to the fact that the station will be operated in accordance with the provisions of No. 342 of the Radio Regulations, it shall be examined immediately with respect to paragraphs 6.3.9 and 6.3.10.

6.3.14 If the finding is favourable with respect to paragraph 6.3.9 or 6.3.10, as appropriate, the assignment shall be recorded in the Master Register. The date of receipt by the Board of the notice shall be entered in Column 2d.

6.3.15 If the finding is unfavourable with respect to paragraph 6.3.9 or 6.3.10, as appropriate, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding. In those circumstances the notifying administration shall undertake not to bring into use the frequency assignment until the condition specified in paragraph 6.3.14 can be fulfilled. But the administrations concerned may explore the possibility of reaching an agreement on the use of the proposed frequency assignment for a specified period.

6.3.16 Where the notice does not include a specific reference to the fact that the station will be operated in accordance with the provisions of No. 342 of the Radio Regulations, it shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding and with such suggestions as the Board may be able to offer with a view to the satisfactory solution of the problem.

6.3.17 If the notifying administration resubmits the notice unchanged, it shall be treated in accordance with the provisions of paragraph 6.3.16.

6.3.18 If the notifying administration resubmits the notice with a specific reference to the fact that the station will be operated in accordance with the provisions of No. 342 of the Radio Regulations, it shall be treated in accordance with the provisions of paragraphs 6.3.13 and 6.3.14 or 6.3.15, as appropriate.

6.3.19 If the notifying administration resubmits the notice with modifications which, after re-examination, result in a favourable finding by the Board with respect to paragraph 6.3.8, the notice shall be treated under the provisions of paragraphs 6.3.20 to 6.3.32. However, in any subsequent recording of the assignment, the date of receipt by the Board of the resubmitted notice shall be entered in Column 2d.

6.3.20 Finding favourable with respect to paragraph 6.3.8

6.3.21 Where the Board finds that the coordination procedure mentioned in paragraph 6.3.9 has been successfully completed with all administrations whose broadcasting-satellite services may be affected, the assignment shall be recorded in the Master Register. The date of receipt by the Board of the notice shall be entered in Column 2d.

6.3.22 Where the Board finds that the coordination procedure mentioned in paragraph 6.3.9 has not been applied, and the notifying administration requests the Board to effect the required coordination, the Board shall take the appropriate action necessary and shall inform the administrations concerned of the results obtained. If the Board's efforts are successful, the notice shall be treated in accordance with paragraph 6.3.21. If the Board's efforts are unsuccessful, the notice shall be examined by the Board with respect to the provisions of paragraph 6.3.10.

6.3.23 Where the Board finds that the coordination procedure mentioned in paragraph 6.3.9 has not been applied and the notifying administration does not request the Board to effect the required coordination, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this action and with such suggestions as the Board may be able to offer with a view to the satisfactory solution of the problem.

6.3.24 Where the notifying administration resubmits the notice and the Board finds that the coordination procedure mentioned in paragraph 6.3.9 has been successfully completed with all administrations whose broadcasting-satellite services may be affected, the assignment shall be recorded in the Master Register. The date of receipt by the Board of the original notice shall be entered in Column 2d. The date of the receipt by the Board of the resubmitted notice shall be entered in the Remarks Column.

6.3.25 Where the notifying administration resubmits the notice with a request that the Board effect the required coordination, it shall be treated in accordance with the provisions of paragraph 6.3.22. However, in any subsequent recording of the assignment, the date of receipt by the Board of the resubmitted notice shall be entered in the Remarks Column.

6.3.26 Where the notifying administration resubmits the notice and states it has been unsuccessful in effecting the coordination, it shall be examined by the Board with respect to the provisions of paragraph 6.3.10. However, in any subsequent recording of the assignment, the date of receipt by the Board of the resubmitted notice shall be entered in the Remarks Column.

6.3.27 Finding favourable with respect to paragraphs 6.3.8 and 6.3.10

6.3.28 The assignment shall be recorded in the Master Register. The date of receipt by the Board of the notice shall be entered in Column 2d.

6.3.29 Finding favourable with respect to paragraph 6.3.8 but unfavourable with respect to paragraph 6.3.10

6.3.30 The notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding and with such suggestions as the Board may be able to offer with a view to the satisfactory solution of the problem.

6.3.31 Should the notifying administration resubmit the notice with modifications which result, after re-examination, in a favourable finding by the Board with respect to paragraph 6.3.10, the assignment shall be recorded in the Master Register. The date of receipt by the Board of the original notice shall be entered in Column 2d. The date of receipt by the Board of the resubmitted notice shall be indicated in the Remarks Column.

6.3.32 Should the notifying administration resubmit the notice, either unchanged or with modifications which decrease the probability of harmful interference but not sufficiently to permit the provisions of paragraph 6.3.31 to be applied and should that administration insist upon reconsideration of the notice but the Board's finding remain unchanged, the notification shall again be returned to the notifying administration in accordance with paragraph 6.3.30. In those circumstances, the notifying administration shall undertake not to bring into use the proposed frequency assignment until the condition specified in paragraph 6.3.31 can be fulfilled. But the administrations concerned may explore the possibility of reaching an agreement on the use of the frequency assignment for a specified period. In that event the Board shall be notified of the agreement and the frequency assignment shall be recorded in the Master Register with a note indicating that the assignment is valid only for the specified period. The notifying administration using the frequency assignment during a specified period shall not subsequently use this circumstance to justify continued use of the frequency beyond the period specified if it does not obtain the agreement of the administration or the administrations concerned.

6.3.33 Change in the basic characteristics of assignments already recorded in the Master Register

6.3.34 A notice of a change in the basic characteristics of an assignment already recorded, as specified in Appendix 1 to the Radio Regulations (except those entered in Columns 2c, 3 and 4a of the Master Register), shall be examined by the Board in accordance with paragraphs 6.3.8 and 6.3.9 and, where appropriate, paragraph 6.3.10 and paragraphs 6.3.12 to 6.3.32 inclusive shall be applied. Where the change should be recorded, the original assignment shall be amended according to the notice.

6.3.35 However, in the case of a change in the basic characteristics of an assignment which is in conformity with paragraph 6.3.8, should the Board reach a favourable finding with respect to paragraph 6.3.9 and, if applicable, paragraph 6.3.10, or find that the change does not increase the probability of harmful interference to assignments already recorded, the amended assignment shall retain the original date in Column 2d. In addition, the date of receipt by the Board of the notice relating to the change shall be entered in the Remarks Column.

6.3.36 The projected date of bringing into use of a frequency assignment may be extended on request of the notifying administration by three months. In the case where the administration states that, due to exceptional circumstances, it needs a further extension of this period, such extension may be provided but it shall in no case exceed six months from the original projected date of bringing into use.

6.3.37 In applying the provisions of this Section, any resubmitted notice which is received by the Board more than two years after the date of its return by the Board shall be considered as a new notice.

6.3.38 Recording of frequency assignments notified before being brought into use

6.3.39 If a frequency assignment notified in advance of bringing into use has received a favourable finding by the Board with respect to paragraphs 6.3.8 and 6.3.9, and, where appropriate, 6.3.10, it shall be entered provisionally in the Master Register with a special symbol in the Remarks Column indicating the provisional nature of that entry.

6.3.40 Within one month after the date of bringing into use, either as originally notified or as modified in application of paragraph 6.3.36, the notifying administration shall confirm that the frequency assignment has been brought into use. When the Board is informed that the assignment has been brought into use, the special symbol shall be deleted from the Remarks Column.

6.3.41 If the Board does not receive this confirmation within the period referred to in paragraph 6.3.40, the entry concerned shall be cancelled. The Board shall consult the administration concerned before taking such action.

ARTICLE 8

Miscellaneous Provisions Relating to the Procedures

8.1 If it is requested by any administration, the Board, using such means at its disposal as are appropriate in the circumstances, shall conduct a study of cases of alleged contravention or non-observance of these provisions or of harmful interference.

8.2 The Board shall thereupon prepare and forward to the administration concerned a report containing its findings and recommendations for the solution of the problem.

8.3 On receiving the Board's recommendations for the solution of the problem, an administration shall promptly acknowledge the receipt by telegram and shall subsequently indicate the action it intends to take. In cases when the Board's suggestions or recommendations are unacceptable to the administrations concerned, further efforts should be made by the Board to find an acceptable solution to the problem.

8.4 In a case where, as a result of a study, the Board submits to one or more administrations suggestions or recommendations for the solution of a problem, and where no answer has been received from one or more of these administrations within a period of three months, the Board shall consider that the suggestions or recommendations concerned are unacceptable to the administrations which did not answer. If it was the requesting administration which failed to answer within this period, the Board shall close the study.

8.5 If it is requested by any administration, particularly by an administration of a country in need of special assistance, the Board, using such means at its disposal as are appropriate in the circumstances, shall render the following assistance:

- a) computation necessary in the application of Annexes 1, 3 and 4;
- b) any other assistance of a technical nature for completion of the procedures in this Appendix.

8.6 In making a request to the Board under paragraph 8.5, the administration shall furnish the Board with the necessary information.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Addendum 1 to
Document DT/48-E
26 August 1985
Original: English

Source: Document DL/24

WORKING GROUP 5A

NOTE BY THE CHAIRMAN OF SUB-WORKING GROUP 5A-1 TO THE CHAIRMAN OF WORKING GROUP 5A

1. The following texts of Sub-Working Group 5A-1 follow the consideration of the texts in Documents DT/27 and DT/27(Add.1) and those forwarded in writing to the Working Group.

2. In some of the texts forwarded for your consideration, some members of the Group considered that the texts contained elements of a planning method rather than a planning principle. The Group was also unable to agree whether some of these matters were relevant to the work of the Group.

3. This document contains "planning principles" grouped broadly under the headings of:

Efficiency
Provisions for multi-service and multi-band networks
Sharing of inconveniences
Others

but it should be recognized that some principles overlap or fall into more than one specific category.

4. This is the final document from the Sub-Working Group.

I.R. HUTCHINGS
Chairman of Sub-Working Group 5A-1

EFFICIENCY

- 1) Any planning method should ensure efficient and economical use of the geostationary orbit and the frequency bands allocated to space services;
- 2) Any planning approach shall, in satisfying the requirements, progressively achieve more efficient use of the GSO/spectrum resource, account being taken of the need for access and operational, technical and economical constraints.
- 3) Any planning method should encourage progressive improvements in satellite technology which will help increase orbit/spectrum capacity, and which are acceptable to the majority of countries.
- 4) Any planning method should ensure that the plan adopted meets the requirements of administrations with regard to the OSR in the most efficient way possible from the standpoint of technical, operational and economic factors, and of the needs of developing countries.
- 5) Any planning method should ensure optimum operation of the GSO spectrum resource while permitting the development and introduction of new technical facilities which make for reduced system costs.
- 6) Any planning methods adopted must encourage homogeneous orbit and spectrum utilization to improve the efficiency of GSO utilization.
- 7) Any planning method should include only realistic requirements in any planning approach, to improve the efficiency of GSO utilization.
- 8) All States should cooperate in the efficient and economic use of the GO, on a regional or world-wide scale, either directly or through the United Nations and other competent international organizations.
- 9) Technological advances considered for the establishment of communication-satellite systems should be aimed not only at more efficient use of the OSR, but also at greater economy, especially in the Earth segment.
- 10) For all satellite networks whether in the plan or outside the plan, the "In-Orbit" spare satellites should utilize the same orbital positions as those of the respective primary satellites in order to avoid inefficiency and complexity in utilizing the GSO.
- 11) Any planning method adopted should ensure that the inactive spare satellite should be co-located with the active operational satellite.

Source of principle

- 1) URS/9/3(b)
- 2) USA/5/7(27.7), CAN/35/1
- 3) MLA/82/6(6.1)
SNG
THA
- 4) COMP/110/3(5b.8)
- 5) BFA/104/1
- 6) G/18/5.7
- 7) USA/5/8(d)
- 8) COMP/110/(a.5)
- 9) COMP/110/(c.3)
- 10) IRQ/87/13
- 11) MLA/82/7
SNG
THA

PROVISIONS FOR MULTI-SERVICE AND MULTI-BAND NETWORKS

- 1) Any planning method should be able to accommodate multi-service and/or multi-band satellite networks.
- 2) The requirements of multi-service and/or multi-band systems could be projected by administrations for inclusion of the appropriate elements in the development of the plan after taking into consideration the problems/difficulties, if any, in coordinating the unplanned service frequencies forming a part of such systems.
- 3) Any planning method should be able to accommodate multi-service and/or multi-band satellite networks unless they may jeopardize efficient and flexible use of the GSO/spectrum resources.

Source of principle

- 1) B/37/12(i)
- 2) IND/54/5(4.5)
- 3) J/39/3

SHARING OF INCONVENIENCES

- 1) Any planning method should ensure that existing systems will continue to be accommodated as new systems are introduced and that the burden of access will be shared among all systems over time.
- 2) Any adjustment of satellite networks arising from the need to accommodate unplanned requirements and/or improvements in technology should be within the resources of most countries.
- 3) The existing systems may also have to adjust some of their parameters, if required along with those of a new entrant. However, there is a necessity to keep these adjustments to the minimum, so that operating systems are not adversely affected. The scope and extent of such an adjustment could also be defined wherever possible.
- 4) Any planning method should recognize that only finite adjustments are possible to in-orbit systems over a satellite lifetime, and that the readjustment burden may be other than equitable initially.
- 5) If new networks or modifications cannot wait until the next Conference, the corresponding applications shall be allowed only:
 - when they do not cause interference greater than that fixed for the purposes of establishing the Plan, or if the administrations affected accept the higher level of interference;
 - if the rights of other administrations are not infringed.

Source of principle

- 1) USA/5/8(29.b)
- 2) MLA/82/8
SNG
THA
- 3) IND/54/5(4.1)
- 4) NZL/8/(page 7)
- 5) CLM/106/53

OTHERS

- 1) Satellites should, inter alia, be able to change orbital position and to leave the geostationary-satellite orbit as soon as they are no longer used.
- 2) The beam of a national satellite should so far as possible be able to cover neighbouring countries.
- 3) Countries should be encouraged to use less congested bands.
- 4) International rules must be such as to allow the use of a satellite network throughout its life without such use being modified by a change in the rules.

- 5) The Conference should adopt a Resolution stipulating that, in designing geostationary space station coverage, all available technical means should be used to reduce radiation over the territory of other countries unless those countries have expressly agreed to it, and prohibiting any intentional coverage on which there has been no consultation.
- 6) Any planning method should be effective and efficient with regard to operation, easy to apply and economical in its demands on the administrative and technical personnel.
- 7) Any planning method seeking for better ways of using GSO will necessarily require computer processing rather than manual handling.
- 8) Recognizing the disparity between the technical resources available to different administrations and groups of administrations, those in need of special assistance for the purposes of the coordination procedures must be assured that it will be available from the ITU consistent with the resources of the Union.
- 9) Any plan drawn up at the Conference shall be realistic enough to be implemented.
- 10) The orbit/spectrum resource is a limited natural resource and therefore subject to possible saturation.
- 11) A national allotment plan based on the principle of satisfying only national requirements, guaranteeing each country an orbital position and an overall bandwidth capable of satisfying all its telecommunication needs.
- 12) The cost of the development and application of the regulatory regime must be reasonable.
- 13) The planning process will cover, in relation to the geostationary orbit and the radio services utilizing it:
 - the orbital positions,
 - the frequency spectrum (frequency assignments and band allocations),
and
 - the radiocommunication services.
- 14) The special needs of the developing countries are explicitly taken into account in Article 33 of the Nairobi Convention. It follows that all measures adopted for utilization of the OSR, in addition to being equitable, must favour solutions which help to speed up the development of these countries.
- 15) The GO must be used exclusively for peaceful purposes, and its planning must thus rule out any consideration contrary to those purposes.
- 16) Once the Plan and the corresponding technical parameters have been chosen there should be no reason for the cost of satellite systems to rise because of them for the duration of the Plan, even owing to unforeseen modifications of the introduction of unforeseen new systems. In other words, the cost would be defined when the Plan is chosen and would also be a factor in its choice.

- 17) The major cost of the Plan would arise from the effort required to prepare the Planning Conference. Once established, its management should require a minimum effort on the part of the ITU and the administrations.

Source of principle

- | | |
|------------------|------------------|
| 1) ALG/75/13 | 10) MEX/96/28(1) |
| 2) ALG/75/6 | 11) LBY/103/1 |
| 3) KEN/20/2.1(V) | 12) CAN/35/29 |
| 4) F/11/2 | 13) CLM/106/24 |
| 5) EQA/81 | 14) CLM/106/36 |
| 6) D/31/3 | 15) CLM/106/43 |
| 7) J/41(preface) | 16) CLM/106/64 |
| 8) G/18/5.10 | 17) CLM/106/66 |
| 9) J/39/3(7) | |
-

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/48-E
26 August 1985
Original: English

Source: Documents DL/18, DL/20, DL/22

SUB-WORKING GROUP 5A-1

NOTE BY THE CHAIRMAN OF SUB-WORKING GROUP 5A-1 TO THE CHAIRMAN OF WORKING GROUP 5A

1. The following texts from Sub-Working Group 5A-1 follow the consideration of texts in Documents DT/27 and DT/27(Add.1) and those forwarded in writing to the Working Group. Document 166 was not available to all members of the Group and was accordingly not considered. Document 166 must therefore be considered by Working Group 5A, as must any other recently issued documents.
2. In some of the texts forwarded for your consideration some members of the Group considered that the texts contained elements of a planning method rather than a planning principle.
3. The Group was unable to agree whether the proposals listed below contained a planning principle or not. The Group was also unable to agree whether some of these matters were relevant to the work of the Group.

Proposals: CLM/106/37

CLM/106/40

CLM/106/41

CLM/106/44

CLM/106/45

CLM/106/46

CLM/106/47

CLM/106/49

CLM/106/50

4. This document contains "planning principles" grouped broadly under the headings of:

Guarantee of access and equitability

Sharing with other services

Reservation of resources

Duration of the plan

Special geographical situations

Provision for multi-administration networks

Accommodation of existing systems

Different planning solutions in different circumstances

Flexibility

Usage of allotments

but it should be recognized that some principles overlap or fall into more than one specific category.

I.R. HUTCHINGS
Chairman of Sub-Working Group 5A-1

GUARANTEE OF ACCESS AND EQUITABILITY

- 1) To guarantee in practice for all countries equitable access to the geostationary orbit and the frequency bands allocated to the space services utilizing it.
- 2) To guarantee in practice for all countries equitable access to the geostationary orbit and the frequency bands allocated to the space services utilizing it, having regard to the rights, interests and special needs of the developing countries.
- 3) To guarantee in practice for all countries, whatever their level of technological development, equitable access to the geostationary orbit and the frequency bands allocated to the space services utilizing it, on the basis of the principles of justice and equity.
- 4) An administration's requirement for access shall be accommodated as and when needed.
- 5) At least one "optimal Orbital Position" and the associated frequency bands should be allotted for all countries on an equal basis to meet their national telecommunication requirements.
- 6) Orbit positions and frequency bands must be assigned by means of a priori planning "guaranteeing" access to the OSR at the time when the country concerned is ready to establish its system, without higher cost or more complex technical facilities than those involved for the first users.
- 7) Equitability must be based on an identified demand.
- 8) All planning approaches must operate equitably, i.e. without advantaging or disadvantaging any administration or group of administrations vis-a-vis any others.
- 9) Any plan for the use of the orbit/spectrum resource should respect the right of all peoples to create, store, process, receive and transmit information.
- 10) The use of the geostationary orbit should benefit all mankind.
- 11) When difficulties are encountered in meeting all actual requirements for access to the orbit/spectrum resource, priority should be given to accommodating the actual requirements of administrations which have not yet established a space system or which have established only a few space systems compared to their own requirements, and later than other administrations.

Source of principle

- 1) Several administrations
- 2) CLM/70, ARG/101/3C2)
- 3) MEX/96/28
- 4) USA/5/7, KEN/20, AUS/7/6
- 5) IRQ/87/5
- 6) CLM/106/
- 7) CAN/35/
- 8) G/18/5.1 (ref: 1st paragraph)
- 9) COMP/110/3 (5.a.2)
- 10) COMP/110/3 (5.a.2)
- 11) CHN/25/Corr.1 to Add.1 (3.1.4)

SHARING WITH OTHER SERVICES

- 1) Where frequency bands allocated to one space service using the geostationary-satellite orbit are also allocated to other space services and/or to terrestrial services on an equal primary basis any planning methods adopted must fully respect the equality of rights to operate in these bands.
- 2) Any revision of the regulations must not impose undue additional constraints on terrestrial services sharing the band on an equal basis.
- 3) Any revision of the regulations for a given space service and band must take into account restrictions which are imposed by or on other space services sharing the band.
- 4) Any planning method adopted by the Conference for a space service can only be applied to the bands which are allocated to the planned service as the sole primary space service.
- 5) As the result of the adoption of a plan for not too long a period, it may not be necessary to provide for the protection, with respect to unplanned services, of systems in operation or in active development.

Source of principle

- 1) Several administrations
- 2) CAN/35/2.10
- 3) CAN/35/2.11
- 4) NZL/8
- 5) CLM/106/59

RESERVATION OF RESOURCES

- 1) The planning method should allocate the frequency/orbit resource to the fullest without any spare capacity reserved.
- 2) Certain portions of frequency bands in the planned frequency bands should be reserved for accommodating unforeseen requirements within the planning period.
- 3) The excess capacity of the GSO/spectrum resource not utilized by the plan should be available for use for all countries and regional or global satellite organizations in accordance with a "Modified Radio Regulations" which should be established by the Conference. Such use shall not affect the planned networks beyond the specified limits adopted by the drawing of the plan.
- 4) Access to resources should not be restricted by long term reservations.
- 5) Special arrangements for access to certain expansion bands should be adopted to provide a practical guarantee of the satisfaction of long term requirements. Administrations with numerous space stations in the FSS bands should voluntarily refrain from using these expansion bands.
- 6) The plan must contain a reserve for future Members of the Union.
- 7) The equatorial states shall preserve the corresponding segments of the geostationary orbit superjacent to their territories for the opportune and appropriate utilization of the orbit by all states, particularly the developing countries.
- 8) Any planning approach must be consistent with the universally accepted principle, that administrations or groups of administrations are not entitled to permanent priority in the use of particular frequencies and GSO positions in such a way as to foreclose access by other administrations to the GSO and frequency bands allocated to space services.

Source of principle

- 1) MLA, SNG, THA/82/4(41)
- 2) CHN/28/17
- 3) IRQ/87/9
- 4) AUS/7/6(ii)
- 5) USA/30/36, USA/30/41
- 6) ALG/75/4
- 7) KEN/63/1B
- 8) USA/5

Note 1 - The ad hoc Group was unable to agree whether or not the principles 7 and 8 above should be included under this particular category, or under some other category.

DURATION OF THE PLAN

- 1) The planning period should cover several decades.
- 2) The planning should cover a period of about 10 years.
- 3) The planning period should coincide with the interval between successive conferences.

Source of principle

- 1) ALG/75/3(7)
- 2) Several administrations
- 3) CLM/70/7(C2)

SPECIAL GEOGRAPHICAL SITUATIONS

Any planning method should take into account the relevant technical aspects of the special geographical situation of particular countries or groups of countries.

Source of principle

A/C Resolution No. 895, CLM/106(Add.2)

PROVISIONS FOR MULTI-ADMINISTRATION NETWORKS

- 1) Any planning method shall accommodate the particular needs of multi-administration networks.
- 2) Any planning method should provide the option for an administration to satisfy its requirements through participation in a multi-administration system.
- 3) The use of multi-administration systems should be encouraged.
- 4) The requirements of multi-administration satellite systems could be projected by any one administration acting on behalf of a group of named administrations as per the existing practice and arrangement.
- 5) Multi-administration systems should be guaranteed adequate orbit/spectrum resources for their orderly growth and development.
- 6) Any planning method should give priority to international and regional systems which may satisfy the requirements of several administrations.
- 7) Multi-administration networks should not interfere in any way with efforts to establish networks of individual administrations, especially in developing countries.
- 8) Future regional intergovernmental systems for the developing countries should receive the same guarantees as existing international and regional intergovernmental systems during the planning process.

Source of principle

- | | |
|----------------------------|-----------------|
| 1) Several administrations | 5) GHA/77/2 |
| 2) USA/5/7 | 6) CTI/95/2 |
| 3) AUS/7/6, G/18/5.11 | 7) COMP/110/3 |
| 4) IND/54/5 | 8) COMP/146/3.3 |

ACCOMMODATION OF EXISTING SYSTEMS

- 1) Existing satellite networks should be accommodated for the duration of their designed operational life.
- 2) Any planning approach shall aim to maintain the continued viable operation of existing space systems; in particular, changes involving economic or operational impact shall be minimized.
- 3) Any planning approach shall provide for continuity of established service through replacement of satellites, including those that prematurely fail.
- 4) Existing systems should be included as an integral part of the Plan.
- 5) Existing networks must not acquire permanent title to particular frequencies or orbital locations.
- 6) Existing systems other than international and regional systems would be taken into consideration when the Plan is prepared and would not be entered in the Plan.
- 7) In any plan account should be taken of the protection and continuity of services of the existing or planned systems at the time of the planning.
- 8) Protection should be given to existing and planned multi-administration systems that provide global communications and also be given to existing and planned regional or subregional satellite systems that cater for a number of countries.
- 9) Protection should be afforded until the end of the network's satellite lifetime, or until 8 August 1995, whichever comes first.
- 10) Existing and planned satellite systems submitted by all administrations should be placed on an equal basis in the planning process.
- 11) Existing systems must not be restricted without reasons that are acceptable to the administrations concerned.
- 12) Existing networks should have modifications of their parameters only to the extent that are necessary to enable access of a new system to the GSO/spectrum resources.
- 13) The Conference should guarantee the operational continuity of existing international and regional systems.

Note 1 - The following definitions of the words existing system were considered by the Group.

- Existing systems include those under active development.
- Existing systems include systems registered before planning begins.
- Existing systems are those which are coordinated, notified, registered or in actual operation.
- Existing systems include those under coordination under Article 11.
- Existing system is one which is in operation
- Existing systems include operational satellite networks and those which are notified to the IFRB for "Advanced Publication" in accordance with the present Radio Regulations at a date before 8 August 1985 but not earlier than 8 August 1980.

Note 2 - The words "system" and "network" may be used interchangeably in many of these principles and are not necessarily in accordance with the meanings given in the Radio Regulations.

Source of principle

- | | |
|-------------------|------------------------------|
| 1) AUS/7/6 (vi) | 7) J/39/3(3) |
| 2) USA/5/7 (27.5) | 8) GHA/77/1,2 |
| 3) USA/5/7 (27.6) | 9) IRQ/87/7 |
| 4) URS/9/3 (c) | 10) CHN/25/1 (3.1.2) |
| 5) G/18/5.3 | 11) D/31/4 (ref: 2nd indent) |
| 6) ALG/75/17 | 12) B/37/11 (c) |
| | 13) ALG/75/15 |

DIFFERENT PLANNING SOLUTIONS IN DIFFERENT CIRCUMSTANCES

- 1) Different planning approaches should be considered for different regions and subregions, where appropriate.
- 2) It is essential to plan the 4/6 GHz and 11/14 GHz bands on a world-wide basis.

Note - Principle No. 5 under "Reservation of resources" is also relevant to this category.

Source of principle

- 1) AUS/7/3
- 2) IND/54/ (2.1)

FLEXIBILITY

- 1) Any planning approach shall provide a means to accommodate new or unforeseen requirements, or the modification of requirements of administrations while also providing for the need to minimize disruption of existing networks.
- 2) Any planning approach shall be able to accommodate the introduction of new technology.
- 3) The plan should be based on feasible, applicable and suitable technologies which are well proven and widely available in the time frame involved.
- 4) Any planning method should be able to accommodate a broad range of technology and operational requirements taking into account the effective use of satellite systems for applications for which they are best suited.
- 5) Any planning method should use uniform technical parameters and criteria as far as possible.
- 6) Any planning method should recognize that the most advanced technology may not be the most appropriate.
- 7) If the period between conferences is not excessive then the technical parameters and criteria relating to interference should be fixed for the life of the plan.
- 8) Any planning method should recognize that technological changes in the space and earth segments may occur at different times.
- 9) Any plan shall be able to accommodate future systems with diversified parameters and applications and be adaptable to the introduction of the most advanced satellite communications technology.
- 10) Any planning method should allot orbital arcs rather than assign orbital positions, in order to allow some flexibility.

Note - Principles Nos. 3 and 5 under "Reservation of resources" are also relevant to this category.

Source of principle

- | | |
|----------------------------|---------------|
| 1) USA/5/7 (27.3), B/37/12 | 6) CLM/106/61 |
| 2) USA/5/7 (27.9) | 7) CLM/106/57 |
| 3) IND/54/5 | 8) CLM/106/65 |
| 4) CAN/35, IND/54/5 | 9) J/39/3 (6) |
| 5) ARG/101/3 | 10) CTI/95/2 |

USAGE OF ALLOTMENTS

- 1) Any country allotment not yet used by the country must be able to be used by another country, in whole or in part, under procedures which guarantee the rights of the country for which the allotment is entered in the Plan.
- 2) It should be possible for allotments that are not used by an allottee to be used by another administration(s) subject to mutual agreement.
- 3) Any planning should provide for effective technical and operational means by which affected administrations may resolve potential interference conflicts between networks on a timely and equitable basis. The means provided for such conflict resolution should recognize the use of world, regional, subregional or bilateral forums, as appropriate.

Source of principle

- 1) ALG/75/10
 - 2) GHA/77/6
 - 3) USA/5/8 (29.C)
-

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

Document DT/49/E
26 August 1985
Original: English

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

SUB-WORKING GROUP PL-A-2

Note by the Chairman

SUBJECTS FOR INCLUSION IN AGENDA OF OF SECOND SESSION

On the basis of proposals submitted by administrations, the following list has been prepared of subjects for possible inclusion in the agenda of the second session:

Subject	Related proposals
1. To carry out planning on the basis of the report of the first session and of the intersessional work; and to adopt associated regulatory procedures.	AUS/7/10, URS/9/5 and 10, G/18/paragraph 58a), HOL/21/1, J/40/10, MEX/60/12 CTI/95/7
2. To review and revise as necessary the regulatory procedures and related definitions pertaining to space services and frequency bands not to be subject to planning	AUS/7/10, MEX/60/12, CTI/95/7 F/13/8
3. To adopt the technical parameters recommended by the first session	AUS/7/10, MEX/60/12
4. To draw up a frequency plan for feeder links for the BSS in Regions 1 and 3	URS/9/2 and 10, G/18/paragraph 58c), HOL/22/3, D/31/23, COMP/53/paragraph 3, CTI/95/7, F/165/21
4a) To defer feeder-link planning in Region 3 to a later conference	AUS/98/2
5. Possible consideration of feeder-link bands for DBS bands other than 12 GHz	G/18/paragraph 58d)
6. Consideration of satellite sound broadcasting (Resolution No. 505)	URS/9/9, G/18/paragraph 56, HOL/24/5, D/31/25 + Add.1, B/37/19, MEX/60/6, EQA/81/4, CTI/95/6 and 7

Subject	Related proposals
7. Incorporation of the Region 2 BSS plan	URS/9/11, 5/33/11, COMP/51/1, GRC/74/6, F/76/20, CTI/95/7 and 8
8. High definition TV: 8a) To amend Article 8 to allow the use of the 22.5 - 23 GHz band in Region 1 by the BSS, for HDTV 8b) Consideration by the next space WARC of an appropriate band for HDTV 8c) Consideration of the need to plan the 22.5 - 23 GHz band (in Regions 2 and 3)	 HOL/23/4, E/34/7 + Add.1 S/33/10 CAN/35/21
9. Hybrid satellites	E/42/8
10. Evaluation of the financial impact of the Conference's decisions	CTI/95/7

M.J. BATES
Chairman of Sub-Working Group PL-A-2

SUB-WORKING GROUP 6A2

Draft

Third Report of Sub-Working Group 6A2 to Working Group 6A

At its third and fourth meetings on Saturday 24 and Monday 26 August 1985, Sub-Working Group 6A2 continued to consider the consolidated version of Appendix 30 to the Radio Regulations prepared by the General Secretariat in Document 16, together with the comments from administrations in Document DT/29. Agreement was reached on Article 4 (see Annex).

The delegations of the United Kingdom and Canada reserved the right to come back to paragraphs 4.3.3.2 and 4.3.5 respectively.

It should be borne in mind that the texts in the Annex have been adopted on the understanding that they are still subject to any decisions emanating from discussions in Working Group 6A and Committee 6.

J.F. BROERE
Chairman

Annex: 1

ANNEX

ARTICLE 4

Procedure for Modifications to the Plans

4.1 When an administration intends to make a modification¹ to one of the Regional Plans, i.e. either:

- a) to modify the characteristics of any of its frequency assignments to a space station² in the broadcasting-satellite service which are shown in the appropriate Regional Plan, or for which the procedure in this Article has been successfully applied, whether or not the station has been brought into use; or
- b) to include in the appropriate Regional Plan a new frequency assignment to a space station in the broadcasting-satellite service; or
- c) to cancel a frequency assignment to a space station in the broadcasting-satellite service;

the following procedure shall be applied before any notification of the frequency assignment is made to the International Frequency Registration Board (see Article 5 of this Appendix).

4.1.1 Before an administration proposes to include in the Region 2 Plan under the provisions of 4.1b), a new frequency assignment to a space station or to include in the Plan new frequency assignments to a space station whose orbital position is not designated in the Plan for this administration, all of the assignments to the service area involved should normally have been brought into service or have been notified to the Board in accordance with Article 5 of this Appendix. Should this not be the case, the administration concerned shall inform the Board of the reasons therefor.

4.2 The term "frequency assignment in conformity with the Plan" used in this and the following Articles is defined in Article 1.

¹ The intention not to employ energy dispersal where required in accordance with paragraph [...] shall be treated as a modification and thus subject to the appropriate provisions of this Article. The use of greater energy dispersal than that required in accordance with paragraph [...] shall not be considered as a modification.

² The expression "frequency assignment to a space station", wherever it appears in this Article, shall be understood to refer to a frequency assignment associated with a given orbital position. See also Annex 8 for the orbital position limitations.

4.3 Proposed modifications to a frequency assignment in conformity with a Regional Plan or the inclusion in that Plan of a new frequency assignment

For Regions 1 and 3:

4.3.1 An administration proposing a modification to the characteristics of a frequency assignment in conformity with the Regions 1 and 3 Plan, or the inclusion of a new frequency assignment in that Plan, shall seek the agreement of those administrations:

4.3.1.1 of Regions 1 and 3 having a frequency assignment to a space station in the broadcasting-satellite service in the same or adjacent channel which is in conformity with the Regions 1 and 3 Plan[, or in respect of which modifications to that Plan have been published by the Board in accordance with the provisions of this Article]; or

4.3.1.2 of Region 2 having a frequency assignment to a space station in the broadcasting-satellite service with the necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment, which is in conformity with the Region 2 Plan[, or in respect of which modifications to that Plan have been published by the Board in accordance with the provisions of this Article]; or

4.3.1.3 having no frequency assignment in the broadcasting-satellite service in the channel concerned but in whose territory the power flux-density value exceeds the prescribed limit as a result of the proposed modification; or

4.3.1.4 having a frequency assignment in the band 11.7 - 12.2 GHz in Region 2 or 12.2 - 12.5 GHz in Region 3 to a space station in the fixed-satellite service which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. 1060 of the Radio Regulations, or those of paragraph 7.2.1 of this Appendix;

4.3.1.5 which are considered to be affected.

4.3.2 The services of administrations are considered to be affected when the limits shown in Annex 1 are exceeded.

For Region 2:

4.3.3 An administration proposing a modification to the characteristics of a frequency assignment in conformity with the Region 2 Plan, or the inclusion of a new frequency assignment in that Plan, shall seek the agreement of those administrations:

4.3.3.1 of Region 2 having a frequency assignment in the Region 2 Plan to a space station in the broadcasting-satellite service in the same or adjacent channel which is in conformity with that Plan[, or in respect of which modifications to that Plan have been published by the Board in accordance with the provisions of this Article]; or

4.3.3.2 of Regions 1 and 3 having a frequency assignment to a space station in the broadcasting-satellite service with the necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment, which is in conformity with the Regions 1 and 3 Plan[, or in respect of which modifications to that Plan have been published by the Board in accordance with the provisions of this Article]; or

4.3.3.3 having no frequency assignment in the broadcasting-satellite service in the channel concerned but in whose territory the power flux-density value exceeds the prescribed limit as a result of the proposed modification; or

4.3.3.4 having a frequency assignment in the band 12.5 - 12.7 GHz in Region 1 or 12.2 - 12.7 GHz in Region 3 to a space station in the fixed-satellite service which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. **1060** of the Radio Regulations, or those of paragraph 7.2.1 of this Appendix; or

4.3.3.5 having a frequency assignment to a space station in the broadcasting-satellite service in the band 12.5 - 12.7 GHz in Region 3 with the necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment and which

- a) is recorded in the Master Register, or
- b) has been coordinated or is being coordinated under the provisions of Resolution 33, or
- c) appears in a Region 3 Plan to be adopted at a future administrative radio conference, taking account of modifications which may be introduced subsequently in that Plan, in accordance with the Final Acts of the conference;

4.3.3.6 which are considered to be affected.

4.3.4 The services of administrations are considered to be affected when the limits shown in Annex 1 are exceeded.

For all Regions:

4.3.5 An administration intending to modify characteristics in a Regional Plan shall send to the Board, not earlier than five years but preferably not later than eighteen months before the date on which the assignment is to be brought into use, the relevant information listed in Annex 2. Modifications to that Plan involving additions under 4.1b) shall lapse if the assignment is not brought into use by that date.

4.3.5.1 Where as a result of the intended modification the limits defined in Annex 1 are not exceeded, this fact shall be indicated when submitting to the Board the information required by 4.3.5. The Board shall then publish this information in a special section of its weekly circular.

4.3.5.2 In all other cases the administration shall notify the Board of the names of the administrations whose agreement it considers should be sought in order to arrive at the agreement referred to in 4.3.1 or 4.3.3 as well as of those with which agreement has already been reached.

4.3.6 The Board shall determine on the basis of Annex 1 the administrations whose frequency assignments are considered to be affected within the meaning of 4.3.1 or 4.3.3. The Board shall include the names of those administrations with the information received under 4.3.5.2 and shall publish the complete information in a special section of its weekly circular. The Board shall immediately send the results of its calculations to the administration proposing the modification to the appropriate Regional Plan.

4.3.7 The Board shall send a telegram to the administrations listed in the special section of the weekly circular drawing their attention to the information it contains and shall send them the results of its calculations.

4.3.8 An administration which feels that it should have been included in the list of administrations whose services are considered to be affected may, giving the technical reasons for so doing, request the Board to include its name. The Board shall study this request on the basis of Annex 1 and shall send a copy of the request with an appropriate recommendation to the administration proposing the modification to the appropriate Regional Plan.

4.3.9 Any modification to a frequency assignment which is in conformity with the appropriate Regional Plan or any inclusion in that Plan of a new frequency assignment which would have the effect of exceeding the limits specified in Annex 1 shall be subject to the agreement of all affected administrations.

4.3.10 The administration seeking agreement or the administration with which agreement is sought may request any additional technical information it considers necessary. The administrations shall inform the Board of such requests.

4.3.11 Comments from administrations on the information published pursuant to 4.3.6 should be sent either directly to the administration proposing the modification or through the Board. In any event the Board shall be informed that comments have been made.

4.3.12 An administration that has not notified its comments either to the administration seeking agreement or to the Board within a period of four months following the date of the weekly circular referred to in 4.3.5.1 or 4.3.6 shall be understood to have agreed to the proposed assignment. This time limit may be extended by up to three months for an administration that has requested additional information under 4.3.10 or for an administration that has requested the assistance of the Board under 4.3.20. In the latter case the Board shall inform the administrations concerned of this request.

4.3.13 If, in seeking agreement, an administration modifies its initial proposal, it shall again apply the provisions of 4.3.5 and the consequent procedure with respect to any other administration whose services might be affected as a result of modifications to the initial proposal.

4.3.14 If no comments have been received on the expiry of the periods specified in 4.3.12, or if agreement has been reached with the administrations which have made comments and with which agreement is necessary, the administration proposing the modification may continue with the appropriate procedure in Article 5 and shall inform the Board, indicating the final characteristics of the frequency assignment together with the names of the administrations with which agreement has been reached.

4.3.15 The agreement of the administrations affected may also be obtained in accordance with this Article, for a specified period.

4.3.16 When the proposed modification to the appropriate Regional Plan involves developing countries, administrations shall seek all practicable solutions conducive to the economical development of the broadcasting-satellite systems of these countries.

4.3.17 The Board shall publish in a special section of its weekly circular the information received under 4.3.14 together with the names of any administrations with which the provisions of this Article have been successfully applied. The frequency assignment concerned shall enjoy the same status as those appearing in the appropriate Regional Plan and will be considered as a frequency assignment in conformity with that Plan.

4.3.18 When an administration proposing to modify the characteristics of a frequency assignment or to make a new frequency assignment receives notice of disagreement from an administration whose agreement it has sought, it should first endeavour to solve the problem by exploring all possible means of meeting its requirement. If the problem still cannot be solved by such means, the administration whose agreement has been sought should endeavour to overcome the difficulties as far as possible, and shall state the technical reasons for any disagreement if the administration seeking the agreement requests it to do so.

4.3.19 If no agreement is reached between the administrations concerned, the Board shall carry out any study that may be requested by these administrations; the Board shall inform them of the result of the study and shall make such recommendations as it may be able to offer for the solution of the problem.

4.3.20 An administration may at any stage in the procedure described, or before applying it, request the assistance of the Board, particularly in seeking the agreement of another administration.

4.3.21 The relevant provisions of Article 5 of this Appendix shall be applied when frequency assignments are notified to the Board.

4.4 Cancellation of frequency assignments

When a frequency assignment in conformity with one of the Regional Plans is no longer required, whether or not as a result of a modification, the administration concerned shall immediately so inform the Board. The Board shall publish this information in a special section of its weekly circular and delete the assignment from the appropriate Regional Plan.

4.5 Master copy of the Plans

4.5.1 a) The Board shall maintain an up-to-date master copy of the Regions 1 and 3 Plan taking account of the application of the procedure specified in this Article. The Board shall prepare a document listing the amendments to be made to the Plan as a result of modifications made in accordance with the procedure in this Article.

b) The Board shall maintain an up-to-date master copy of the Region 2 Plan, including the overall equivalent protection margins of each assignment, taking account of the application of the procedure specified in this Article. This master copy shall contain the overall equivalent protection margins derived from the Plan as established by the 1983 Conference and those derived from all modifications to the Plan as a result of the successful completion of the modification procedure described in this Article. The Board shall prepare a document listing the amendments to be made to the Plan as a result of modifications made in accordance with the procedure described in this Article.

4.5.2 The Secretary-General shall be informed by the Board of modifications made to the Regional Plans and shall publish an up-to-date version of those Plans in an appropriate form when justified by the circumstances.

WORKING GROUP 6BDraft Report from Sub-Working Group 6B-2
to Working Group 6BSELECTION OF CENTRE FREQUENCIES FOR PLANNING
THE BROADCASTING-SATELLITE FEEDER LINK CHANNELS IN REGIONS 1 AND 3
IN FREQUENCY BANDS 14.5 - 14.8 AND 17.3 - 18.1 GHz1. Introduction

1.1 In the eighth meeting of Sub-Working Group 6B-2, it was decided to establish a Drafting Party of Sub-Working Group 6B-2. The terms of reference of this Drafting Party are to consider constraints concerning a selection of appropriate translation frequencies, channel bandwidth, channel separation and necessary guard bands, as they were discussed in the eighth meeting and to prepare a proposal for the centre frequencies for planning the broadcasting-satellite feeder link channels in Regions 1 and 3 in the frequency bands 14.5 - 14.8 and 17.3 - 18.1 GHz (in accordance with the pertinent provisions of the Radio Regulations) and their relationship to the channels in the BSS R1,3 Plan.

1.2 The meeting recommended for both feeder link bands to respect as much as possible the general characteristics of the BSS R1,3 Plan, to use linear translation and one translation frequency for a set of transponders serving the channels assigned to the same beam and administration.

1.3 In addition, for the feeder link band 14.5 - 14.8 GHz, 14 channels and two appropriate guard bands should be assumed.

2. General characteristics of the BSS R1,3 Plan

	<u>Region 1</u>	<u>Region 3</u>
Maximum allocated frequency band	11.7 - 12.5	11.7 - 12.2 GHz
Maximum available bandwidth	800	500 MHz
Necessary bandwidth of a channel	27	27 MHz
Channel separation	19.18	19.18 MHz
Number of channels	40	24
Center frequency of the lowest channel	11 727.48	11 727.48 MHz
Center frequency of the highest channel	12 475.50	12 168.62 MHz
Lower guard band	14.00	14.00 MHz
Upper guard band	11.00	17.90 MHz

3. Project for center frequencies for planning the broadcasting-satellite feeder links in the band 17.3 - 18.1 GHz

3.1 As the maximum available bandwidth of 800 MHz is the same for Region 1 BSS Plan and for the feeder link band 17.3 - 18.1 GHz a translation frequency of 5.60 GHz can be used for a single frequency subtractive mixing. In Region 3 the same translation frequency of 5.6 GHz appears to be the optimum for single frequency subtractive mixing also in the case of the feeder link band 17.3 - 17.8 GHz. This will produce a linear translation of all channels and preserve the same guard bands. This kind of conversion will produce down-link channels free from any spurious mixing products which might arise from combination of harmonic frequencies up to 10th order of any spectral line within the feeder link channels and 10th order harmonic of the translation frequency.

3.2 In the case when a translation frequency other than 5.60 GHz is desirable for a single conversion mixing, then the ratio of the translation frequency to any frequency within the necessary bandwidth of a feeder link channel must not equal to 3/10 neither 1/3.

3.3 Table 1 indicates channel numbers and corresponding center frequencies of the BSS R1,3 Plan and the feeder links for the translation frequency of 5.60 GHz.

4. Project for center frequencies for planning the broadcasting-satellite feeder links in the band 14.5 - 14.8 GHz

4.1 As the maximum available bandwidth for the feeder link band 14.5 -14.8 GHz is only 300 MHz in comparison to 800 and 500 MHz for the Regions 1 and 3, respectively, several translation frequencies must be considered for permitting that any channel in the Plan to be used. Consequently, a particular feeder link channel must be assigned to several BSS Plan channels simultaneously.

4.2 Selection of translation frequencies for this purpose is a complex task due to two domains within the possible range of translation frequencies which would create spurious mixing products within certain channels. Therefore, it is necessary to optimize the translation frequencies. Ratios of translation frequency to any frequency within the necessary bandwidth of a feeder link channel to be avoided are 1/6 and 2/11.

4.3 Considering the terms of reference, the general characteristics of the BSS R1,3 Plan and constraints regarding selection of the translation frequencies, the following parameters are recommended for planning feeder links in the frequency band 14.5 - 14.8 GHz :

Necessary bandwidth of a channel	27 MHz
Channel separation	19.18 MHz
Number of channels	14
Center frequency of the lowest channel (1)	14 525.30 MHz
Center frequency of the highest channel (14)	14 774.64 MHz
Lower guard band	11.80 MHz
Upper guard band	11.83 MHz

Translation frequencies:

a)	for BSS channels 1 to 14	2 797.82 MHz
b)	for BSS channels 15 to 28	2 529.30 MHz
c)	for BSS channels 29 to 40	2 260.78 MHz

4.4 Table 2 indicates channel numbers and center frequencies in the feeder link band and the relationship to the same of the BSS R1,3 Plan for the three translation frequencies.

4.5 Recommendations:

i) Recognizing the reduced channel capacity of the 14.5 - 14.8 GHz band administrations should be advised that if more than three channels are requested there may be difficulties in meeting all requirements. More than three channels in this band assigned to one administration would add to the complexity of the satellite.

ii) When certain channel families pertaining to a given beam and administration are split between two translation frequencies, that frequency which provides the greater number of channels should be chosen.

R.M. BARTON
Chairman of Sub-Working Group 6B-2

Annexes: 2 Tables

TABLE 1

Table showing correspondence between channel numbers
and assigned frequencies in the BSS R1,3 Plan and for the
associated feeder links using the translation frequency of 5 600 MHz

Channel No.	Plan assignm. MHz	Feeder assignm. MHz	Channel No.	Plan assignm. MHz	Feeder assignm. MHz
1	11 727.48	17 327.48	21	12 111.08	17 711.08
2	11 746.66	17 346.66	22	12 130.26	17 730.26
3	11 765.84	17 365.84	23	12 149.44	17 749.44
4	11 785.02	17 385.02	24	12 168.62	17 768.62
5	11 804.20	17 404.20	25	12 187.80	17 787.80
6	11 823.38	17 423.38	26	12 206.98	17 806.98
7	11 842.56	17 442.56	27	12 226.16	17 826.16
8	11 861.74	17 461.74	28	12 245.34	17 845.34
9	11 880.92	17 480.92	29	12 264.52	17 864.52
10	11 900.10	17 500.10	30	12 283.70	17 883.70
11	11 919.28	17 519.28	31	12 302.88	17 902.88
12	11 938.46	17 538.46	32	12 322.06	17 922.06
13	11 957.64	17 557.64	33	12 341.24	17 941.24
14	11 976.82	17 576.82	34	12 360.42	17 960.42
15	11 996.00	17 596.00	35	12 379.60	17 979.60
16	12 015.18	17 615.18	36	12 398.78	17 998.78
17	12 034.36	17 634.36	37	12 417.96	18 017.96
18	12 053.54	17 653.54	38	12 437.14	18 037.14
19	12 072.72	17 672.72	39	12 456.32	18 056.32
20	12 091.90	17 691.90	40	12 475.50	18 075.50

TABLE 2

Table showing correspondence between channel numbers
and assigned frequencies for the feeder links in the frequency
band 14.5 - 14.8 GHz and the relationship to the BSS R1,3 Plan assignments

FEEDER LINK ASSIGNMENTS		TRANSLATION FREQUENCIES (MHz)					
		2 797.82		2 529.30		2 260.78	
CH. No.	FREQUENCY (MHZ)	BSS R 1,3 PLAN ASSIGNMENTS					
		CH. No.	FREQUENCY (MHz)	CH. No.	FREQUENCY (MHz)	CH. No.	FREQUENCY (MHz)
1	14 525.30	1	11 727.48	15	11 996.00	29	12 264.52
2	14 544.48	2	11 746.66	16	12 015.18	30	12 283.70
3	14 563.66	3	11 765.84	17	12 034.36	31	12 302.88
4	14 582.84	4	11 785.02	18	12 053.54	32	12 322.06
5	14 602.02	5	11 804.20	19	12 072.72	33	12 341.24
6	14 621.20	6	11 823.38	20	12 091.90	34	12 360.42
7	14 640.38	7	11 842.56	21	12 111.08	35	12 379.60
8	14 659.56	8	11 861.74	22	12 130.26	36	12 398.78
9	14 678.74	9	11 880.92	23	12 149.44	37	12 417.96
10	14 697.92	10	11 900.10	24	12 168.62	38	12 437.14
11	14 717.10	11	11 919.28	25	12 187.80	39	12 456.32
12	14 736.28	12	11 938.46	26	12 206.98	40	12 475.50
13	14 755.46	13	11 957.64	27	12 226.16	--	-----
14	14 774.64	14	11 976.82	28	12 245.34	--	-----

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

Document DT/51-E
26 August 1985
Original: English

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

SUB-WORKING GROUP 6B-2

Draft Report from Drafting Group of Sub-Working Group 6B-2
to Sub-Working Group 6B-2

SELECTION OF CENTRE FREQUENCIES FOR PLANNING
THE BROADCASTING-SATELLITE FEEDER LINK CHANNELS IN REGIONS 1 AND 3
IN FREQUENCY BANDS 14.5 - 14.8 AND 17.3 - 18.1 GHz

1. Introduction

1.1 In the eighth meeting of Sub-Working Group 6B-2, it was decided to establish a Drafting Party of Sub-Working Group 6B-2. The terms of reference of this Drafting Party are to consider constraints concerning a selection of appropriate translation frequencies, channel bandwidth, channel separation and necessary guard bands, as they were discussed in the eighth meeting and to prepare a project for the center frequencies for planning the broadcasting-satellite feeder link channels in Regions 1 and 3 in the frequency bands 14.5 - 14.8 and 17.3 - 18.1 GHz (in accordance with the pertinent provisions of the Radio Regulations) and their relationship to the channels in the BSS R1,3 Plan.

1.2 The meeting recommended for both feeder link bands to respect as much as possible the general characteristics of the BSS R1,3 Plan, to use linear translation and one translation frequency for a set of transponders serving the channels assigned to the same beam and administration.

1.3 In addition, for the feeder link band 14.5 - 14.8 GHz, 14 channels and two appropriate guard bands should be assumed.

2. General characteristics of the BSS R1,3 Plan

	<u>Region 1</u>	<u>Region 3</u>
Maximum allocated frequency band	11.7 - 12.5	11.7 - 12.2 GHz
Maximum available bandwidth	800	500 MHz
Necessary bandwidth of a channel	27	27 MHz
Channel separation	19.18	19.18 MHz
Number of channels	40	24
Center frequency of the lowest channel	11 727.48	11 727.48 MHz
Center frequency of the highest channel	12 475.50	12 168.62 MHz
Lower guard band	14.00	14.00 MHz
Upper guard band	11.00	17.90 MHz

3. Project for center frequencies for planning the broadcasting-satellite feeder links in the band 17.3 - 18.1 GHz

3.1 As the maximum available bandwidth of 800 MHz is the same for Region 1 BSS Plan and for the feeder link band 17.3 - 18.1 GHz a translation frequency of 5.60 GHz can be used for a single frequency subtractive mixing. In Region 3 the same translation frequency of 5.6 GHz appears to be the optimum for single frequency subtractive mixing also in the case of the feeder link band 17.3 - 17.8 GHz. This will produce a linear translation of all channels and preserve the same guard bands. This kind of conversion will produce down-link channels free from any spurious mixing products which might arise from combination of harmonic frequencies up to 10th order of any spectral line within the feeder link channels and 10th order harmonic of the translation frequency.

3.2 In the case when a translation frequency other than 5.60 GHz is desirable for a single conversion mixing, then the ratio of the translation frequency to any frequency within the necessary bandwidth of a feeder link channel must not equal to 3/10 neither 1/3.

3.3 Table 1 indicates channel numbers and corresponding center frequencies of the BSS R1,3 Plan and the feeder links for the translation frequency of 5.60 GHz.

4. Project for center frequencies for planning the broadcasting-satellite feeder links in the band 14.5 - 14.8 GHz

4.1 As the maximum available bandwidth for the feeder link band 14.5 - 14.8 GHz is only 300 MHz in comparison to 800 and 500 MHz for the Regions 1 and 3, respectively, several translation frequencies must be considered for achieving that any channel in the Plan can be used. Consequently, a particular feeder link channel must be assigned to several BSS Plan channels simultaneously.

4.2 Selection of translation frequencies for this purpose is a complex task due to two domains within the possible range of translation frequencies which would create spurious mixing products within certain channels. Therefore, it is necessary to optimize the translation frequencies. Ratios of translation frequency to any frequency within the necessary bandwidth of a feeder link channel to be avoided are 1/6 and 2/11.

4.3 Considering the terms of reference, the general characteristics of the BSS R1,3 Plan and constraints regarding selection of the translation frequencies, the following parameters are suggested for planning feeder links in the frequency band 14.5 - 14.8 GHz :

Necessary bandwidth of a channel	27 MHz
Channel separation	19.18 MHz
Number of channels	14
Center frequency of the lowest channel (1)	14 525.30 MHz
Center frequency of the highest channel (14)	14 774.64 MHz
Lower guard band	11.80 MHz
Upper guard band	11.83 MHz

Translation frequencies:

a)	for BSS channels 1 to 14	2 797.82 MHz
b)	for BSS channels 15 to 28	2 529.30 MHz
c)	for BSS channels 29 to 40	2 260.78 MHz

4.4 Table 2 indicates channel numbers and center frequencies in the feeder link band and the relationship to the same of the BSS R1,3 Plan for the three translation frequencies.

4.5 Recommendations:

i) Assuming the reduced channel capacity of the 14.5 - 14.8 GHz band it is recommended that no more than [3] lowest consecutive channels will be required for planning feeder links in the frequency band 14.5 - 14.8 GHz.

ii) As certain channel families pertaining to a given beam and administration are splitted between two translation frequencies, it should be chosen that translation frequency which covers the higher number of channels.

A. GELLY
Chairman, Drafting Group
of Sub-Working Group 6B-2

Annexes: 2 Tables

TABLE 1

Table showing correspondence between channel numbers
and assigned frequencies in the BSS R1,3 Plan and for the
associated feeder links using the translation frequency of 5 600 MHz

Channel No.	Plan assignm. MHz	Feeder assignm. MHz	Channel No.	Plan assignm. MHz	Feeder assignm. MHz
1	11 727.48	17 327.48	21	12 111.08	17 711.08
2	11 746.66	17 346.66	22	12 130.26	17 730.26
3	11 765.84	17 365.84	23	12 149.44	17 749.44
4	11 785.02	17 385.02	24	12 168.62	17 768.62
5	11 804.20	17 404.20	25	12 187.80	17 787.80
6	11 823.38	17 423.38	26	12 206.98	17 806.98
7	11 842.56	17 442.56	27	12 226.16	17 826.16
8	11 861.74	17 461.74	28	12 245.34	17 845.34
9	11 880.92	17 480.92	29	12 264.52	17 864.52
10	11 900.10	17 500.10	30	12 283.70	17 883.70
11	11 919.28	17 519.28	31	12 302.88	17 902.88
12	11 938.46	17 538.46	32	12 322.06	17 922.06
13	11 957.64	17 557.64	33	12 341.24	17 941.24
14	11 976.82	17 576.82	34	12 360.42	17 960.42
15	11 996.00	17 596.00	35	12 379.60	17 979.60
16	12 015.18	17 615.18	36	12 398.78	17 998.78
17	12 034.36	17 634.36	37	12 417.96	18 017.96
18	12 053.54	17 653.54	38	12 437.14	18 037.14
19	12 072.72	17 672.72	39	12 456.32	18 056.32
20	12 091.90	17 691.90	40	12 475.50	18 075.50

TABLE 2

Table showing correspondence between channel numbers
and assigned frequencies for the feeder links in the frequency
band 14.5 - 14.8 GHz and the relationship to the BSS R1,3 Plan assignments

FEEDER LINK ASSIGNMENTS		TRANSLATION FREQUENCIES (MHz)					
		2 797.82		2 529.30		2 260.78	
CH. No.	FREQUENCY (MHZ)	BSS R 1,3 PLAN ASSIGNMENTS					
		CH. No.	FREQUENCY (MHZ)	CH. No.	FREQUENCY (MHZ)	CH. No.	FREQUENCY (MHZ)
1	14 525.30	1	11 727.48	15	11 996.00	29	12 264.52
2	14 544.48	2	11 746.66	16	12 015.18	30	12 283.70
3	14 563.66	3	11 765.84	17	12 034.36	31	12 302.88
4	14 582.84	4	11 785.02	18	12 053.54	32	12 322.06
5	14 602.02	5	11 804.20	19	12 072.72	33	12 341.24
6	14 621.20	6	11 823.38	20	12 091.90	34	12 360.42
7	14 640.38	7	11 842.56	21	12 111.08	35	12 379.60
8	14 659.56	8	11 861.74	22	12 130.26	36	12 398.78
9	14 678.74	9	11 880.92	23	12 149.44	37	12 417.96
10	14 697.92	10	11 900.10	24	12 168.62	38	12 437.14
11	14 717.10	11	11 919.28	25	12 187.80	39	12 456.32
12	14 736.28	12	11 938.46	26	12 206.98	40	12 475.50
13	14 755.46	13	11 957.64	27	12 226.16	--	-----
14	14 774.64	14	11 976.82	28	12 245.34	--	-----

Draft Report from Sub-Working Group 6B-2
to Working Group 6BATTENUATION AND DEPOLARIZATION DUE TO RAINFALL
FOR FEEDER LINKS TO BROADCASTING SATELLITES

The propagation model, as described below, is based on the following agreed parameters:

- frequency bands under consideration are 17.3 - 18.1 GHz and 14.5 - 14.8 GHz;
- rain attenuation for feeder links is to be calculated for 1% of the worst month;
- rain attenuation model as well as depolarization due to rain are based on the CPM Report, Annex 2 (sections 2.4.1 and 2.4.4, respectively).

1. Attenuation

For calculation, the following data are needed:

$R_{0.01}$: point rainfall rate for the location for 0.01% of an average year (mm/h)

h_o : the height above mean sea level of the earth station (km)

θ : the elevation angle (degrees)

f : frequency (GHz)

φ : latitude of earth station [$^{\circ}$]

Mean frequencies will be used for calculations for the two bands, i.e. 17.7 GHz and 14.65 GHz.

Step 1: The mean zero-degree isotherm height h_F is:

$$h_F = 5.1 - 2.15 \log \left(1 + 10^{\frac{(\varphi - 27)}{25}} \right) \text{ [km]}$$

Step 2: The rain height h_R is:

$$h_R = C \cdot h_F$$

where

$$C = 0.6 \text{ for } 0^\circ < \varphi \leq 20^\circ$$

$$C = 0.6 + 0.02 (\varphi / -20) \text{ for } 20^\circ < \varphi \leq 40^\circ$$

$$C = 1 \text{ for } \varphi > 40^\circ$$

Step 3: The slant-path length, L_s , below the rain height is:

$$L_s = \frac{2 (h_R - h_o)}{\left(\sin^2 \theta + 2 \left(\frac{h_R - h_o}{R_e} \right)^{1/2} + \sin \theta \right)} \quad [\text{km}]$$

where

R_e is the effective radius of the Earth (8,500 km)

Step 4: The horizontal projection, L_G , of the slant-path is:

$$L_G = L_s \cos \theta \quad [\text{km}]$$

Step 5: The rain path reduction factor, $r_{0.01}$, for 0.01% of the time is:

$$r_{0.01} = \frac{90}{90 + 4 L_G}$$

Step 6: The specific attenuation, γ_R , is determined from:

$$\gamma_R = k (R_{0.01})^\alpha \quad [\text{dB/km}]$$

where

$R_{0.01}$ is given in Table 1, frequency dependent coefficients in Table 2 and rain climatic zones in Figures 1 and 2, respectively.

TABLE 1

Rainfall intensity exceeded (mm/h) for 0.01% of an average year

Percentage of time	A	B	C	D	E	F	G	H	J	K	L	M	N	P
0.01	8	12	15	19	22	28	30	32	35	42	60	63	95	145

TABLE 2

Frequency dependent coefficients

Frequency	k	α
14.65	0.0327	1.149
17.7	0.0531	1.110

Frequency dependant coefficients are calculated for circular polarization using the following formulas and Table 3.

$$k = [k_H + k_V + (k_H - k_V) \cos^2 \theta \cos 2\tau]/2 \quad (11)$$

$$\alpha = [k_H \alpha_H + k_V \alpha_V + (k_H \alpha_H - k_V \alpha_V) \cos^2 \theta \cos 2\tau]/2k \quad (12)$$

where θ is the path elevation angle and τ is the polarization tilt angle relative to the horizontal ($\tau = 45^\circ$ for circular polarization).

TABLE 3

Regression coefficients for estimating specific attenuations in equation (7)

Frequency (GHz)	k_H	k_V	α_H	α_V
12	0.0188	0.0168	1.217	1.200
15	0.0367	0.0335	1.154	1.128
20	0.0751	0.0691	1.099	1.065

Step 7: The attenuation exceeded for 1% of the worst month is:

$$A_{1\%} = 0.21 \gamma_R L_s r_{0.01} \quad [\text{dB}]$$

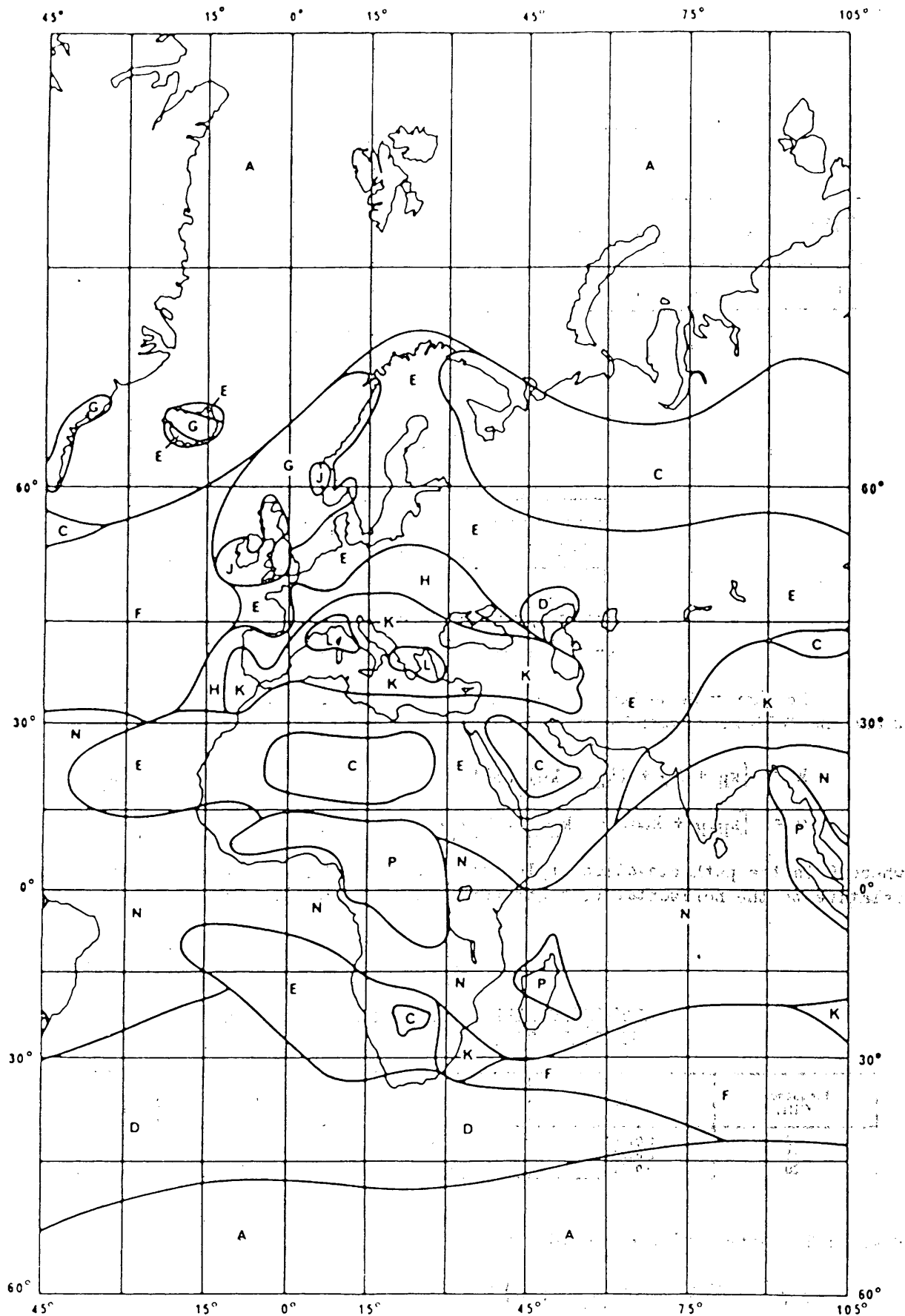


FIGURE 1

Rain climatic zones (45°W - 105°E)

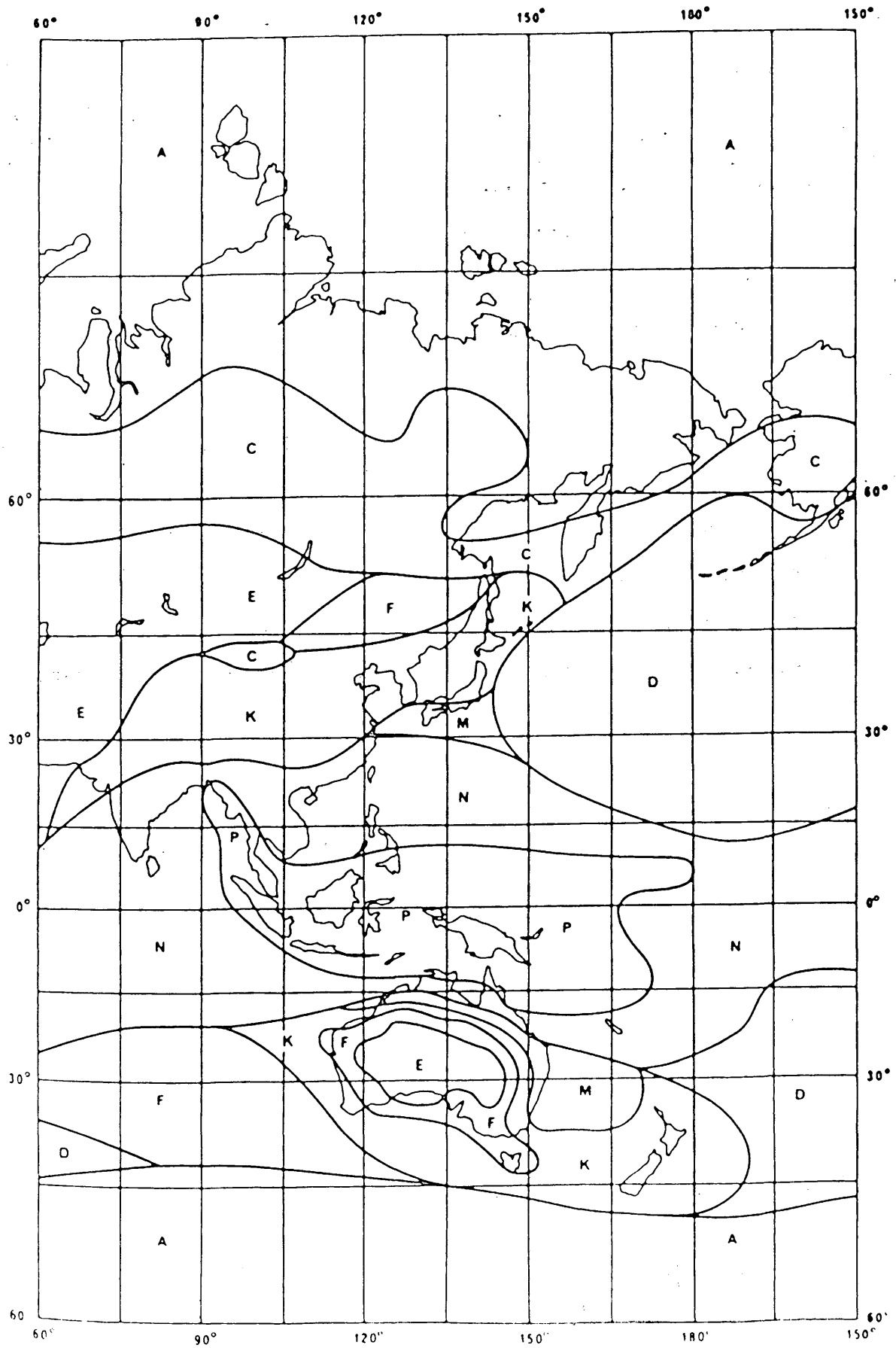


FIGURE 2

Rain climatic zones (60°E - 150°W)

2. Depolarization

Rain and ice can cause depolarization of radio frequency signals. The level of the co-polar component relative to the depolarized component is given by the cross-polarization discrimination (XPD) ratio. For the feeder link, the XPD ratio, in dB, not exceeded for 1% of the worst month is given by:

$$\text{XPD} = 30 \log f - 40 \log (\cos \theta) - V \log A_p \text{ (dB) for } 5^\circ < \theta < 60^\circ$$

where

$$V = 20 \text{ for } 14.5 - 14.8 \text{ GHz}$$

and

$$V = 23 \text{ for } 17.3 - 18.1 \text{ GHz}$$

where

A_p :: co-polar rain attenuation exceeded for 1% of the worst month,

f :: frequency (GHz),

θ : elevation angle. [$^\circ$]

For values of θ greater than 60° , use $\theta = 60^\circ$ in the above equation.

R.M. BARTON
Chairman of Sub-Working Group 6B-2

Draft Report from Drafting Group of Sub-Working Group 6B-2
to Sub-Working Group 6B-2ATTENUATION AND DEPOLARIZATION DUE TO RAINFALL
FOR FEEDER LINKS TO BROADCASTING SATELLITES

The propagation model, as described below, is based on the following agreed parameters:

- frequency bands under consideration are 17.3 - 18.1 GHz and 14.5 - 14.8 GHz;
- rain attenuation for feeder links is to be calculated for 1% of the worst month;
- rain attenuation model as well as depolarization due to rain are based on the CPM Report, Annex 2 (sections 2.4.1 and 2.4.4, respectively).

1. Attenuation

For calculation, the following data are needed:

$R_{0.01}$: point rainfall rate for the location for 0.01% of an average year (mm/h)

h_o : the height above mean sea level of the earth station (km)

θ : the elevation angle (degrees)

f : frequency (GHz)

φ : latitude of earth station

Mean frequencies will be used for calculations for the two bands, i.e. 17.7 GHz and 14.65 GHz.

Step 1: The mean zero-degree isotherm height h_F is:

$$h_F = 5.1 - 2.15 \log \left(1 + 10^{\frac{(\varphi - 27)}{25}} \right) \text{ [km]}$$

Step 2: The rain height h_R is:

$$h_R = C \cdot h_F$$

where

$$C = 0.6 \text{ for } 0^\circ < \varphi \leq 20^\circ$$

$$C = 0.6 + 0.2 (\varphi / -20) \text{ for } 20^\circ < \varphi \leq 40^\circ$$

$$C = 1 \text{ for } \varphi > 40^\circ$$

Step 3: The slant-path length, L_s , below the rain height is:

$$L_s = \frac{2 (h_R - h_o)}{(\sin^2 \theta + 2 \left(\frac{h_R - h_o}{R_e} \right)^{1/2} + \sin \theta)} \quad [\text{km}]$$

where

R_e is the effective radius of the Earth (8,500 km)

Step 4: The horizontal projection, L_G , of the slant-path is:

$$L_G = L_s \cos \theta \quad [\text{km}]$$

Step 5: The rain path reduction factor, $r_{0.01}$, for 0.01% of the time is:

$$r_{0.01} = \frac{90}{90 + 4 L_G}$$

Step 6: The specific attenuation, γ_R , is determined from:

$$\gamma_R = k (R_{0.01})^\alpha \quad [\text{dB/km}]$$

where

$R_{0.01}$ is given in Table 1, frequency dependent coefficients in Table 2 and rain climatic zones in Figures 1 and 2, respectively.

TABLE 1

Rainfall intensity exceeded (mm/h) for 0.01%
of an average year

Percentage of time	A	B	C	D	E	F	G	H	J	K	L	M	N	P
0.01	8	12	15	19	22	28	30	32	35	42	60	63	95	145

TABLE 2

Frequency dependent coefficients

Frequency dependent coefficients (k) and (α) are calculated according to the CPM Report, Annex 2, using the formulas [11] and [12] as well as coefficients in Table A2-III.

Frequency	k	α
14.65	0.0327	1.149
17.7	0.0531	1.110

step 8: The attenuation exceeded for 1% of the worst month is:

$$A_{1\%} = 0.21 \gamma_R L_s r_{0.01} \quad [\text{dB}]$$

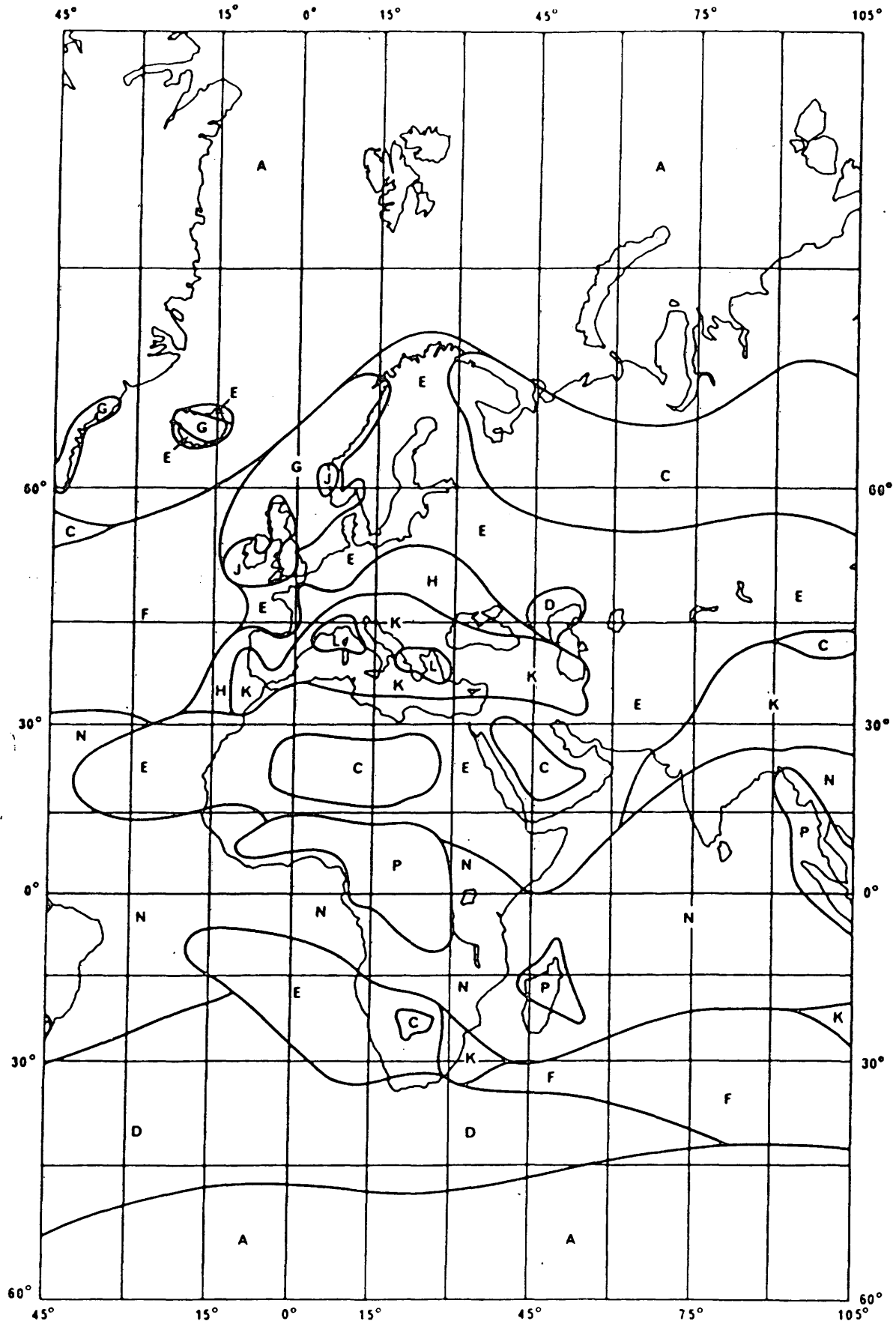


FIGURE 1

Rain climatic zones (45°W - 105°E)

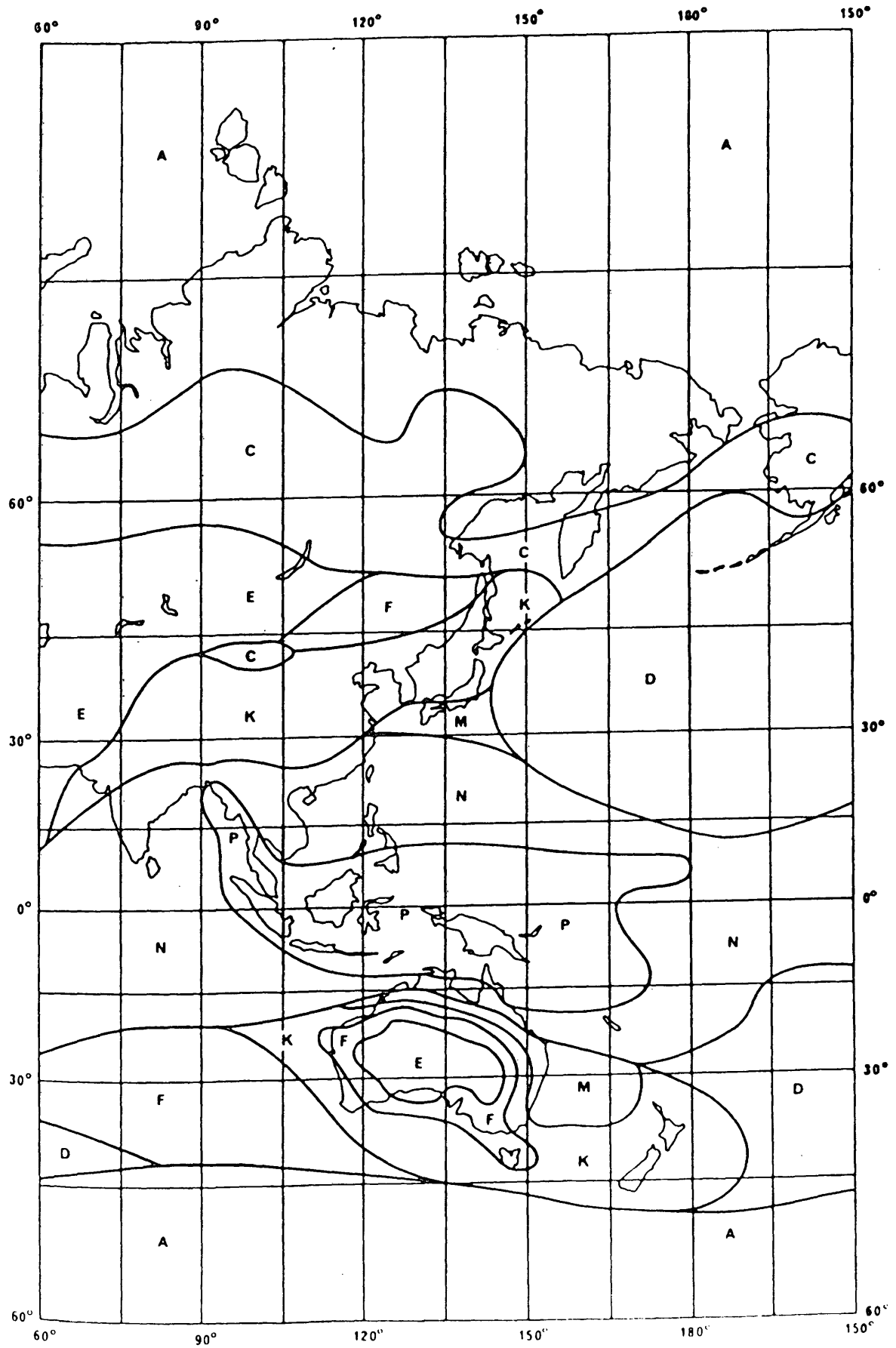


FIGURE 2

Rain climatic zones (60°E - 150°W)

2. Depolarization

Rain and ice can cause depolarization of radio frequency signals. The level of the co-polar component relative to the depolarized component is given by the cross-polarization discrimination (XPD) ratio. For the feeder link, the XPD ratio, in dB, not exceeded for 1% of the worst month is given by:

$$\text{XPD} = 30 \log f - 40 \log (\cos \theta) - V \log A_p \text{ (dB) for } 5^\circ < \theta < 60^\circ$$

where

$$V = 20 \text{ for } 14.5 - 14.8 \text{ GHz}$$

and

$$V = 23 \text{ for } 17.3 - 18.1 \text{ GHz}$$

where

A_p : co-polar rain attenuation exceeded for 1% of the worst month,

f : frequency (GHz),

θ : elevation angle.

For values of θ greater than 60° , use $\theta = 60^\circ$ in the above equation.

B. BRAJAN
Chairman of Drafting Group of 6B-2

Source: Document DL/23

WORKING GROUP 6B

DRAFT REPORT OF SUB-WORKING GROUP 6B-2 TO WORKING PARTY 6B

1. Technical characteristics for feeder-link planning1.1 Overall performance

Assuming that there is no transponder output back-off, a 0.5 dB noise contribution of the feeder link to the overall link requires that:

$$(C/N)_u = (C/N)_{d(\text{total})} + 10 \text{ dB} \quad (1)$$

For down links, the WARC-BS-77 has adopted a figure of C/N equal to 14.5 dB for 99% of the worst month at the edge of the service area. The up-link C/N required is 24 dB for 99% of the worst month, to produce an overall performance of 14 dB.

Some additional factors should also be taken into account when constructing the link budget:

- although the requirements of the WARC-BS-77 are based on the C/N at the edge of the service area, it may be useful to recall that at the beam centre the C/N will be 3 dB higher;
- a margin of 1 dB for possible mispointing of the earth-station's transmitting antenna;
- a factor of about 2 dB due to the non-linear AM-PM conversion phenomena of the satellite repeater.

Another factor of about 3 dB may be desirable for systems with enhanced quality.

In case of difficulty in planning feeder links, account should be taken of the protection ratio margin available on the space-to-Earth link in the WARC-BS-77 Plan so as to retain values of 30 dB and 14 dB for the protection ratios at the earth-station receiver input.

1.2 Carrier-to-noise ratio

The minimum $(C/N)_u$ required for planning of the feeder links in Regions 1 and 3 is 24 dB. It may be desirable for some administrations to achieve a significantly higher value of C/N, however, the use of any value higher than 24 dB should not prevent the interference conditions from being met in the plan.

1.3 Co-channel carrier-to-interference protection ratio

The protection ratio to be planned for co-channel interference is 40 dB.

1.4 Adjacent channel carrier-to-interference protection ratio

Tests carried out recently in Japan showed that the adjacent-channel protection ratio in feeder links for just-perceptible interference could be reduced to 19 dB, when signals are passed through a 12 GHz TWT amplifier operating at saturation with an AM-PM conversion factor of 2°/dB and then received through an SAW filter with 27 MHz bandwidth before the demodulator.

These tests were carried out using a TWT with a low value of AM-PM conversion. It is believed that the effects of adjacent-channel interference will be intensified by AM-PM conversion by the same mechanism as that reported for the intensification of noise. An additional margin of 2 dB above the 19 dB measured in laboratory tests is therefore recommended. It is recommended to use for planning 21 dB for adjacent-channel protection ratio.

Some administrations proposed that planning should use a value of 24 dB but where this cannot be applied a value of 21 dB be used.

1.5 Feeder link e.i.r.p.

A uniform value of e.i.r.p. for each band should be used for initial planning. For the 17/18 GHz band this should be 84 dBW and for the 14.5 to 14.8 GHz band 82 dBW.

These are initial values to be used in developing the plan. They will be adjusted, if necessary, during the plan development on a case-by-case basis to ensure that the minimum carrier-to-noise and carrier-to-interference criteria specified in the plan are met for the feeder-link systems of all administrations. Adjustments will also be made, if required to accommodate the requirements of particular administrations.

Some administrations consider that these initial planning values may not meet their requirements.

1.6 Transmitting antenna

1.6.1 Antenna diameter

For a given value of e.i.r.p. and a given relative antenna pattern, the off-axis radiation power depends on the diameter of the antenna. The larger the diameter of the antenna, the smaller is the off-axis radiation power which is a potential source of interference between adjacent orbital positions.

So for planning of feeder links it is necessary to define a minimum reference antenna diameter. For the 17/18 GHz band the value adopted is 5 m and for the 14.5 to 14.8 GHz band 6 m.

Smaller antennas of for example 2.5 m, can also be used provided there is no degradation of the interference situation. In practice this means that the e.i.r.p. might need to be reduced or the antenna diagram improved so there is no increase in the off-axis radiation power, and hence no unacceptable interference to the adjacent orbital position and other services.

For the frequency band 17.3-18.1 GHz, the minimum antenna diameter must be such that there is no significant interference between adjacent broadcasting satellites. For other frequency bands where there is sharing with other systems of the FSS, it may be necessary to use a large antenna in order to achieve a better efficiency of orbit utilization.

1.6.2 On-axis gain

The on-axis gain for the 5 m antenna at 17.3 - 18.1 GHz and for the 6 m antenna at 14.5 to 14.8 GHz is taken as 57 dBi.

1.6.3 Co-polar response pattern

The reference co-polar radiation pattern is given by the formula:

$$G = 32 - 25 \log \phi \text{ (dBi) for } 1^\circ \leq \phi \leq 48^\circ$$

$$G = -10 \text{ (dBi) for } \phi > 48^\circ$$

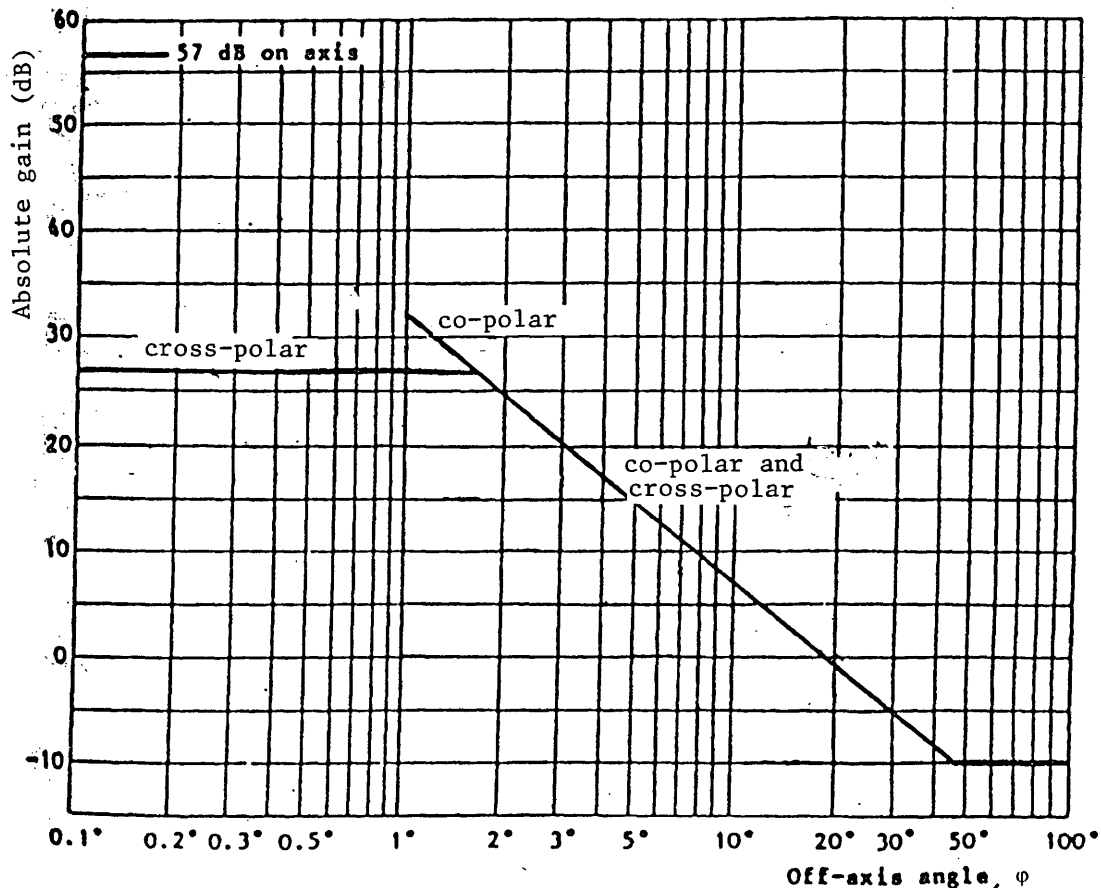


FIGURE 1

Earth station transmit antenna reference patterns

In circumstances where independent planning of orbit positions is adversely affected, the off-axis co- and cross-polar side-lobe response patterns of the earth station transmitting antenna may be limited to $29 - 25 \log \phi$ (dBi), for values of off-axis angle, ϕ , in the regions of the adjacent and next-but-one adjacent orbital positions in the plane of the geostationary orbit

1.6.4 Cross-polar response pattern

The reference cross-polar response pattern is given by the formula:

- **Cross-polar relative gain**

$$G = -30 \text{ dB} \quad \text{for} \quad 0 \leq \phi \leq 1.6^\circ$$

- **Cross-polar gain (dBi)**

$$G = 32 - 25 \log \phi \quad \text{for} \quad 1.6^\circ \leq \phi \leq 48^\circ$$

- **Cross-polar gain (dBi)**

$$G = -10 \quad \text{for} \quad \phi > 48^\circ \quad (\text{Figure 1})$$

In circumstances where insufficient cross-polar isolation is achieved, the off-axis cross-polar side-lobe response pattern of the earth station transmitting antenna may be limited to $24 - 25 \log \phi$ (dBi) for $0.76^\circ \leq \phi \leq 22.9^\circ$ and -10 (dBi) for $\phi > 22.9^\circ$

1.7 Earth station mispointing loss

An allowance of 1 dB should be made for the loss in gain due to earth station antenna mispointing.

1.8 Satellite receiving antenna

If a common transmit/receive antenna is used, the cross-polar gain, beamwidth, pointing accuracy and the radiation pattern would be tied to the down-link antenna characteristics.

Where separate antennas are used for transmit and receive the parameters of the receiving antenna are given in the following. Separate receiving antennas offer greater flexibility in terms of independence of the feeder-link frequency, polarization and service area.

1.8.1 Cross section of receiving antenna beam

Initial planning is to be based on beams of elliptical or circular cross section. If the cross section of the receiving antenna beam is elliptical, the effective beamwidth ϕ_0 is a function of the angle of rotation q between the plane containing the satellite and the major axis of the beam cross-section and the plane in which the beamwidth is required.

The relationship between the maximum gain of an antenna and the half-power beamwidth can be derived from the expression.

$$G_m = 27843/ab$$

or

$$G_m(\text{dB}) = 44.44 - 10 \log a - 10 \log b$$

where:

a and b are the angles (in degrees) subtended at the satellite by the major and minor axes of the elliptical cross-section of the beam.

A minimum value of 0.6° for the half power beamwidth is adopted for planning, except where an administration requests a lower value.

1.8.2 Co-polar response pattern

The reference co-polar response pattern is given by the formula:

Co-polar relative gain (dB)

$$G = -12\left(\frac{\phi}{\phi_0}\right)^2 \text{ for } 0 \leq \frac{\phi}{\phi_0} < 1.30$$

$$G = -17.5 - 25 \log\left(\frac{\phi}{\phi_0}\right) \text{ for } \frac{\phi}{\phi_0} > 1.30$$

After intersection with curve C:

as curve C (see Figure 2 - curve A)

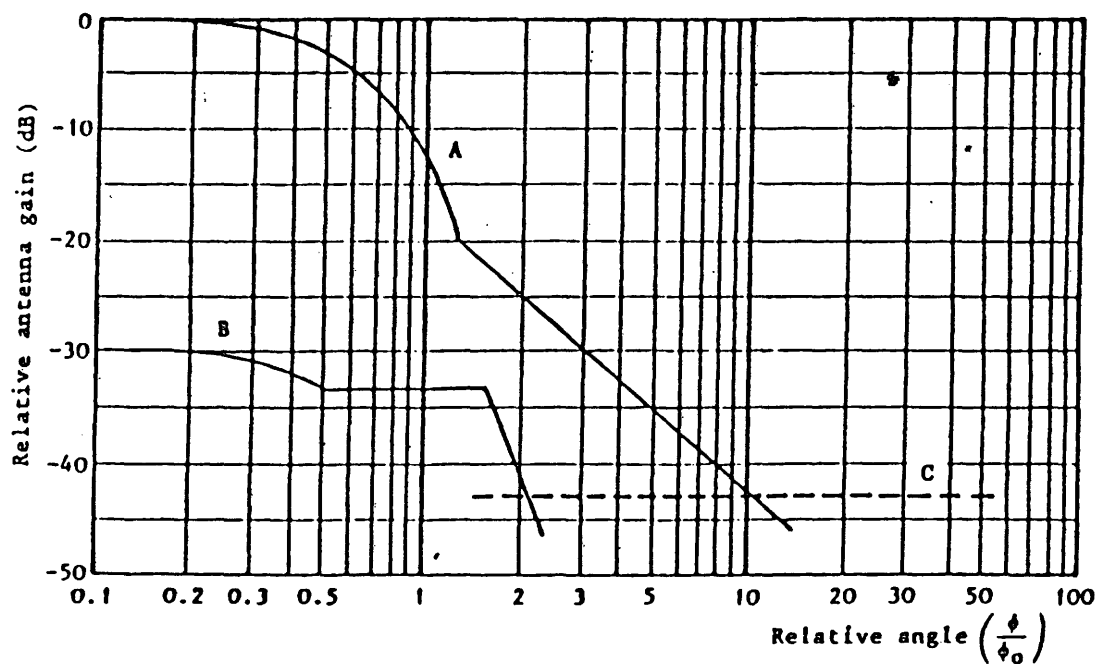


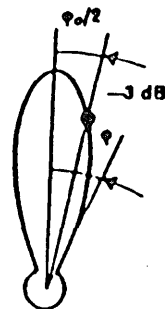
FIGURE 2

Satellite receive antenna pattern

Curve A - co-polar component (4.8.1)

Curve B - cross-polar component (4.8.2)

Curve C - minus the on-axis gain



1.8.3 Cross-polar response pattern

The reference cross-polar response pattern is given by the formula:

Cross-polar relative gain (dB)

$$G = -30 - 12\left(\frac{\varphi}{\varphi_0}\right)^2 \text{ for } 0 \leq \frac{\varphi}{\varphi_0} \leq 0.5$$

$$G = -33 \text{ for } 0.5 \leq \frac{\varphi}{\varphi_0} \leq 1.67$$

$$G = -\left[40 + 40 \log\left|\frac{\varphi}{\varphi_0} - 1\right|\right] \text{ for } 1.67 < \frac{\varphi}{\varphi_0}$$

After intersection with curve C:

as curve C (see Figure 2 - curve B)

1.9 Satellite receiving antenna pointing accuracy

The deviation of the receiving antenna beam from its nominal pointing direction should not exceed 0.2° in any direction. Moreover, the angular rotation of the receiving beam about its axis should not exceed $\pm 1^\circ$; this latter limit is not necessary for beams of circular cross-section using circular polarization.

Should only one antenna be used for transmission and reception, the pointing accuracy for the receiving antenna is governed by, but not necessarily equal to, the transmitting antenna. Where two separate reflectors are used for transmission and reception, steering the transmitting antenna by using an automatic pointing mechanism operating by detection of a land radio-frequency beacon is possible. With this precise antenna pointing system, the receiving beam with slave control from the transmitting antenna may be stabilized to within 0.2° .

1.10 Satellite system noise temperature

The planning should be based on a satellite system noise temperature of 1800 K. One administration believes a figure of 1000 K would be more appropriate.

1.11 Type of polarization

Circular polarization is assumed in planning. Linear polarization may be used at a given orbit position subject to the agreement of all the affected administrations.

1.12 Sense of polarization

In the case of uniform frequency translation the polarization sense of the feeder link should be either:

all opposite to their corresponding down-links;

or:

all the same sense as their corresponding down-links;

for each orbit position.

In the case of a non-uniform frequency translation plan it is necessary to maintain a uniform polarization/frequency arrangement at each orbit position.

Choice of the sense of circular polarization when common transmit/receive antennas are used is influenced by the technology.

For simple elliptical beams, the opposite sense of polarization on the Earth-space and space-Earth links permits the use of a simple and economical orthomode transducer to provide isolation between transmit and receive signals.

For shaped beams employing multiple horns, the same sense of polarization permits the use of simple and economical satellite antenna configurations avoiding the complexity of a separate orthomode transducer for each feed horn in the case of the opposite sense. Isolation between transmit and receive signals is provided by filters.

It is necessary to have one choice of polarization within one orbit position. However, provided there is no interaction between feeder links to two adjacent orbital positions it does not appear to be essential to make the same choice for all orbital positions.

1.13 Automatic gain control

The plan should not take account of automatic gain control on-board satellites. Up to 15 dB of automatic gain control is permitted, subject to no increase in interference to other satellite systems.

1.14 Power control

The plan should not take account of power control. Power control is permitted only to the extent that interference to other satellites does not increase by more than 0.5 dB relative to that calculated in the feeder link plan.

Guidelines should be developed for the use of power control based on the following information:

The allowable increase of earth-transmitter power applicable to earth-transmitting stations, without deteriorating the interference ratios in clear weather, is derived, taking into account the geographical locations of the earth stations and the feeder-link beam areas.

In line with this, Table 3 summarizes examples of probable combination of increase of transmitter power and rain attenuation for various values of cross-polar interference (XPIsat) and elevation angle.

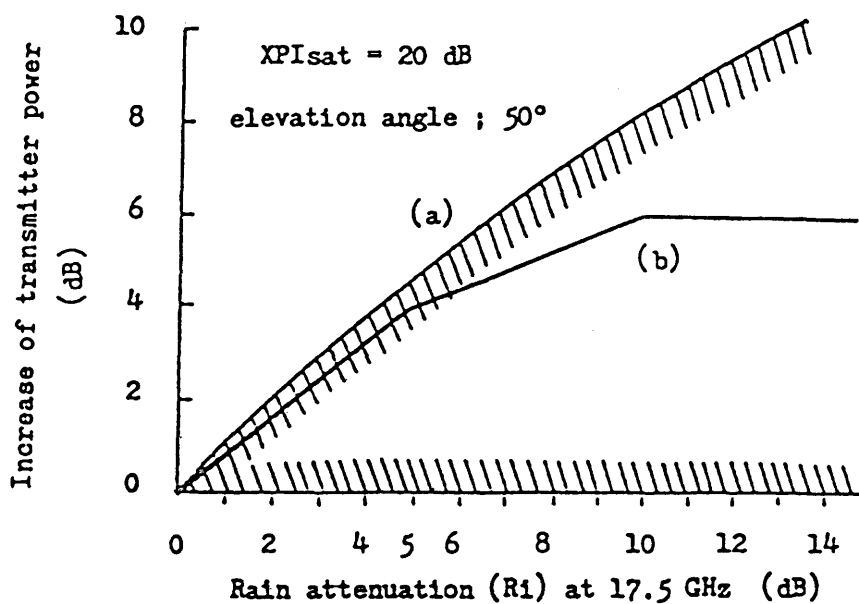


FIGURE 3

The possible increase of transmitter power for power control

Curve (a): upper limit for power control

Curve (b): an example of power control as illustrated in Table I

TABLE I

Possible increase of earth-transmitter power for power control
for various values of XPIsat and satellite elevation angle

XPIsat (dB)	Satellite elevation angle (degrees)	Increase of earth-transmitter- power (dB)	
		For rain attenuation 0 dB to 5 dB	For rain attenu- ation 5 dB to 10 dB and more
10 to 15	0 to 10	0	0
	10 to 30	0 to 4	4 to 7
	30 to 50	0 to 4	4 to 8
	50 to 60	0 to 5	5 to 9
	60 to 90	0 to 5	5 to 10
15 to 20	0 to 10	0	0
	10 to 30	0 to 2	2 to 4
	30 to 40	0 to 3	3 to 4
	40 to 50	0 to 3	3 to 6
	50 to 60	0 to 4	4 to 8
	60 to 90	0 to 5	5 to 9
20 to 25 ^{*1}	0 to 30	0	0
	30 to 40	0 to 2	2
	40 to 50	0 to 3	3 to 4
	50 to 60 ^{*1}	0 to 4 ^{*1}	4 to 6 ^{*1}
	60 to 90	0 to 5	5 to 8
25 to 30 ^{*2}	0 to 40	0	0
	40 to 50	0 to 2	2
	50 to 60	0 to 3	3
	60 to 90	0 to 5	5

*1 This case is illustrated with Curve (b) in Figure 3 as an example.

*2 These cases are identical to those given in Table I of Part II in the Final Acts of RARC-SAT-83.

1.15 Earth station location

Planning should meet the requirements of administrations, but for feeder-link earth stations located outside the down-link service area it may be necessary to employ the methods of resolving incompatibilities in planning described in 1.20.

Three cases for feeder-link service area have been identified:

- i) within the down-link service area;
- ii) within the national territory of an administration;
- iii) within the national territory of one or more administrations in agreement of serving down-link beam of another administration under the same agreement.

To resolve incompatibilities in planning, cases i) and ii) will be protected in meeting their requirements against cases set in iii) of this note.

1.16 Propagation

See Document DT/52(Rev.1).

1.17 AM to PM conversion

The degradation caused by AM to PM conversion should be taken into account when calculating the C/N of the feeder link. A figure of 2.0 dB should be allowed.

1.18 Depolarization compensation

Depolarization compensation is not taken into account in planning. It is permitted only to the extent that interference to other satellites systems does not increase by more than 0.5 dB relative to that calculated in the feeder link plan.

1.19 Site diversity

The use of site diversity is not taken into account in planning. It is permitted and is considered to be an effective technique for maintaining high carrier-to-noise ratio and carrier-to-interference ratio during periods of moderate to severe rain attenuation.

1.20 Methods of resolving incompatibilities in planning feeder links during the second session of the Conference.

Use of a common set of technical parameters for all feeder links in planning is desirable but preliminary studies by a number of administrations have indicated that there may be a difficulty in obtaining the required carrier-to-interference ratios on a small number of feeder links, particularly when certain administrations have special requirements to be met.

In order to overcome these difficulties, a certain amount of flexibility in the values of planning parameters used is proposed. Employment of one or more of the following techniques may be used, where necessary, in the planning process to attain the target values for interference protection:

1.20.1 Adjustment of the maximum level of e.i.r.p. of potential interfering feeder links or feeder links subject to excessive interference, subject to maintaining adequate carrier-to-noise and carrier-to-interference ratios on the adjusted feeder links .

1.20.2 In circumstances where independent planning of orbit positions is adversely affected, the off-axis co- and cross-polar side-lobe response patterns of the earth station transmitting antenna may be limited to $29 - 25 \log \phi$ (dBi). For values of off-axis angle, ϕ , in the regions of the adjacent and next-but-one adjacent orbital positions in the plane of the geostationary orbit.

1.20.3 In circumstances where insufficient cross-polar isolation is achieved, the off-axis cross-polar side-lobe response pattern of the earth station transmitting antenna may be limited to $24 - 25 \log \phi$ (dBi) for $0.76^\circ \leq \phi \leq 22.9^\circ$ and -10 (dBi) for $\phi > 22.9^\circ$.

1.20.4 Adjustment of the feeder-link channel assignments, retaining the same translation frequency for all assignments associated with a given down-link beam .

1.20.5 Modifying the satellite receiving antenna beam pattern shape, size, and/or side-lobe response (for example, multiple beam or shaped beam antenna).

1.20.6 Off-setting the beam-pointing direction of the satellite receiving antenna subject to maintaining the target carrier-to-noise ratio .

1.20.7 Improving the beam-pointing accuracy of the satellite receiving antenna to 0.1° .

1.20.8 Setting an upper limit of 10 dB to the rain attenuation margin included in the feeder-link power budget.

1.20.9 Separating satellite orbit positions by $\pm 0.2^\circ$ from the nominal position and specifying the transmitting antenna pattern, for relevant earth stations in the range 0° to 1° off-axis beam angles (note that this technique may require changes to Appendix 30 and should therefore be subject to further discussion)

For such cases, where $E(\text{dBW})$ is the earth station e.i.r.p., the radiated power of the earth station transmitting antenna for angles $0 < \phi \leq 1^\circ$ is given by the formula:

$$\text{for } 0^\circ \leq \phi \leq 0.1^\circ, E \quad (\text{dBW})$$

$$\text{for } 0.1^\circ \leq \phi \leq 0.32^\circ, E - 57 + 36 - 20 \log \phi \quad (\text{dBW})$$

$$\text{for } 0.32^\circ \leq \phi \leq 0.44^\circ, E - 57 + 51.3 - 53.2 \phi^2 \quad (\text{dBW})$$

$$\text{for } 0.44^\circ \leq \phi \leq 1^\circ, E - 57 + 32 - 25 \log \phi \quad (\text{dBW})$$

1.21 Summary table of initial technical parameters for feeder-link planning in Regions 1 and 3
(Frequency bands 17.3 - 18.1 GHz and 14.5 - 14.8 GHz)

Item	Parameter	Value	Reference
1.	Carrier-to-noise ratio	24 dB	1.2
2.	Co-channel carrier-to-interference ratio	40 dB	1.3
3.	Adjacent channel carrier-to-interference ratio	21 dB	1.4
4.	Feeder link e.i.r.p. initial planning value	17/18 GHz - 84 dBW 14 GHz - 82 dBW	1.5
5.	Transmitting antenna		1.6
a)	Diameter	17/18 GHz - 5 m 14 GHz - 6 m	1.6.1
b)	On-axis gain	57 dBi	1.6.2
c)	Co-polar response pattern	32-25 log ϕ (dBi) for $1^\circ \leq \phi \leq 48^\circ$, -10(dBi) for $\phi > 48^\circ$	1.6.3
d)	Cross-polar response pattern	-30 dB relative to co-polar on-axis gain, for $0^\circ \leq \phi \leq 1.6^\circ$, 32-25 log ϕ (dBi) for $1.6^\circ \leq \phi \leq 48^\circ$, -10(dBi) for $\phi > 48^\circ$	1.6.4
6.	Earth station mispointing loss	1 dB	1.7
7.	Satellite receiving antenna		1.8
a)	Cross section of beam	elliptical or circular	1.8.1
b)	Co-polar response pattern	relative gain (dB) $-12\left(\frac{\phi}{\phi_0}\right)^2$ for $0 \leq \frac{\phi}{\phi_0} < 1.30$ $-17.5 - 25 \log\left(\frac{\phi}{\phi_0}\right)$ for $\frac{\phi}{\phi_0} > 1.30$ After intersection with curve C: as curve C. (see Figure 2 - curve A)	1.8.2
c)	Cross-polar response pattern	relative gain (dB) $-30 - 12\left(\frac{\phi}{\phi_0}\right)^2$ for $0 \leq \frac{\phi}{\phi_0} \leq 0.5$ -33 for $0.5 \leq \frac{\phi}{\phi_0} \leq 1.67$ $-40 + 40 \log\left \frac{\phi}{\phi_0} - 1\right $ for $1.67 < \frac{\phi}{\phi_0}$ After intersection with curve C: as curve C. (See Figure 2 - curve B)	1.8.2
8.	Satellite receiving antenna pointing accuracy	0.2°	1.9
9.	Satellite system noise temperature	1800	1.10

<u>Item</u>	<u>Parameter</u>	<u>Value</u>	<u>Reference</u>
10.	Type of polarization	Circular	1.11
11.	Sense of polarization	(See reference)	1.12
12.	Automatic gain control	Not taken into account	1.13
13.	Power control	Not taken into account	1.14
14.	Earth station location	(See reference)	1.15
15.	Propagation	(See reference)	1.16
16.	AM-to-PM conversion	2.0 dB	1.17
17.	Depolarization compensation	Not taken into account	1.18
18.	Site diversity	Not taken into account	1.19

R.M. BARTON
Chairman of Sub-Working Group 6B-2

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/53-E

26 August 1985

Original: English

Source: Document DL/23

SUB-WORKING GROUP 6B-2

DRAFT REPORT OF SUB-WORKING GROUP 6B-2

1. Technical characteristics for feeder-link planning

1.1 Overall performance

Assuming that there is no transponder output back-off, a 0.5 dB noise contribution of the feeder link to the overall link requires that:

$$(C/N)_u = (C/N)_{d(\text{total})} + 10 \text{ dB} \quad (1)$$

For down links, the WARC-BS-77 has adopted a figure of C/N equal to 14.5 dB for 99% of the worst month at the edge of the service area. The up-link C/N required is 24 dB for 99% of the worst month, to produce an overall performance of 14 dB.

Some additional factors should also be taken into account when constructing the link budget:

- although the requirements of the WARC-BS-77 are based on the C/N at the edge of the service area, it may be useful to recall that at the beam centre the C/N will be 3 dB higher;
- a margin of 1 dB for possible mispointing of the earth-station's transmitting antenna;
- a factor of about 2 dB due to the non-linear AM-PM conversion phenomena of the satellite repeater.

Another factor of about 3 dB may be desirable for systems with enhanced quality.

In case of difficulty in planning feeder links, account should be taken of the protection ratio margin available on the space-to-Earth link in the WARC-BS-77 Plan so as to retain values of 30 dB and 14 dB for the protection ratios at the earth-station receiver input.

1.2 Carrier-to-noise ratio

The minimum $(C/N)_u$ required for planning of the feeder links in Regions 1 and 3 is 24 dB. It may be desirable for some administrations to achieve a significantly higher value of C/N, however, the use of any value higher than 24 dB should not prevent the interference conditions from being met in the plan.

1.3 Co-channel carrier-to-interference protection ratio

The protection ratio to be planned for co-channel interference is 40 dB.

1.4 Adjacent channel carrier-to-interference protection ratio

Tests carried out recently in Japan showed that the adjacent-channel protection ratio in feeder links for just-perceptible interference could be reduced to 19 dB, when signals are passed through a 12 GHz TWT amplifier operating at saturation with an AM-PM conversion factor of 2°/dB and then received through an SAW filter with 27 MHz bandwidth before the demodulator.

These tests were carried out using a TWT with a low value of AM-PM conversion. It is believed that the effects of adjacent-channel interference will be intensified by AM-PM conversion by the same mechanism as that reported for the intensification of noise. An additional margin of 2 dB above the 19 dB measured in laboratory tests is therefore recommended. This makes a planning limit of 21 dB for adjacent-channel interference desirable.

One administration proposed that planning should use a value of 24 dB but where this cannot be applied a value of 21 dB be used. The other administrations supported adoption of a single value of 21 dB.

1.5 Feeder link e.i.r.p.

A uniform value of e.i.r.p. for each band should be used for initial planning. For the 17/18 GHz band this should be 84 dBW and for the 14.5 to 14.8 GHz band 82 dBW.

These are initial values to be used in developing the plan. They will be adjusted, if necessary, during the plan development on a case-by-case basis to ensure that the minimum carrier-to-noise and carrier-to-interference criteria specified in the plan are met for the feeder-link systems of all administrations. Adjustments will also be made, if required to accommodate the requirements of particular administrations.

Some administrations consider that these initial planning values may not meet their requirements.

1.6 Transmitting antenna

1.6.1 Antenna diameter

For a given value of e.i.r.p. and a given relative antenna pattern, the off-axis radiation power depends on the diameter of the antenna. The larger the diameter of the antenna, the smaller is the off-axis radiation power which is a potential source of interference between adjacent orbital positions.

So for planning of feeder links it is necessary to define a minimum reference antenna diameter. For the 17/18 GHz band the value adopted is 5 m and for the 14.5 to 14.8 GHz band 6 m.

Smaller antennas of for example 2.5 m, can also be used provided there is no degradation of the interference situation. In practice this means that the e.i.r.p. might need to be reduced or the antenna diagram improved so there is no increase in the off-axis radiation power, and hence no unacceptable interference to the adjacent orbital position and other services.

For the frequency band 17.3-18.1 GHz, the minimum antenna diameter must be such that there is no significant interference between adjacent broadcasting satellites. For other frequency bands where there is sharing with other systems of the FSS, it may be necessary to use a large antenna in order to achieve a better efficiency of orbit utilization.

1.6.2 On-axis gain

The on-axis gain for the 5 m antenna at 17/18 GHz and for the 6 m antenna at 14.5 to 14.8 GHz is taken as 57 dBi.

1.6.3 Co-polar response pattern

The reference co-polar radiation pattern is given by the formula:

$$G = 32 - 25 \log \phi \text{ (dBi) for } 1^\circ \leq \phi \leq 48^\circ$$

$$G = -10 \text{ (dBi) for } \phi > 48^\circ$$

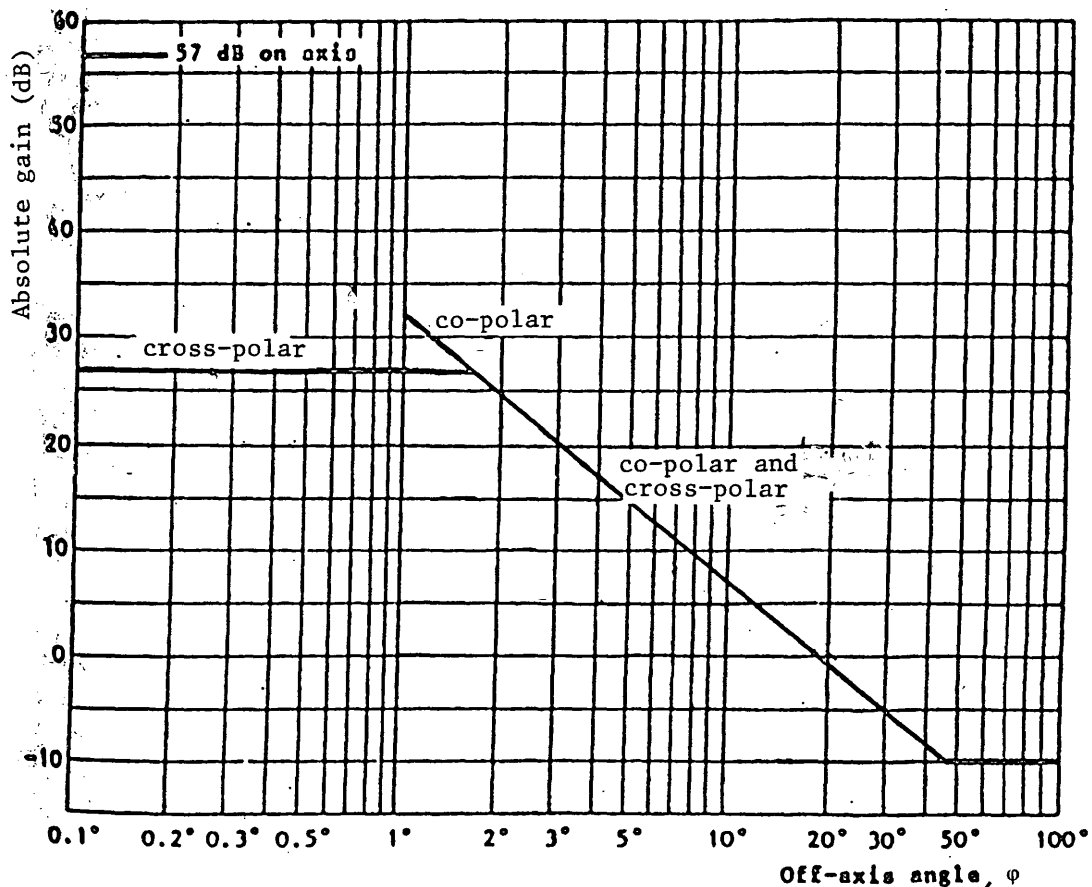


FIGURE 1

Earth station transmit antenna reference patterns

In circumstances where independent planning of orbit positions is adversely affected, the off-axis co- and cross-polar side-lobe response patterns of the earth station transmitting antenna may be limited to $29 - 25 \log \phi$ (dBi), for values of off-axis angle, ϕ , in the regions of the adjacent and next-but-one adjacent orbital positions in the plane of the geostationary orbit

1.6.4 Cross-polar response pattern

The reference cross-polar response pattern is given by the formula:

- Cross-polar relative gain

$$G = -30 \text{ dB} \quad \text{for} \quad 0 \leq \phi \leq 1.6^\circ$$

- Cross-polar gain (dBi)

$$G = 32 - 25 \log \phi \quad \text{for} \quad 1.6^\circ \leq \phi \leq 48^\circ$$

- Cross-polar gain (dBi)

$$G = -10 \quad \text{for} \quad \phi > 48^\circ \quad \text{(Figure 1)}$$

In circumstances where insufficient cross-polar isolation is achieved, the off-axis cross-polar side-lobe response pattern of the earth station transmitting antenna may be limited to $24 - 25 \log \phi$ (dBi) for $0.76^\circ \leq \phi \leq 22.9^\circ$ and -10 (dBi) for $\phi > 22.9^\circ$

1.7 Earth station mispointing loss

An allowance of 1 dB should be made for the loss in gain due to earth station antenna mispointing.

1.8 Satellite receiving antenna

If a common transmit/receive antenna is used, the cross-polar gain, beamwidth, pointing accuracy and the radiation pattern would be tied to the down-link antenna characteristics.

Where separate antennas are used for transmit and receive the parameters of the receiving antenna are given in the following. Separate receiving antennas offer greater flexibility in terms of independence of the feeder-link frequency, polarization and service area.

[1.8.1 Cross section of receiving antenna beam

Initial planning is to be based on beams of elliptical or circular cross section. If the cross section of the receiving antenna beam is elliptical, the effective beamwidth ϕ_0 is a function of the angle of rotation q between the plane containing the satellite and the major axis of the beam cross-section and the plane in which the beamwidth is required.

The relationship between the maximum gain of an antenna and the half-power beamwidth can be derived from the expression.

$$G_m = 27843/ab$$

or

$$G_m(\text{dB}) = 44.44 - 10 \log a - 10 \log b$$

where:

a and b are the angles (in degrees) subtended at the satellite by the major and minor axes of the elliptical cross-section of the beam.

A minimum value of 0.6° for the half power beamwidth is adopted for planning.]

1.8.2 Co-polar response pattern

The reference co-polar response pattern is given by the formula:

Co-polar relative gain (dB)

$$G = -12\left(\frac{\phi}{\phi_0}\right)^2 \text{ for } 0 \leq \frac{\phi}{\phi_0} < 1.30$$

$$G = -17.5 - 25 \log\left(\frac{\phi}{\phi_0}\right) \text{ for } \frac{\phi}{\phi_0} > 1.30$$

After intersection with curve C:

as curve C (see Figure 2 - curve A)

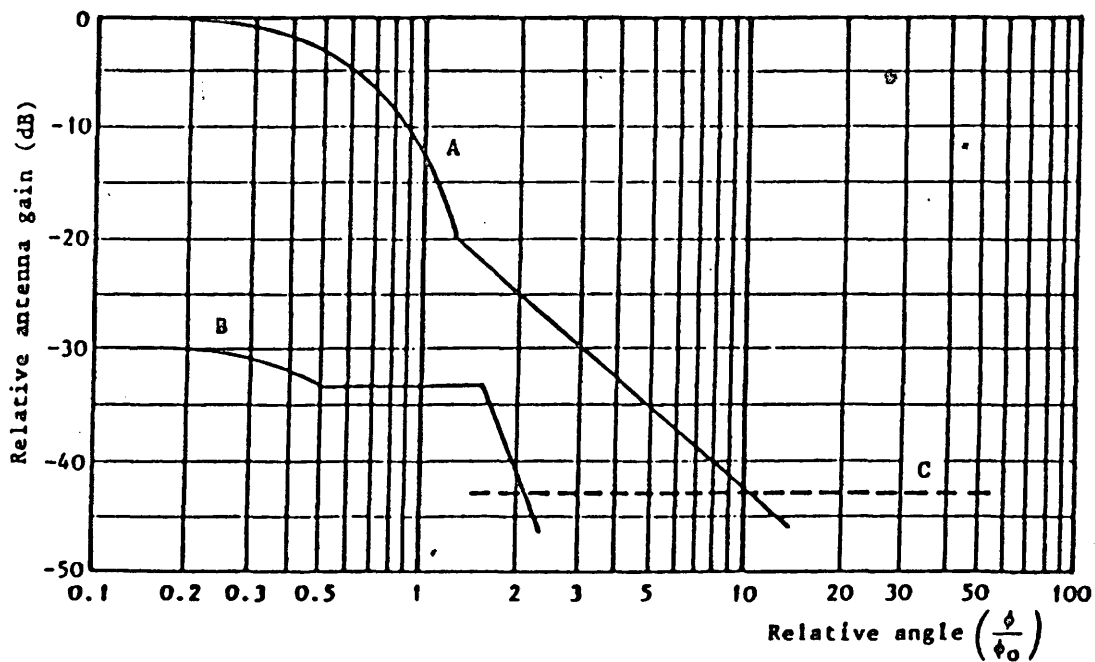


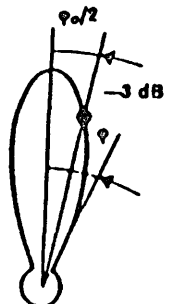
FIGURE 2

Satellite receive antenna pattern

Curve A - co-polar component (4.8.1)

Curve B - cross-polar component (4.8.2)

Curve C - minus the on-axis gain



1.8.3 Cross-polar response pattern

The reference cross-polar response pattern is given by the formula:

Cross-polar relative gain (dB)

$$G = -30 - 12\left(\frac{\varphi}{\varphi_0}\right)^2 \text{ for } 0 \leq \frac{\varphi}{\varphi_0} \leq 0.5$$

$$G = -33 \text{ for } 0.5 \leq \frac{\varphi}{\varphi_0} \leq 1.67$$

$$G = -\left[40 + 40 \log\left|\frac{\varphi}{\varphi_0} - 1\right|\right] \text{ for } 1.67 < \frac{\varphi}{\varphi_0}$$

After intersection with curve C:

as curve C (see Figure 2 - curve B)

1.9 Satellite receiving antenna pointing accuracy

The deviation of the receiving antenna beam from its nominal pointing direction should not exceed 0.2° in any direction. [Moreover, the angular rotation of the receiving beam about its axis should not exceed $\pm 1^\circ$; this latter limit is not necessary for beams of circular cross-section using circular polarization].

Should only one antenna be used for transmission and reception, the pointing accuracy for the receiving antenna is governed by, but not necessarily equal to, the transmitting antenna. Where two separate reflectors are used for transmission and reception, steering the transmitting antenna by using an automatic pointing mechanism operating by detection of a land radio-frequency beacon is possible. With this precise antenna pointing system, the receiving beam with slave control from the transmitting antenna may be stabilized to within 0.2° .

1.10 Satellite system noise temperature

The planning should be based on a satellite system noise temperature of [1 500 K].

1.11 Type of polarization

Circular polarization is assumed in planning. Linear polarization may be used at a given orbit position subject to the agreement of all the affected administrations.

1.12 Sense of polarization

In the case of uniform frequency translation the polarization sense of the feeder link should be either:

all opposite to their corresponding down-links;

or:

all the same sense as their corresponding down-links;

for each orbit position.

In the case of a non-uniform frequency translation plan it is necessary to maintain a uniform polarization/frequency arrangement at each orbit position.

Choice of the sense of circular polarization when common transmit/receive antennas are used is influenced by the technology.

For simple elliptical beams, the opposite sense of polarization on the Earth-space and space-Earth links permits the use of a simple and economical orthomode transducer to provide isolation between transmit and receive signals.

For shaped beams employing multiple horns, the same sense of polarization permits the use of simple and economical satellite antenna configurations avoiding the complexity of a separate orthomode transducer for each feed horn in the case of the opposite sense. Isolation between transmit and receive signals is provided by filters.

It is necessary to have one choice of polarization within one orbit position. However, provided there is no interaction between feeder links to two adjacent orbital positions it does not appear to be essential to make the same choice for all orbital positions.

1.13 Automatic gain control

The plan should not take account of automatic gain control on-board satellites. Up to 15 dB of automatic gain control is permitted, subject to no increase in interference to other satellite systems.

1.14 Power control

The plan should not take account of power control. Power control is permitted only to the extent that interference to other satellites does not increase by more than 0.5 dB relative to that calculated in the feeder link plan.

Guidelines should be developed for the use of power control based on the following information:

The allowable increase of earth-transmitter power applicable to earth-transmitting stations, without deteriorating the interference ratios in clear weather, is derived, taking into account the geographical locations of the earth stations and the feeder-link beam areas.

In line with this, Table 3 summarizes examples of probable combination of increase of transmitter power and rain attenuation for various values of cross-polar interference (XPIsat) and elevation angle.

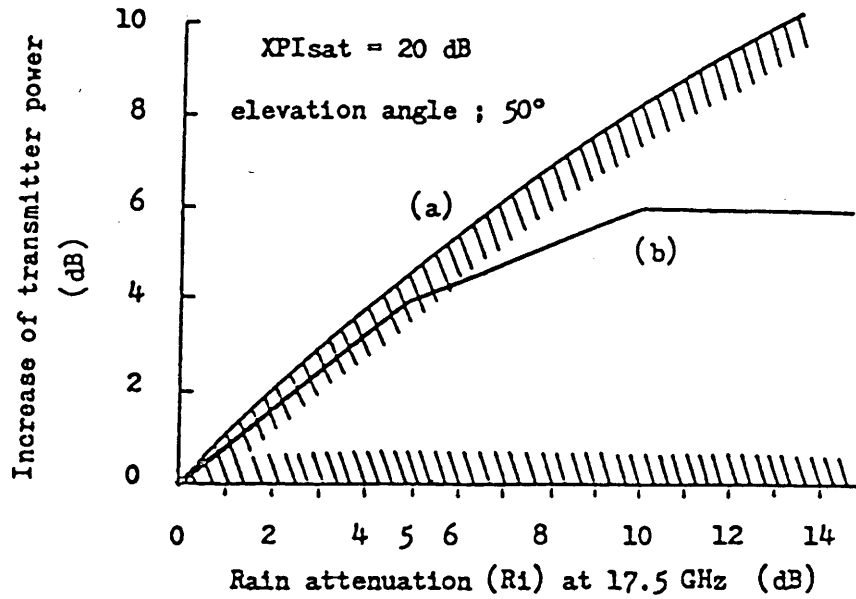


FIGURE 3

The possible increase of transmitter power for power control

Curve (a): upper limit for power control

Curve (b): an example of power control as illustrated in Table I

TABLE I

Possible increase of earth-transmitter power for power control
for various values of XPIsat and satellite elevation angle

XPIsat (dB)	Satellite elevation angle (degrees)	Increase of earth-transmitter- power (dB)	
		For rain attenuation 0 dB to 5 dB	For rain attenu- ation 5 dB to 10 dB and more
10 to 15	0 to 10	0	0
	10 to 30	0 to 4	4 to 7
	30 to 50	0 to 4	4 to 8
	50 to 60	0 to 5	5 to 9
	60 to 90	0 to 5	5 to 10
15 to 20	0 to 10	0	0
	10 to 30	0 to 2	2 to 4
	30 to 40	0 to 3	3 to 4
	40 to 50	0 to 3	3 to 6
	50 to 60	0 to 4	4 to 8
20 to 25 ^{*1}	60 to 90	0 to 5	5 to 9
	0 to 30	0	0
	30 to 40	0 to 2	2
	40 to 50	0 to 3	3 to 4
	50 to 60 ^{*1}	0 to 4 ^{*1}	4 to 6 ^{*1}
25 to 30 ^{*2}	60 to 90	0 to 5	5 to 8
	0 to 40	0	0
	40 to 50	0 to 2	2
	50 to 60	0 to 3	3
	60 to 90	0 to 5	5

*1 This case is illustrated with Curve (b) in Figure 3 as an example.

*2 These cases are identical to those given in Table I of Part II in the Final Acts of RARC-SAT-83.

1.15 Earth station location

Planning should meet the requirements of administrations, but for feeder-link earth stations located outside the down-link service area it may be necessary to employ the methods of resolving incompatibilities in planning described in 1.20.

Three cases for feeder-link service area have been identified:

- i) within the down-link service area;
- ii) within the national territory of an administration;
- iii) within the national territory of one or more cooperating administrations serving the down-link beam of another cooperating administration.

[/ In the third case, the locations of feeder-link earth stations to be used for this purpose should be specified.]

1.16 Propagation

[/ To be supplied separately.]

[/ 1.17 AM to PM conversion

The degradation caused by AM to PM conversion should be taken into account when calculating the C/N of the feeder link. A figure of 2.0 dB should be allowed.]

[/ 1.18 Depolarization compensation

Depolarization compensation is not taken into account in planning. It is permitted only to the extent that interference to other satellites systems does not increase by more than 0.5 dB relative to that calculated in the feeder link plan.]

[/ 1.19 Site diversity

The use of site diversity is not taken into account in planning. It is permitted and is considered to be an effective technique for maintaining high carrier-to-noise ratio and carrier-to-interference ratio during periods of moderate to severe rain attenuation.]

1.20 Methods of resolving incompatibilities in planning feeder links during the second session of the Conference.

Use of a common set of technical parameters for all feeder links in planning is desirable but preliminary studies by a number of administrations have indicated that there may be a difficulty in obtaining the required carrier-to-interference ratios on a small number of feeder links, particularly when certain administrations have special requirements to be met.

In order to overcome these difficulties, a certain amount of flexibility in the values of planning parameters used is proposed. Employment of one or more of the following techniques may be used, where necessary, in the planning process to attain the target values for interference protection:

1.20.1 Adjustment of the maximum level of e.i.r.p. of potential interfering feeder links or feeder links subject to excessive interference, subject to maintaining adequate carrier-to-noise and carrier-to-interference ratios on the adjusted feeder links .

1.20.2 In circumstances where independent planning of orbit positions is adversely affected, the off-axis co- and cross-polar side-lobe response patterns of the earth station transmitting antenna may be limited to $29 - 25 \log \varphi$ (dBi). For values of off-axis angle, φ , in the regions of the adjacent and next-but-one adjacent orbital positions in the plane of the geostationary orbit.

1.20.3 In circumstances where insufficient cross-polar isolation is achieved, the off-axis cross-polar side-lobe response pattern of the earth station transmitting antenna may be limited to $24 - 25 \log \varphi$ (dBi) for $0.76^\circ \leq \varphi \leq 22.9^\circ$ and -10 (dBi) for $\varphi > 22.9^\circ$.

1.20.4 Adjustment of the feeder-link channel assignments, retaining the same translation frequency for all assignments associated with a given down-link beam .

1.20.5 Modifying the satellite receiving antenna beam pattern shape, size, and/or side-lobe response (for example, multiple beam or shaped beam antenna), particularly when the feeder link is located outside the down-link service area .

1.20.6 Off-setting the beam-pointing direction of the satellite receiving antenna subject to maintaining the target carrier-to-noise ratio .

1.20.7 Improving the beam-pointing accuracy of the satellite receiving antenna to 0.1° .

1.20.8 Setting an upper limit of 10 dB to the rain attenuation margin included in the feeder-link power budget.

1.20.9 Separating satellite orbit positions by $\pm 0.2^\circ$ from the nominal position and specifying the transmitting antenna pattern, for relevant earth stations in the range 0° to 1° off-axis beam angles (note that this technique may require changes to Appendix 30 and should therefore be subject to further discussion)

For such cases, the reference response pattern of the transmitting antenna for $0 \leq \varphi \leq 1^\circ$ is given by the formula:

$$G = 57 \text{ dBi for } 0 \leq \varphi \leq 0.1^\circ$$

$$G = 36 - 20 \log \varphi \text{ for } 0.1^\circ \leq \varphi \leq 0.32^\circ$$

$$G = 51 - 53.2 \varphi^2 \text{ for } 0.32^\circ \leq \varphi \leq 0.44^\circ$$

$$G = 32 - 25 \log \varphi \text{ for } 0.44^\circ \leq \varphi \leq 1^\circ .]$$

1.21 Summary table of initial technical parameters for feeder-link planning in Regions 1 and 3
(Frequency bands 17.3 - 18.1 GHz and 14.5 - 14.8 GHz)

Item	Parameter	Value	Reference
1.	Carrier-to-noise ratio	24 dB	1.2
2.	Co-channel carrier-to-interference ratio	40 dB	1.3
3.	Adjacent channel carrier-to-interference ratio	21 dB	1.4
4.	Feeder link e.i.r.p. initial planning value	17/18 GHz - 84 dBW 14 GHz - 82 dBW	1.5
5.	Transmitting antenna		1.6
a)	Diameter	17/18 GHz - 5 m 14 GHz - 6 m	1.6.1
b)	On-axis gain	57 dBi	1.6.2
c)	Co-polar response pattern	$32-25 \log \phi$ (dBi) for $1^\circ \leq \phi \leq 48^\circ$, -10(dBi) for $\phi > 48^\circ$	1.6.3
d)	Cross-polar response pattern	-30 dB relative to co-polar on-axis gain, for $0^\circ \leq \phi \leq 1.6^\circ$, $32-25 \log \phi$ dBi for $1.6^\circ < \phi \leq 48^\circ$, -10(dBi) for $\phi > 48^\circ$	1.6.4
6.	Earth station mispointing loss	1 dB	1.7
7.	Satellite receiving antenna		1.8
a)	Cross section of beam	[elliptical or circular]	1.8.1
b)	Co-polar response pattern	relative gain (dB) $-12\left(\frac{\phi}{\phi_0}\right)^2$ for $0 \leq \frac{\phi}{\phi_0} < 1.30$ $-17.5 - 25 \log \left(\frac{\phi}{\phi_0}\right)$ for $\frac{\phi}{\phi_0} > 1.30$ After intersection with curve C: as curve C. (see Figure 2 - curve A)	1.8.2
c)	Cross-polar response pattern	relative gain (dB) $-30 - 12\left(\frac{\phi}{\phi_0}\right)^2$ for $0 \leq \frac{\phi}{\phi_0} \leq 0.5$ -33 for $0.5 \leq \frac{\phi}{\phi_0} \leq 1.67$ $-40 - 40 \log \left(\frac{\phi}{\phi_0} - 1\right)$ for $1.67 < \frac{\phi}{\phi_0}$ After intersection with curve C: as curve C. (See Figure 2 - curve B)	1.8.2
8.	Satellite receiving antenna pointing accuracy	0.2°	1.9
9.	Satellite system noise temperature	[1500 K]	1.10

<u>Item</u>	<u>Parameter</u>	<u>Value</u>	<u>Reference</u>
10.	Type of polarization	Circular	1.11
11.	Sense of polarization	(See reference)	1.12
12.	Automatic gain control	Not taken into account	1.13
13.	Power control	Not taken into account	1.14
14.	Earth station location	(See reference)	1.15
15.	Propagation	(See reference)	1.16
16.	AM-to-PM conversion	[<u>-2.0 dB</u>]	1.17
17.	Depolarization compensation	Not taken into account	1.18
18.	Site diversity	Not taken into account	1.19

R.M. BARTON
Chairman of Sub-Working Group 6B-2

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

Document DT/54 (Rev.2) - E
27 August 1985
Original: English

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

WORKING GROUP 4B

Draft Report of Sub-Working Group 4B-1

INTERSERVICE SHARING

1. Introduction

[Committee 4] has reviewed those portions of the Report of the Conference Preparatory Meeting (CPM) of the CCIR (Document 3) relevant to its terms of reference: specifically, Chapters 8 and 10 of Part 1 of the report, and all of Annex 5 and section 6.1.3.4 of Part 2. The Group also reviewed the following contributions to ORB-85: 4 (the report of the IFRB), 8 (New Zealand), 18 (United Kingdom), 27 (China), 35 (Canada) and 37 (Brazil).

This is an interim report, describing the work of the [Committee] to date on item a) of its terms of reference set forth in Document DT/7: under agenda item 2.6, "Analyze current sharing situations in frequency bands to be discussed in Committee 5 under agenda item 2.2, based on input from administrations and results of studies in the CCIR, identifying the current availability of sharing information and areas requiring further study". Both down-link and feeder-link sharing situations have been considered.

2. The Report of the CPM

The [Committee] has decided not to summarize here, these relevant sections of the CPM Report, knowing that such an effort would probably not do justice to a report which itself summarizes source documents of the CCIR. Rather, the [Committee] incorporates in this report, by reference, the pertinent sections of the Report of the CPM cited above.

[Committee 4] endorses the material contained in those chapters and annexes, including the sharing principles, the discussion of performance requirements and interference criteria, the available sharing criteria for sharing between services and the conclusions set forth. This report is referred to other Committees of this Conference for the information and guidance it offers, particularly to Committee 5 in its consideration of bands and services to be planned, planning principles and criteria.

Among the principles and conclusions of particular importance are the following:

2.1 Interference and sharing criteria are necessary to permit the equitable sharing of a band by services having primary allocations in that band. Such criteria have been developed for many bands and services, and are responsible for the successful and intensive use now being made of shared bands. [CPM 8.3].

2.2 Services, whether space or terrestrial, having primary allocations in a particular band, have equal rights with respect to the use of the spectrum. The requirements of both services must be taken into account while planning a space service, without changing their existing sharing status, taking into account in specific bands, Article 8 of the Radio Regulations - regardless of the planning method or approach employed. [CPM 8.2].

2.3 In order for the development of terrestrial services in shared bands to continue, as a corollary or consequence of the principle set forth immediately above, earth station locations should not be included in the planning of bands shared on a primary basis with terrestrial services. [CPM 8.2].

2.4 Techniques that may be necessary or desirable to facilitate sharing, also bring about the more efficient use of the spectrum by all services. [CPM Annex 5, 5.3.1.3].

2.5 The planning of bands shared by space services operating in different directions of transmission (i.e. "Reverse-Band Working"), could well impose additional constraints on both services, particularly when a terrestrial fixed service is also a primary service in those bands. Further study is required on the extent of these constraints. [CPM 8.2].

2.6 The report of the CPM indicates that further study may be needed for a number of combinations of services which may share a band or bands. These combinations include:

- a) BSS/FSS at 2.5 GHz;
- b) BSS/FSS at 12 GHz - Interregional;
- c) FSS/EESS (passive) at 18.6 - 18.8 GHz;
- d) FSS/MetSS at around 7/8 GHz and at 18 GHz;
- e) ISS/BSS at 22.5 - 23 GHz;
- f) FSS/FS in bidirectional bands;
- g) MSS/FS at 1.6/1.5 GHz;
- h) BSS/FS at 22 GHz;
- i) FSS/EES at 8 GHz.

3. Other views on interservice Sharing Situations

3.1 Interference limits and sharing criteria must permit a continuation of at least the same level of sharing between services in a particular band. However, certain planning methods could adversely affect the ability of these sharing criteria to ensure the same level of sharing.

3.2 It may be possible in some operational environments to increase the overall use of some FSS/FS shared bands through Reverse Band Working (RBW), without significantly affecting terrestrial services or significantly reducing the capacity in the forward-band working, if the initial indications can be confirmed that the favourable geometry associated with the high elevation angles (above 40° was proposed by one administration) significantly ameliorates the constraints outlined in section 2.5 above. It is recommended that such

studies be conducted during the intersessional period. It would, however, be necessary, while considering RBW at 4 and 6 GHz in particular, to restrict satellite pfd and require adequate satellite antenna discrimination towards the limb of the Earth, taking into account existing terrestrial stations (whether they employ analogue or digital techniques) and where the main beam of the satellite antenna is directed within two degrees of the Earth's limb. The limits on pfd and the required satellite antenna discrimination should also be determined during the intersessional period.

3.3 Criteria have not yet been adopted for certain sharing situations. While they will eventually be necessary in any event, a decision to plan one or more space services in a band implies that relevant criteria must be developed and adopted and then employed in the planning process.

3.4 WARC-79 by Recommendation No. 66, recommended that the CCIR study (as a matter of urgency) the question of spurious emissions from space stations. It is important that intersessional studies provide the second session of the Conference with information to be able to take appropriate action at that time.

3.5 Once ORB-85 has identified bands and services to be planned, new sharing criteria must be developed for situations where no criteria exist, and existing criteria should be reviewed for their adequacy in light of the particular planning method to be employed. It is contemplated that those criteria requiring further study should be identified for consideration during the intersessional period.

3.6 [Committee 4] is of the opinion that the CCIR can provide a knowledgeable and efficient forum for the development of new criteria and the examination of existing ones; however, special arrangements may be necessary to enable the CCIR to provide the information required within the limited available time.

3.7 A review of the Report of the IFRB (Document 4, supplemented by Document DT/21), indicates that, in situations where interference and sharing criteria had not been incorporated in the Radio Regulations, the Board, acting in accordance with the Regulations, developed and applied such criteria to Article 14 procedures on a provisional basis to space services. The [Committee] urges review of these sharing criteria during the intersessional period, and that appropriate recommendations be made to the second session of WARC-ORB.

3.7.1 With regard to Table I of Appendix 28, the [Committee] notes that several services and bands in which sharing could take place under current [footnote] allocations, employing the provisions of Article 14, are not included in the Table. These instances are summarized in Table [A], which also gives the number of such cases that have been received by the IFRB during the period 1 January, 1982 to 31 October, 1984.

The [Committee] noted that the first three columns of Table II of Appendix 28 do not contain values of certain interference parameters and criteria ($p_0\%$, n , $J(\text{dB})$, $M_0(P_0)$, W , B or $P_r(p)$). Other columns should be added to Table II of Appendix 28 for the bands and services marked in Table [B] with a plus sign (+).

3.7.2 With regard to Appendix 29, the [Committee] notes that the value of 4% triggering the requirement for coordination between space systems, was adopted some years ago for the FSS, taking into account the sharing situations that could arise at the time, and assuming technical characteristics of FSS then envisaged.

This level of 4% may not be appropriate for space services other than the FSS, and may even be in need of revision for application to the FSS (many, or even most, FSS systems whose system temperature is increased by 4% may still not experience unacceptable interference). Study of this matter should be undertaken by the CCIR during the intersessional period and the results made available to the second session.

3.7.3 The sharing situations which are the subject of many such communications would appear to be in greatest need of having sharing criteria studied by the CCIR during the intersessional period, for consideration by the second session, but other bands may have equal or greater need, because of the narrower bandwidth available, or the technical characteristics of systems likely to be employed.

The [Committee] invites the IFRB to identify early in the intersessional period, those services which, in its opinion, are in greatest need of formally adopted sharing criteria, or of review and revision of existing criteria.

It should be borne in mind during the intersessional period, when considering changes to the technical provisions of coordination (such as those set forth in Appendix 28), that Resolution No. 703 offers a possible means for those administrations wishing to amend these provisions within their particular geographic area, without imposing these amendments on other administrations, and without causing unacceptable interference to any administration.

4. Agenda item 2.2, sharing criteria for bands and services to be planned.

In view of the [provisional] decision of [Committee 5] [this Conference] to select the service[s] and bands listed below for planning at the second session, [Committee 4] [the Conference] provides the following information both for guidance during the intersessional period, and to the second session.

Service selected: FSS,

Bands selected: 4 and 6 GHz
11-12 and 14 GHz.

4.1 The [Committee] has reviewed the existing sharing criteria for the service[s] and bands selected for planning. In the case of the FSS in the 4 and 6 GHz bands, these criteria include the pfd limits set forth in Radio Regulations 2565-2568, the restrictions on the pointing of antennas in the FS at or near the orbit contained in Radio Regulations 2502-2547, and certain other provisions of the Regulations.

It is the view of the [Committee] that these criteria, which have enabled extensive sharing between the fixed, mobile (except aeronautical mobile) and fixed-satellite services for many years, are adequate to permit the continuation of sharing in the 4 and 6 GHz bands (3 700 - 4 200 MHz (space-to-Earth) and 5 925 - 6 425 MHz (Earth-to-space)). Based on more limited experience, the present criteria are also deemed adequate for the expansion bands (3 400 - 3 700 MHz (space-to-Earth), 4 500 - 4 800 MHz (space-to-Earth) and 6 425 - 7 025 MHz (Earth-to-space)). These conclusions are valid regardless of which of the possible planning methods is selected by the Conference, unless the planning method violates principle [2.3 of this document] by specifying nominal earth station locations.

4.2 Regarding the 11-12 and 14 GHz bands, the [Committee] has reviewed the sharing criteria for these bands, including the pfd limits set forth in Radio Regulations 2572-2576, and the restrictions on the pointing of antennas in the FS at or near the orbit contained in Radio Regulations 2502-2547, and certain other provisions of the Regulations.

It is the view of the [Committee] that these criteria, which have enabled sharing between the fixed, mobile (except aeronautical mobile) and fixed-satellite services to develop in recent years, are adequate to permit the continuation of sharing in these bands. This conclusion is valid, regardless of which of the possible planning methods is selected by the Conference, unless the planning method violates the principle of [section 2.3 of this document] by specifying nominal earth station locations.

4.3 It should be noted that sharing criteria for bands below 15 GHz are restricted to analogue-modulated terrestrial systems, so that parameters for digital systems need to be developed.

RICHARD G. GOULD
Chairman of Sub-Working Group 4B-1

TABLE A (Rev.)

Services and frequency bands subject to the procedure of Article 14
and not included in Table I of Appendix 28 (between 1 and 40 GHz)

Frequency bands	Ref. No.	Services concerned	Status of services	Direction of links	Number of cases received by the IFRB during the period 1.1.82 to 31.10.84
1 610 - 1 626.5 MHz	732	Radionavigation-satellite	Not mentioned	Not mentioned	
1 610 - 1 626.5 MHz	733	Aeronautical mobile-satellite (R)	Primary	Not mentioned	1
1 750 - 1 850 MHz	745	Space operation	Primary	Up-link	4
1 750 - 1 850 MHz	745	Space research	Primary	Up-link	
1 770 - 1 790 MHz	746	Meteorological-satellite	Primary	Not mentioned	
2 025 - 2 110 MHz	747	Space research	Not mentioned	Up-link and intersatellite	44
2 025 - 2 110 MHz	747	Space operation	Not mentioned	Up-link and intersatellite	
2 025 - 2 110 MHz	747	Earth exploration-satellite	Not mentioned	Up-link and intersatellite	
2 110 - 2 120 MHz	748/749	Space research	Not mentioned	Up-link	5
2 110 - 2 120 MHz	749	Space operation	Not mentioned	Up-link	
2 655 - 2 690 MHz	761	Fixed-satellite	Primary	Up-link, down-link	2
5 000 - 5 250 MHz	797	Fixed-satellite	Not mentioned	Not mentioned	
5 000 - 5 250 MHz	797	Intersatellite	Not mentioned	Intersatellite	
7 125 - 7 155 MHz	810	Space operation	Not mentioned	Up-link	
7 145 - 7 235 MHz	811	Space research	Not mentioned	Up-link	
7 900 - 8 025 MHz	812	Mobile-satellite	Not mentioned	Up-link	8
13.25 - 13.4 GHz	852	Space research	Secondary*	Up-link	
15.4 - 15.7 GHz	797	Fixed-satellite	Not mentioned	Not mentioned	
15.4 - 15.7 GHz	797	Intersatellite	Not mentioned	Intersatellite	
37 - 39 GHz	899	Fixed-satellite	Not mentioned	Up-link	

* Because of its secondary status, [Committee 4] does not propose inclusion of the space research service in this band in Table I of Appendix 28.

Frequency bands	Ref. No.	Services concerned	Status of services	Direction of links	Number of cases received by the IFRB during the period 1.1.82 to 31.10.84
1 610 - 1 626.5 MHz ⁺	732	Radionavigation-satellite	Not mentioned	Not mentioned	
1 610 - 1 626.5 MHz ⁺	733	Aeronautical mobile-satellite (R)	Not mentioned	Not mentioned	1
1 770 - 1 790 MHz	746	Meteorological-satellite	Primary	Not mentioned	
2 025 - 2 110 MHz*	747	Space research	Not mentioned	Up-link and intersatellite	44
2 025 - 2 110 MHz*	747	Space operation	Not mentioned	Up-link and intersatellite	
2 025 - 2 110 MHz*	747	Earth exploration-satellite	Not mentioned	Up-link and intersatellite	
2 200 - 2 290 MHz* ⁺	750	Space research	Not mentioned	Down-link and intersatellite	49
2 200 - 2 290 MHz* ⁺	750	Space operation	Not mentioned	Down-link and intersatellite	
2 200 - 2 290 MHz* ⁺	750	Earth-exploration satellite	Not mentioned	Down-link and intersatellite	
2 500 - 2 535 MHz ⁺	754	Mobile-satellite	Not mentioned	Down-link	
5 000 - 5 250 MHz ⁺	797	Fixed-satellite	Not mentioned	Not mentioned	
5 000 - 5 250 MHz ⁺	797	Intersatellite	Not mentioned	Intersatellite	
8 025 - 8 400 MHz*	815	Earth exploration-satellite	Primary	Down-link	4
11.7 - 12.7 GHz ⁺	839	Broadcasting-satellite	Primary	Down-link	18
11.7 - 12.7 GHz	839	Fixed-satellite	Primary	Down-link	
22.5 - 23 GHz ⁺	877	Broadcasting-satellite	Primary	Down-link	
31.8 - 33.8 GHz	892	Fixed-satellite	Not mentioned	Down-link	

Note 1 - In bands marked with an asterisk (*) Table references specify that the service concerned is subject to power flux-density limits under Article 28, Section IV.

Note 2 - Bands and services marked with a plus (+) sign are also missing in Table II of Appendix 28.

WORKING GROUP 4B

Draft Report of Sub-Working Group 4B-1

INTERSERVICE SHARING

1. Introduction

[Committee 4] has reviewed those portions of the Report of the Conference Preparatory Meeting (CPM) of the CCIR (Document 3) relevant to its terms of reference: specifically, Chapters 8 and 10 of Part 1 of the report, and all of Annex 5 and section 6.1.3.4 of Part 2. The Group also reviewed the following contributions to ORB-85: 4 (the report of the IFRB), 8 (New Zealand), 18 (United Kingdom), 27 (China), 35 (Canada) and 37 (Brazil).

This is an interim report, describing the work of the [Committee] to date on item a) of its terms of reference set forth in Document DT/7: under agenda item 2.6, "Analyze current sharing situations in frequency bands to be discussed in Committee 5 under agenda item 2.2, based on input from administrations and results of studies in the CCIR, identifying the current availability of sharing information and areas requiring further study". Both down-link and feeder-link sharing situations have been considered.

2. The Report of the CPM

The [Committee] has decided not to summarize here, these relevant sections of the CPM Report, knowing that such an effort would probably not do justice to a report which itself summarizes source documents of the CCIR. Rather, the [Committee] incorporates in this report, by reference, the pertinent sections of the Report of the CPM cited above.

[Committee 4] endorses the material contained in those chapters and annexes, including the sharing principles, the discussion of performance requirements and interference criteria, the available sharing criteria for sharing between services and the conclusions set forth. This report is referred to other Committees of this Conference for the information and guidance it offers, particularly to Committee 5 in its consideration of bands and services to be planned, planning principles and criteria.

Among the principles and conclusions of particular importance are the following:

2.1 Interference and sharing criteria are necessary to permit the equitable sharing of a band by services having primary allocations in that band. Such criteria have been developed for many bands and services, and are responsible for the successful and intensive use now being made of shared bands. [CPM 8.3].

2.2 Services, whether space or terrestrial, having primary allocations in a particular band, have equal rights with respect to the use of the spectrum. The requirements of both services must be taken into account while planning a space service, without changing their existing sharing status, taking into account in specific bands, Article 8 of the Radio Regulations - regardless of the planning method or approach employed. [CPM 8.2].

2.3 In order for the development of terrestrial services in shared bands to continue, as a corollary or consequence of the principle set forth immediately above, earth station locations should not be included in the planning of bands shared on a primary basis with terrestrial services. [CPM 8.2].

2.4 Techniques that may be necessary or desirable to facilitate sharing, also bring about the more efficient use of the spectrum by all services. [CPM Annex 5, 5.3.1.3].

2.5 The planning of bands shared by space services operating in different directions of transmission (i.e. "Reverse-Band Working"), could well impose additional constraints on both services, particularly when a terrestrial fixed service is also a primary service in those bands. Further study is required on the extent of these constraints. [CPM 8.2].

2.6 The report of the CPM indicates that further study may be needed for a number of combinations of services which may share a band or bands. These combinations include:

- a) BSS/FSS at 2.5 GHz;
- b) BSS/FSS at 12 GHz - Interregional;
- c) FSS/EESS (passive) at 18.6 - 18.8 GHz;
- d) FSS/MetSS at around 7/8 GHz and at 18 GHz;
- e) ISS/BSS at 22.5 - 23 GHz;
- f) FSS/FS in bidirectional bands;
- g) MSS/FS at 1.6/1.5 GHz;
- h) BSS/FS at 22 GHz;
- i) FSS/EES at 8 GHz.

3. Other views on interservice Sharing Situations

3.1 Interference limits and sharing criteria must permit a continuation of at least the same level of sharing between services in a particular band. However, certain planning methods could adversely affect the ability of these sharing criteria to ensure the same level of sharing.

3.2 It may be possible in some operational environments to increase the overall use of some FSS/FS shared bands through Reverse Band Working (RBW), without significantly affecting terrestrial services or significantly reducing the capacity in the forward-band working sense, if the initial indications can be confirmed that the favourable geometry associated with the high elevation angles (above 40° was proposed by one administration) significantly ameliorates the constraints outlined in section 2.5 above. It is recommended that such studies be conducted during the intersessional period. It would, however, be necessary, while considering RBW at 4 and 6 GHz in particular, to restrict satellite pfd and require adequate satellite antenna discrimination towards the limb of the Earth, taking into account existing terrestrial stations (whether they employ analogue or digital techniques) and where the main beam of the satellite antenna is directed within two degrees of the Earth's limb. The limits on pfd and the required satellite antenna discrimination should also be determined during the intersessional period.

3.3 Criteria have not yet been adopted for certain sharing situations. While they will eventually be necessary in any event, a decision to plan one or more space services in a band implies that relevant criteria must be developed and adopted and then employed in the planning process.

3.4 WARC-79 by Recommendation No. 66, recommended that the CCIR study (as a matter of urgency) the question of spurious emissions from space stations. It is important that intersessional studies provide the second session of the Conference with information to be able to take appropriate action at that time.

3.5 Once ORB-85 has identified bands and services to be planned, new sharing criteria must be developed for situations where no criteria exist, and existing criteria should be reviewed for their adequacy in light of the particular planning method to be employed. It is contemplated that those criteria requiring further study should be identified for consideration during the intersessional period.

3.6 [Committee 4] is of the opinion that the CCIR can provide a knowledgeable and efficient forum for the development of new criteria and the examination of existing ones; however, special arrangements may be necessary to enable the CCIR to provide the information required within the limited available time.

3.7 A review of the Report of the IFRB (Document 4, supplemented by Document DT/21), indicates that, in situations where interference and sharing criteria had not been incorporated in the Radio Regulations, the Board, acting in accordance with the Regulations, developed and applied such criteria to Article 14 procedures on a provisional basis to space services. The [Committee] urges review of these sharing criteria during the intersessional period, and that appropriate recommendations be made to the second session of WARC-ORB.

3.7.1 With regard to Table I of Appendix 28, the [Committee] notes that several services and bands in which sharing could take place under current [footnote] allocations, employing the provisions of Article 14, are not included in the Table. These instances are summarized in Table [A], which also gives the number of such cases that have been received by the IFRB during the period 1 January, 1982 to 31 October, 1984.

The [Committee] noted that the first three columns of Table II of Appendix 28 do not contain values of certain interference parameters and criteria (po%, n, J(dB), Mo(Po), W, B or Pr(p)). Other columns should be added to Table II of Appendix 28 for the bands and services marked in Table [B] with a plus sign (+).

3.7.2 With regard to Appendix 29, the [Committee] notes that the value of 4% triggering the requirement for coordination between space systems, was adopted some years ago for the FSS, taking into account the sharing situations that could arise at the time, and assuming technical characteristics of FSS then envisaged.

This level of 4% may not be appropriate for space services other than the FSS, and may even be in need of revision for application to the FSS (many, or even most, FSS systems whose system temperature is increased by 4% may still not experience unacceptable interference). Study of this matter should be undertaken by the CCIR during the intersessional period and the results made available to the second session.

3.7.3 The sharing situations which are the subject of many such communications would appear to be in greatest need of having sharing criteria studied by the CCIR during the intersessional period, for consideration by the second session, but other bands may have equal or greater need, because of the narrower bandwidth available, or the technical characteristics of systems likely to be employed.

The [Committee] invites the IFRB to identify early in the intersessional period, those services which, in its opinion, are in greatest need of formally adopted sharing criteria, or of review and revision of existing criteria.

It should be borne in mind during the intersessional period, when considering changes to the technical aspects of coordination (such as those set forth in Appendix 28), that Resolution No. 703 offers a possible means for those administrations wishing to amend these aspects within their particular geographic area, without imposing these amendments on other administrations, and without causing unacceptable interference to any administration.

4. Agenda item 2.2, sharing criteria for bands and services to be planned.

In view of the [provisional] decision of [Committee 5] [this Conference] to select the service[s] and bands listed below for planning at the second session, [Committee 4] [the Conference] provides the following information both for guidance during the intersessional period, and to the second session.

Service[s] selected: FSS [others, if any];

Bands selected: 4 and 6 GHz
14 and 10-11 GHz
[others, if any].

4.1 The [Committee] has reviewed the existing sharing criteria for the service[s] and bands selected for planning. In the case of the FSS in the 4 and 6 GHz bands, these criteria include the pfd limits set forth in Radio Regulations 2565-2568, the restrictions on the pointing of antennas in the FS at or near the orbit contained in Radio Regulations 2502-2547, and certain other provisions of the Regulations.

It is the view of the [Committee] that these criteria, which have enabled extensive sharing between the two services for many years, are adequate to permit the continuation of sharing, in the original 4 and 6 GHz bands, and in the so-called expansion bands in this same portion of the spectrum. The present criteria are deemed adequate, regardless of which of the possible planning methods (described in Document 140), is selected by the Conference, since there is no information available to the [Committee] to indicate otherwise.

4.2 Regarding the 14 and 10-11 GHz bands, the [Committee] has reviewed the sharing criteria for these bands, including the pfd limits set forth in Radio Regulations 2572-2576, and the restrictions on the pointing of antennas in the FS at or near the orbit contained in Radio Regulations 2502-2547, and certain other provisions of the Regulations.

It is the view of the [Committee] that these criteria, which have enabled sharing between the two services to develop in recent years, are adequate to permit the continuation of sharing in these bands. The present criteria are deemed adequate, regardless of which of the possible planning methods (described in Document 140), is selected by the Conference, since there is no information available to the [Committee] to indicate otherwise.

TABLE A(Rev.)

Services and frequency bands subject to the procedure of Article 14
and not included in Table I of Appendix 28 (between 1 and 40 GHz)

Frequency bands	Ref. No.	Services concerned	Status of services	Direction of links	Number of cases received by the IFRB since 1.1.82
1 610 - 1 626.5 MHz	732	Radionavigation-satellite	Not mentioned	Not mentioned	
1 610 - 1 626.5 MHz	733	Aeronautical mobile-satellite (R)	Primary	Not mentioned	1
1 750 - 1 850 MHz	745	Space operation	Primary	Up-link	4
1 750 - 1 850 MHz	745	Space research	Primary	Up-link	
1 770 - 1 790 MHz	746	Meteorological-satellite	Primary	Not mentioned	
2 025 - 2 110 MHz	747	Space research	Not mentioned	Up-link and intersatellite	44
2 025 - 2 110 MHz	747	Space operation	Not mentioned	Up-link and intersatellite	
2 025 - 2 110 MHz	747	Earth exploration-satellite	Not mentioned	Up-link and intersatellite	
2 110 - 2 120 MHz	748/749	Space research	Not mentioned	Up-link	5
2 110 - 2 120 MHz	749	Space operation	Not mentioned	Up-link	
2 655 - 2 690 MHz	761	Fixed-satellite	Primary	Up-link, down-link	2
5 000 - 5 250 MHz	797	Fixed-satellite	Not mentioned	Not mentioned	
5 000 - 5 250 MHz	797	Intersatellite	Not mentioned	Intersatellite	
7 125 - 7 155 MHz	810	Space operation	Not mentioned	Up-link	
7 145 - 7 235 MHz	811	Space research	Not mentioned	Up-link	
7 900 - 8 025 MHz	812	Mobile-satellite	Not mentioned	Up-link	8
13.25 - 13.4 GHz	852	Space research	Secondary ¹	Up-link	
15.4 - 15.7 GHz	797	Fixed-satellite	Not mentioned	Not mentioned	
15.4 - 15.7 GHz	797	Intersatellite	Not mentioned	Intersatellite	
37 - 39 GHz	899	Fixed-satellite	Not mentioned	Up-link	

Note 1 - Because of its secondary status, /Committee 4 7 does not propose inclusion of the space research service in this band in Table I of Appendix 28.

TABLE B(Rev.)

Services and frequency bands subject to Article 14 procedure
not included in Section IV of Article 28 (between 1 and 40 GHz)

Frequency bands	Ref. No.	Services concerned	Status of services	Direction of links	Number of cases received by the IFRB since 1.1.82
1 610 - 1 626.5 MHz ⁺	732	Radionavigation-satellite	Not mentioned	Not mentioned	1
1 610 - 1 626.5 MHz ⁺	733	Aeronautical mobile-satellite (R)	Not mentioned	Not mentioned	
1 770 - 1 790 MHz	746	Meteorological-satellite	Primary	Not mentioned	
2 025 - 2 110 MHz*	747	Space research	Not mentioned	Up-link and intersatellite	44
2 025 - 2 110 MHz*	747	Space operation	Not mentioned	Up-link and intersatellite	
2 025 - 2 110 MHz*	747	Earth exploration-satellite	Not mentioned	Up-link and intersatellite	
2 200 - 2 290 MHz ⁺⁺	750	Space research	Not mentioned	Down-link and intersatellite	49
2 200 - 2 290 MHz ⁺⁺	750	Space operation	Not mentioned	Down-link and intersatellite	
2 200 - 2 290 MHz ⁺⁺	750	Earth-exploration satellite	Not mentioned	Down-link and intersatellite	
2 500 - 2 535 MHz ⁺	754	Mobile-satellite	Not mentioned	Down-link	4
5 000 - 5 250 MHz ⁺	797	Fixed satellite	Not mentioned	Not mentioned	
5 000 - 5 250 MHz ⁺	797	Intersatellite	Not mentioned	Intersatellite	
8 025 - 8 400 MHz*	815	Earth exploration-satellite	Primary	Down-link	18
11.7 - 12.7 GHz ⁺	839	Broadcasting-satellite	Primary	Down-link	
11.7 - 12.7 GHz	839	Fixed-satellite	Primary	Down-link	
22.5 - 23 GHz ⁺	877	Broadcasting-satellite	Primary	Down-link	
31.8 - 33.8 GHz	892	Fixed-satellite	Not mentioned	Down-link	

Note 1 - In bands marked with an asterisk (*) Table references specify that the service concerned is subject to power flux-density limits under Article 28, Section IV.

Note 2 - Bands and services marked with a plus (+) sign are also missing in Table II of Appendix 28.

Draft Report of Sub-Working Group 4B-1

INTERSERVICE SHARING

1. Introduction

[Committee 4] has reviewed those portions of the Report of the Conference Preparatory Meeting (CPM) of the CCIR (Document 3) relevant to its terms of reference: specifically, Chapters 8 and 10 of Part 1 of the report, and all of Annex 5 and section 6.1.3.4 of Part 2. The Group also reviewed the following contributions to ORB-85: 4 (the report of the IFRB), 8 (New Zealand), 18 (United Kingdom), 27 (China), 35 (Canada) and 37 (Brazil).

This is an interim report, describing the work of the [Committee] to date on item a) of its terms of reference set forth in Document DT/7: under agenda item 2.6, "Analyze current sharing situations in frequency bands to be discussed in Committee 5 under agenda item 2.2, based on input from administrations and results of studies in the CCIR, identifying the current availability of sharing information and areas requiring further study". Both down-link and feeder-link sharing situations have been considered.

2. The Report of the CPM

The [Committee] has decided not to summarize here, these relevant sections of the CPM Report, knowing that such an effort would probably not do justice to a report which itself summarizes source documents of the CCIR. Rather, the [Committee] incorporates in this report, by reference, the pertinent sections of the Report of the CPM cited above.

[Committee 4] endorses the material contained in those chapters and annexes, including the sharing principles, the discussion of performance requirements and interference criteria, the available sharing criteria for sharing between services and the conclusions set forth. We refer it to other Committees of this Conference for the information and guidance it offers, particularly to Committee 5 in its consideration of bands and services to be planned, planning principles and criteria.

Among the principles and conclusions of particular importance are the following:

2.1 Interference and sharing criteria are necessary to permit the equitable sharing of a band by services having primary allocations in that band. Such criteria have been developed for many bands and services, and are responsible for the successful and intensive use now being made of shared bands. [CPM 8.3].

2.2 Services, whether space or terrestrial, having primary allocations in a particular band, have equal rights with respect to the use of the spectrum. Their requirements must be taken into account while planning a space service, without changing their existing sharing status - regardless of the planning method or approach employed. [CPM 8.2].

2.3 In order for the development of terrestrial services in shared bands to continue, as a corollary or consequence of the principle set forth immediately above, earth station locations should not be planned in bands shared on a primary basis with terrestrial services. [CPM 8.2].

2.4 Techniques that may be necessary or desirable to facilitate sharing, also bring about the more efficient use of the spectrum by all services. [CPM Annex 5, 5.3.1.3].

2.5 The planning of bands shared by space services operating in different directions of transmission (i.e. "Reverse-Band Working"), could well impose additional constraints on both services, particularly when a terrestrial Fixed service is also a primary service in those bands. Further study is required on the extent of these constraints. [CPM 8.2].

2.6 The report of the CPM indicates that further study may be needed for a number of combinations of services which may share a band or bands. These combinations include:

- a) BSS/FSS at 2.5 GHz;
- b) BSS/FSS at 12 GHz - Interregional;
- c) FSS/EESS (passive) at 18.6 - 18.8 GHz;
- d) FSS/MetSS at around 8 GHz and at 18 GHz;
- e) ISS/BSS at 22.5 - 23 GHz;
- f) FSS/FS in bidirectional bands;
- g) MSS/FS at 1.6/1.5 GHz;
- h) BSS/FS at 22 GHz;
- i) FSS/ESS at 8 GHz.

3. Other views on interservice Sharing Situations

3.1 Interference limits and sharing criteria must permit a continuation of at least the same level of sharing between services in a particular band. However, certain planning methods could adversely affect the ability of these sharing criteria to ensure the same level of sharing.

3.2 It may be possible in some operational environments to increase the overall use of some FSS/FS shared bands through Reverse Band Working (RBW), without significantly affecting terrestrial services or significantly reducing the capacity in the forward-band working sense, if the initial indications can be confirmed (during the intersessional period) that the favourable geometry associated with the high elevation angles (above 40°) proposed in Document 18 significantly ameliorates the constraints outlined in section 2.5 above. It is recommended that such studies be conducted during the intersessional period. It would, however, be necessary, while considering RBW at 4 and 6 GHz in particular, to restrict satellite pfd and require adequate satellite antenna discrimination, taking into account existing terrestrial stations (whether they employ analogue or digital techniques) and whether the main beam of the satellite antenna is directed within two degrees of the Earth's limb. The limits on pfd and the required satellite antenna discrimination should also be determined during the intersessional period.

3.3 Criteria have not yet been adopted for certain sharing situations. While they will eventually be necessary in any event, a decision to plan one or more space services in a band implies that relevant criteria must be developed and adopted and then employed in the planning process.

[3.4 WARC'79 also urged the CCIR to study (as a matter of urgency) the question of spurious emissions from space stations. It is important that the Second Session of the Conference should establish, where feasible, limits for maximum permissible level of spurious emissions outside FSS bands. A Resolution to this effect is given in Annex 1 to this report. (A revision of this section is being considered by Messrs. Clark, Mohanavelu, Sahay and Trofimov.)]

3.5 Once ORB-85 has identified bands and services to be planned, new sharing criteria must be developed for situations where no criteria exist, and existing criteria should be reviewed for their adequacy in light of the particular planning method to be employed. It is contemplated that those criteria requiring further study should be identified for consideration during the intersessional period.

3.6 [Committee 4] is of the opinion that the CCIR can provide a knowledgeable and efficient forum for the development of new criteria and the examination of existing ones.

3.7 A review of the Report of the IFRB (Document 4, supplemented by Doc. DT/21), indicates that, in situations where interference and sharing criteria had not been incorporated in the Radio Regulations, the Board, acting in accordance with the Regulations, developed and applied such criteria to Article 14 procedures on a provisional basis to space services. The [Committee] urges review of these sharing criteria during the intersessional period, and that appropriate recommendations be made to the Second Session of WARC-ORB.

3.7.1 With regard to Table I of Appendix 28, the [Committee] notes that several services and bands in which sharing could take place under current [footnote] allocations, employing the provisions of Article 14, are not included in the Table. These instances are summarized in Table [A], which also gives the number of such cases that have been received by the IFRB during the period January 1, 1982 to October 31, 1984.

The [Committee] noted that the first three columns of Table II of Appendix 28 do not contain values of certain interference parameters and criteria (po%, n, J(dB), Mo(Po), W, B or Pr(p)). Other columns should be added to Table II of Appendix 28 for the bands and services marked in Table [B] with a plus sign (+).

3.7.2 With regard to Appendix 29, the [Committee] notes that the value of 4% triggering the requirement for coordination between space systems, was adopted some years ago for the FSS, taking into account the sharing situations that could arise at the time, and assuming technical characteristics of FSS then envisaged.

This level of 4% may not be appropriate for space services other than the FSS, and may even be in need of revision for application to the FSS (many--or even most--FSS systems whose system temperature is increased by 4% may still not experience unacceptable interference). Study of this matter should be undertaken by the CCIR during the intersessional period and the results made available to the second session.

3.7.3 The sharing situations which are the subject of many such communications would appear to be in greatest need of having sharing criteria studied by the CCIR during the intersessional period, for consideration by the Second Session, but other bands may have equal or greater need, because of the narrower bandwidth available, or the technical characteristics of systems likely to be employed.

The [Committee] invites the IFRB to identify early in the intersessional period, those services which, in its opinion, are in greatest need of formally adopted sharing criteria, or of review and revision of existing criteria.

It should be borne in mind during the intersessional period, when considering changes to the technical aspects of coordination (such as those set forth in Appendix 28), that Resolution 703 offers a possible means for those administrations wishing to amend these aspects within their particular geographic area, without imposing these amendments on other administrations, and without causing unacceptable interference to any administration.

4. Agenda Item 2.2, Sharing Criteria for Bands and Services to be Planned

[Text to be supplied.]

Richard G. Gould (Box 425)
Chairman of Sub-Working Group 4B-1

TABLE A(Rev.)

Services and frequency bands subject to the procedure of Article 14
and not included in Table I of Appendix 28 (between 1 and 40 GHz)

Frequency bands	Ref. No.	Services concerned	Status of services	Direction of links	Number of cases received by the IFRB since 1.1.82
1 610 - 1 626.5 MHz	732	Radionavigation-satellite	Not mentioned	Not mentioned	
1 610 - 1 626.5 MHz	733	Aeronautical mobile-satellite (R)	Primary	Not mentioned	1
1 750 - 1 850 MHz	745	Space operation	Primary	Up-link	4
1 750 - 1 850 MHz	745	Space research	Primary	Up-link	
1 770 - 1 790 MHz	746	Meteorological-satellite	Primary	Not mentioned	
2 025 - 2 110 MHz	747	Space research	Not mentioned	Up-link and intersatellite	44
2 025 - 2 110 MHz	747	Space operation	Not mentioned	Up-link and intersatellite	
2 025 - 2 110 MHz	747	Earth exploration-satellite	Not mentioned	Up-link and intersatellite	
2 110 - 2 120 MHz	748/749	Space research	Not mentioned	Up-link	5
2 110 - 2 120 MHz	749	Space operation	Not mentioned	Up-link	
2 655 - 2 690 MHz	761	Fixed-satellite	Primary	Up-link, down-link	2
5 000 - 5 250 MHz	797	Fixed-satellite	Not mentioned	Not mentioned	8
		Intersatellite	Not mentioned	Intersatellite	
7 125 - 7 155 MHz	810	Space operation	Not mentioned	Up-link	
7 145 - 7 235 MHz	811	Space research	Not mentioned	Up-link	
7 900 - 8 025 MHz	812	Mobile-satellite	Not mentioned	Up-link	
13.25 - 13.4 GHz	852	Space research	Secondary ¹	Up-link	
15.4 - 15.7 GHz	797	Fixed-satellite	Not mentioned	Not mentioned	
	797	Intersatellite	Not mentioned	Intersatellite	
37 - 39 GHz	899	Fixed-satellite	Not mentioned	Up-link	

Note 1 - Because of its secondary status, /Committee 4/ does not propose inclusion of the space research service in this band in Table I of Appendix 28.

TABLE B(Rev.)

Services and frequency bands subject to Article 14 procedure
not included in Section IV of Article 28 (between 1 and 40 GHz)

Frequency bands	Ref. No.	Services concerned	Status of services	Direction of links	Number of cases received by the IFRB since 1.1.82
1 610 - 1 626.5 MHz ⁺	732	Radionavigation-satellite	Not mentioned	Not mentioned	1
1 610 - 1 626.5 MHz ⁺	733	Aeronautical mobile-satellite (R)	Not mentioned	Not mentioned	
1 770 - 1 790 MHz	746	Meteorological-satellite	Primary	Not mentioned	
2 025 - 2 110 MHz*	747	Space research	Not mentioned	Up-link and intersatellite	44
2 025 - 2 110 MHz	747	Space operation	Not mentioned	Up-link and intersatellite	
2 025 - 2 110 MHz	747	Earth exploration-satellite	Not mentioned	Up-link and intersatellite	
2 200 - 2 290 MHz**	750	Space research	Not mentioned	Down-link and intersatellite	49
2 200 - 2 290 MHz ⁺	750	Space operation	Not mentioned	Down-link and intersatellite	
2 200 - 2 290 MHz ⁺	750	Earth-exploration satellite	Not mentioned	Down-link and intersatellite	
2 500 - 2 535 MHz ⁺	754	Mobile-satellite	Not mentioned	Down-link	
5 000 - 5 250 MHz ⁺	797	Fixed satellite	Not mentioned	Not mentioned	
5 000 - 5 250 MHz ⁺	797	Intersatellite	Not mentioned	Intersatellite	
8 025 - 8 400 MHz*	815	Earth exploration-satellite	Primary	Down-link	4
11.7 - 12.7 GHz ⁺	839	Broadcasting-satellite	Primary	Down-link	18
11.7 - 12.7 GHz	839	Fixed-satellite	Primary	Down-link	
22.5 - 23 GHz ⁺	877	Broadcasting-satellite	Primary	Down-link	
31.8 - 33.8 GHz	892	Fixed-satellite	Not mentioned	Down-link	

Note 1 - In bands marked with an asterisk (*) Table references specify that the service concerned is subject to power flux-density limits under Article 28, Section IV.

Note 2 - Bands and services marked with a plus (+) sign are also missing in Table II of Appendix 28.

WORKING GROUP 5B

Draft

REPORT FROM SUB-WORKING GROUP 5B-1
TO WORKING GROUP 5B ON
PROVISIONAL GUIDELINES CONCERNING ARTICLE 14
IN RESPECT OF SPACE SERVICES*

I. Factors which need to be taken into account

I.1 The procedure of Article 14 must be applied to assignments being made under different kinds of footnote allocations including the space and terrestrial services and in certain situations to allocations in the frame of the Table of Frequency Allocations (Article 8).

I.2 The first session of this Conference does not have the competence to effect any changes to the Table nor to any of the footnotes thereto, nor otherwise alter the status of the services concerned.

I.3 It has been noted that the precise interpretation of certain footnotes which refer to Article 14 is ambiguous or unclear. The Report of the IFRB (Document 4) was considered, and in accordance with the explanation given by the Board it was noted that the successful application of Article 14 to footnotes where the only condition is the application of that Article shall lead to primary status for assignments in that service. In this regard the assignments to stations of a space service under RR 747 and RR 750 shall be considered as primary on successful completion of the procedure, except however that the space-to-space assignments would operate on a non-interference basis (RR 435) only in relation to other space services.

I.4 It was noted that, as in the case of other assignments, the Board accepts notifications under RR 342 of assignments which are subject to application of the Article 14 procedure at any stage of the application of that procedure.

I.5 It was noted that administrations in their bilateral relationships may accord a status other than that prescribed in a footnote under which application of Article 14 is required, provided that the services of other administrations are not thereby affected.

I.6 In developing the guidelines given in section II below, the question of the application of the Article 14 procedure to the broadcasting-satellite service was not addressed.

* Discussion in 5B-1 was confined to the application of Article 14. It was noted that there may be consequential matters for consideration in 5B-2.

II. Tentative guidelines

The following tentative guidelines are recommended for consideration by the second session and any intersessional work which may be scheduled.

II.1 The provisions of Article 14 as concerned with space services should be reviewed and modified in such a way that they are applicable to a satellite network instead of individual assignments: therefore, the data requirements should be reviewed and specified accordingly.

II.2 The relevance of Article 14 to assignments for reception should be considered and clarified.

II.3 The procedure should include a means by which "affected administrations" are identified. During the intersessional period, administrations should review the technical standards adopted by the IFRB and, if necessary, propose alternative standards for consideration.

II.4 The procedure to be applied in unresolved cases of disagreement should be included in the Regulations. Objections to agreement under Article 14 must be based on valid technical grounds which demonstrate non-compatibility. It is noted that decisions of the Board have supported this principle (see Document 4, section 4.3.2.4). The second session should consider the matter of technical information to be supplied in such cases.

II.5 The meaning of the term "planned assignment" (RR 1617 and RR 1618) should be considered. It is suggested that assignments on which an objection has been based would normally be expected to be brought into use within a reasonable period (perhaps 3-5 years). It was concluded that such assignments should be notified to the IFRB in accordance with RR 1214 or RR 1488, as appropriate, in order to ensure that the objection raised on the basis of these assignments continues to be valid.

II.6 The question of modification to a network which has successfully completed the Article 14 procedure should be considered. The second session might decide that if the modification:

- for a transmitting station results in a reduction of potential interference, and
- for a receiving station, the administration accepts the probability of increased interference to its assignment,

then Article 14 need not be reapplied in respect of the modified network.

II.7 The second session should consider the matter of priority of dates (paragraph 4.3.2.3.1 of the IFRB Report refers). Radio Regulations should specify that an assignment which has successfully completed the Article 14 procedure is to be taken into account by an administration applying the procedure at a later date for an assignment which would achieve the same status after successful completion.

A.V. CAREW
Chairman of Sub-Working Group 5B-1

Draft

REPORT FROM SUB-WORKING GROUP 5B-1
TO WORKING GROUP 5B ON
PROVISIONAL GUIDELINES CONCERNING ARTICLE 14
IN RESPECT OF SPACE SERVICES*

I. Factors which need to be taken into account

I.1 The procedure of Article 14 must be applied to assignments being made under different kinds of footnote allocations including the space and terrestrial services and in certain situations to allocations in the frame of the Table of Frequency Allocations (Article 8).

I.2 The first session of this Conference does not have the competence to effect any changes to the Table nor to any of the footnotes thereto, nor otherwise alter the status of the services concerned.

I.3 It has been noted that the precise interpretation of certain footnotes which refer to Article 14 is ambiguous or unclear. The Report of the IFRB (Document 4) was considered, and in accordance with the explanation given by the Board it was noted that the successful application of Article 14 to footnotes where the only condition is the application of that Article shall lead to primary status. In this regard the allocation to space services under RR 747 and RR 750 shall be considered as primary on successful completion of the procedure, except however that the space-to-space links would operate on a non-interference basis (RR 435) only in relation to other space services.

I.4 It was noted that the Board accepts notifications under RR 342 at any stage of the application of Article 14.

I.5 It was noted that administrations in their own bilateral relationships may wish to accord a status other than that prescribed in a footnote under which application of Article 14 is required.

* Discussion in 5B-1 was confined to the application of Article 14. It was noted that there may be consequential matters for consideration in 5B-2.

II. Tentative guidelines

The following tentative guidelines are recommended for consideration by the second session and any intersessional work which may be scheduled.

II.1 The provisions of Article 14 as concerned with space services should be reviewed and modified in such a way that they are applicable to a satellite network instead of individual assignments: therefore, the data requirements should be reviewed and specified accordingly.

II.2 The relevance of Article 14 to assignments for reception should be considered and clarified.

II.3 The procedure should include a means by which "affected administrations" are identified. During the intersessional period, administrations should review the technical standards adopted by the IFRB and, if necessary, propose alternative standards for consideration.

II.4 The procedure to be applied in unresolved cases of disagreement should be included in the Regulations. Objections to agreement under Article 14 must be based on valid technical grounds which demonstrate non-compatibility. It is noted that decisions of the Board have supported this principle (see Document 4, section 4.3.2.4). The second session should consider the matter of technical information to be supplied in such cases.

II.5 The meaning of the term "planned assignment" (RR 1617 and RR 1618) should be considered. It is suggested that assignments on which an objection has been based would normally be expected to be brought into use within a reasonable period (perhaps 3-5 years). It was concluded that such assignments should be notified to the IFRB in accordance with RR 1214 or RR 1488, as appropriate, in order to ensure that the objection raised on the basis of these assignments continues to be valid.

II.6 The question of modification to a network which has successfully completed the Article 14 procedure should be considered. The second session might decide that if the modification:

- for a transmitting station results in a reduction of potential interference, and
- for a receiving station, the administration accepts the probability of increased interference to its assignment,

then Article 14 need not be reapplied in respect of the modified network.

II.7 The second session should consider the matter of priority of dates (paragraph 4.3.2.3.1 of the IFRB Report refers). Radio Regulations should specify that an assignment which has successfully completed the Article 14 procedure is to be taken into account by an administration applying the procedure at a later date in respect of an assignment which would achieve the same status after successful completion.

A.V. CAREW
Chairman of Sub-Working Group 5B-1

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/56(Rev.1)-E
4 September 1985
Original: English

SUB-WORKING GROUP 6A2

NOTE BY THE CHAIRMAN OF SUB-WORKING GROUP 6A2

The decision to incorporate the provisions and associated Plan for the broadcasting-satellite service in Region 2 and the provisions and associated Plan for the feeder links in the fixed-satellite service in Region 2 into the Radio Regulations has led to the recognition of the need for a Resolution relating to the application of the revised Appendix 30 [and of Appendix [30A]] prior to the date of entry into force of the Final Acts of the first session of this Conference.

A proposed text appears in the annex to this document.

J.F. BROERE
Chairman of Sub-Working Group 6A2

Annex: 1

ANNEX

RESOLUTION No. [COM6/2]

**Relating to the Use of the Provisions of Appendix 30
and Appendix 30A Contained in the Final Acts of WARC-ORB(1)
prior to the Date of Entry into Force of those Final Acts**

The World Administrative Radio Conference on the Use of the
Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It
(First Session - Geneva, 1985),

considering

- a) that the present Conference has decided to incorporate in the Radio Regulations the provisions and associated Plans for the broadcasting-satellite service in the band 12.1 - 12.7 GHz and the fixed-satellite service for feeder links in the band 17.3 - 17.8 GHz in Region 2;
- b) that during the period preceding the date of entry into force of the Final Acts of this Conference, administrations of countries of Region 2 may wish to bring into use assignments appearing in the Region 2 Plans or to modify them or to bring them into use as an interim system;
- c) that there is a need to apply the interregional sharing criteria developed by this Conference for all Regions;

further considering

that there is a need for procedures to be applied by all
administrations and the IFRB during the interim period referred to above;

resolves

- 1. that during the period preceding the date of entry into force of the Final Acts of the present Conference, administrations and the IFRB shall apply on a provisional basis the provisions of Appendix 30 and Appendix 30A contained in these Final Acts;
- 2. that on the date of entry into force of the Final Acts of the present Conference, the IFRB shall publish the modifications to the Plans introduced in application of resolves 1 above, in a special section of its weekly circular in order to enter them into the appropriate Regional Plan.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/56-E
27 August 1985
Original: English

SUB-WORKING GROUP 6A2

Note by the Chairman of Sub-Working Group 6A2

The decision to incorporate the provisions and associated Plan for the broadcasting-satellite service in Region 2 and the provisions and associated Plan for the feeder links in the fixed-satellite service in Region 2 into the Radio Regulations has led to the recognition of the need for a Resolution relating to the application of the revised Appendix 30 [and of Appendix [30A]] prior to the date of entry into force of the Final Acts of the First Session of this Conference.

A proposed text appears in the Annex to this document.

J.F. BROERE
Chairman

Annex : 1

ANNEX

[DRAFT] RESOLUTION [COM6/B]

**Relating to the Use of Appendix 30 (Rev.)
[and Appendix [30A]] prior to the date of Entry
into Force of the Final Acts of the WARC-ORB(1)**

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of the Space Services Utilizing It, First Session, Geneva, 1985,

considering

- a) that the present Conference has decided to incorporate in the Radio Regulations the provisions and associated Plans for the broadcasting-satellite service and the fixed-satellite service for feeder-links in Region 2;
- b) that during the period preceding the date of entry into force of the Final Acts of this Conference, administrations of countries of Region 2 may wish to bring into use assignments appearing in the Region 2 Plans or to modify them or to bring them into use as an interim system;
- c) [that administrations of Regions 1 and 3 may wish to bring into use assignments appearing in the Regions 1 and 3 Plan as an interim system];
- c) that there is a need to apply the interregional sharing criteria developed by this Conference for all Regions;

further considering

that there is a need for procedures to be applied by all administrations and the IFRB during the interim period referred to above;

resolves

- 1. that during the period preceding the date of entry into force of the Final Acts of the present Conference, administrations and the IFRB shall apply the provisions of Appendix 30 (Rev.) [and Appendix 30A], on a provisional basis;
- 2. that on the date of entry into force of the Final Acts of the present Conference, the IFRB shall publish the modifications to the Plans introduced in application of resolves 1 above, in a special section of its weekly circular in order to enter them into the appropriate Regional Plan.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/57-E
27 August 1985
Original: English

SUB-WORKING GROUP 6A2

Note by the Chairman of Sub-Working Group 6A2

The Regional Administrative Radio Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, prepared a Plan for the Broadcasting-Satellite Service in the band 12.2 - 12.7 GHz and a Plan for the associated feeder links in the band 17.3 - 17.8 GHz with the provision of implementing interim systems in accordance with Resolution 2 (Sat-R2). A copy of Resolution 2 (Sat-R2) appears at Annex 1 to this Document.

For the incorporation of the decisions of the Sat-R2 Conference into the Radio Regulations, it is considered necessary that a Resolution of a World Administrative Radio Conference be drafted relating to the use of interim systems. A proposed draft text appears at Annex 2 to this document.

J.F. BROERE
Chairman

Annexes : 2

ANNEX 1

RESOLUTION No. 2(Sat-R2)

Relating to Interim Systems

The Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983,

considering

- a) that it has prepared a Plan for the broadcasting-satellite service in Region 2 in the band 12.2 - 12.7 GHz and a Plan for the associated feeder links in the band 17.3 - 17.8 GHz on the basis of the requirements submitted by administrations and of the technological information available to it;
- b) that in the implementation of their assignments in the Plans, the administrations may find it more appropriate to adopt a phased approach and initially to use characteristics different from those appearing in the Plans;
- c) that some administrations may cooperate in the joint development of a space system with a view to covering two or more service areas from the same orbital position or to using a beam which would encompass two or more service areas;
- d) that some administrations may cooperate in the joint development of a space system with a view to covering two or more feeder-link service areas from the same orbital position or to using a beam which encompasses two or more feeder-link service areas;
- e) that there may be some advantage in using interim systems as a phased approach to implementing the assignments in the Plans on condition that the use of such systems does not lead to a degradation of the service rendered by the assignments in the Plans unless coordinated between the administrations concerned and affected;
- f) that interim systems shall not adversely affect the Plans nor hamper the implementation and evolution of the Plans;
- g) that the number of assignments to be used in an interim system shall not in any case exceed the number of assignments appearing in the appropriate Plan which are to be suspended;
- h) that an interim system shall not be introduced without the agreement of all the administrations whose space and terrestrial services are considered to be affected;

resolves

that the administrations and the IFRB shall apply the procedure contained in the Annex to this Resolution;

recommends the First Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1985

1. to consider and adopt the *resolves* part of this Resolution in order to apply it to all countries of Region 2;
2. to instruct the IFRB to publish the interim uses introduced in application of Resolution No. 1(Sat-R2) in a special section of its weekly Circular in order to enter them in the Interim List referred to in paragraph 11 of the Annex to this Resolution.

ANNEX TO RESOLUTION No. 2(Sat-R2)

1. An administration or a group of administrations may, after successful application of the procedure contained in this Annex, use an interim system during a specified maximum period not exceeding 12 years in order:

1.1 *for an interim system in the broadcasting-satellite service*

- a) to use an increased e.i.r.p. in any direction relative to that appearing in the Plan provided that the power flux-density does not exceed the limits given in Annex 5 to Part I of the present Final Acts;
- b) to use modulation characteristics¹ different from those appearing in the Annexes to the Plan and resulting in an increased probability of harmful interference or in a wider assigned bandwidth;
- c) to change the coverage area by displacing boresight, or by increasing the major or minor axis or by rotating them;
- d) to use a coverage area appearing in the Plan or a coverage area encompassing two or more coverage areas appearing in the Plan from an orbital position which shall be one of the corresponding orbital positions appearing in the Plan;
- e) to use a polarization different from that in the Plan.

1.2 *for an interim feeder-link system*

- a) to use an increased e.i.r.p. in any direction relative to that appearing in the Plan;
- b) to use modulation characteristics¹ different from those appearing in the Annexes to the Plan and resulting in an increased probability of harmful interference or in a wider assigned bandwidth;
- c) to change the feeder-link beam area by displacing boresight, or by increasing the major or minor axis or by rotating them;
- d) to use a feeder-link beam area appearing in the Plan or a feeder-link beam area encompassing two or more feeder-link beam areas appearing in the Plan in relation to an orbital position which shall be one of the corresponding orbital positions appearing in the Plan;
- e) to use a polarization different from that in the Plan.

¹ For example, modulation with sound channels frequency-multiplexed within the bandwidth of a television channel, digital modulation of sound and television signals, or other pre-emphasis characteristics.

2. In all cases, an interim system shall correspond to assignments in the Plan(s); the number of assignments to be used in an interim system shall not in any case exceed the number of assignments appearing in the Plan(s) which are to be suspended. During the use of an interim system, the use of the corresponding assignments in the Plan(s) is suspended; they shall not be brought into use before the cessation of use of the interim system. However, the suspended assignments, but not the interim system's assignments, of an administration shall be taken into account when other administrations apply the procedure of Article 4 of Part I or Part II of these Final Acts, as appropriate, in order to modify the Plan(s) or the procedure of this Annex in order to bring an interim system into use.

3. When an administration proposes to use an assignment in accordance with paragraph 1, it shall communicate to the IFRB the information listed in Annex 2 to Part I or Part II of these Final Acts as appropriate nor earlier than five years but, preferably, not later than twelve months before the date of bringing into use. The administration shall also indicate:

- a) the maximum specified period during which the interim assignment is intended to remain in use;
- b) the assignment(s) in the Plan(s) the use of which will remain suspended for the duration of use of the corresponding interim assignment;
- c) the names of the administrations with which an agreement for the use of the interim assignment has been reached, together with any comment relating to the period of use so agreed and the names of administrations with which an agreement may be required but has not yet been reached.

4. An administration is considered to be affected:

4.1 *for an interim system in the broadcasting-satellite service*

- a) if any overall equivalent protection margin of one of its assignments in the Plan, calculated in accordance with Annex 5 to Part I of these Final Acts, including the cumulative effect of all interim uses during the maximum specified period of use of the interim system, but excluding the corresponding suspended assignment(s) (paragraph 3b), becomes negative or a former negative value is made more negative;
- b) if it has a frequency assignment in the fixed-satellite service which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. 1060 of the Radio Regulations, or which has been published in accordance with No. 1044 of the Radio Regulations or of paragraph 7.1.3 of Part I of these Final Acts and the appropriate limits of Annex 1 to Part I of these Final Acts are exceeded;
- c) if, although having no frequency assignment in the broadcasting-satellite service in the channel concerned, it nevertheless would receive on its territory a power flux-density value which exceeds the limits given in Annex 1 to Part I of these Final Acts as a result of the proposed interim assignment;
- d) if in countries of Region 1 having a frequency assignment to a space station in the broadcasting-satellite service with a necessary bandwidth any portion of which falls within the necessary bandwidth of the proposed assignment, and which is in accordance with the Plan contained in Appendix 30 to the Radio Regulations or in respect of which modifications have been published by the Board in accordance with the provisions of that Appendix and the appropriate limits of Annex 1 to Part I of these Final Acts are exceeded;
- e) if it has a frequency assignment to a space station in the broadcasting-satellite service in the band 12.5 to 12.7 GHz in Region 3 with a necessary bandwidth any portion of which falls within the necessary bandwidth of the proposed assignment, and which:
 - is recorded in the Master Register; or
 - has been coordinated or is being coordinated under the provisions of Resolution No. 33 of the World Administrative Radio Conference, Geneva, 1979; or
 - appears in a Region 3 plan to be adopted at a future administrative radio conference, taking account of modifications which may be introduced subsequently in accordance with the Final Acts of that Conference,

and the appropriate limits of Annex 1 to Part I of the present Final Acts are exceeded.

4.2 *for interim feeder-link systems*

- a) if any overall equivalent protection margin of one of its assignments in the Plan, calculated in accordance with Annex 3 to Part II of these Final Acts, including the cumulative effect of all interim uses during the maximum specified period of use of the interim system, but excluding the corresponding suspended assignment(s) (paragraph 3.b), becomes negative or a former negative value is made more negative;
- b) if it has a frequency assignment in the fixed-satellite service which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. 1060 of the Radio Regulations and the appropriate limits of Annex 1 to Part II of these Final Acts are exceeded;
- c) if it has a frequency assignment in the band 17.7 - 17.8 GHz to a terrestrial station, in use or intended to be brought into use within three years of the projected date of bringing into use of the feeder-link earth station, which is located within the coordination area of the feeder-link earth station concerned and the appropriate limits of Annex 1 to Part II of these Final Acts are exceeded;

5. The Board shall publish in a special section of its weekly circular the information received under paragraph 3, together with the names of the administrations it has identified in application of paragraph 4.

6. When the Board finds that the suspended assignment of an administration having an interim system is not affected, it shall examine the projected interim system with respect to the interim system of that administration and if there is an incompatibility, it shall request the two administrations concerned to adopt any measures that may enable the new interim system to be operated.

7. The Board shall send a telegram to the administrations listed in the special section of the weekly circular drawing their attention to the information it contains and shall send them the results of its calculations.

8. Any administration not listed in the special section which considers that its planned interim assignment may be affected shall so inform the administration responsible for the interim system and the Board, and the two administrations shall endeavour to resolve the difficulty before the proposed date of bringing the interim assignment into use.

9. An administration which has not sent its comments either to the administration seeking agreement or to the Board within a period of four months following the date of the weekly circular referred to in paragraph 5 shall be understood as having agreed to the proposed interim use.

10. On the expiry of four months following the date of publication of the weekly circular referred to in paragraph 5, the Board shall review the matter and, depending on the results obtained, shall inform the administration proposing the interim assignment that:

- a) it may notify its proposed use under Article 5 of Part I or Part II of these Final Acts, as appropriate, if no agreement is required or the required agreement has been obtained from the administrations concerned. In this case the Board shall update the Interim List;
- b) it may not bring into use its interim system before having obtained the agreement of the administrations affected, either directly or by applying the procedure described in Article 4 of Part I or Part II of these Final Acts, as appropriate, as a means of obtaining that agreement.

11. The Board shall include all the interim assignments in an Interim List in two parts, one each for the broadcasting-satellite service and the feeder-link assignments, and shall update it in accordance with this Annex. The Interim List shall be published together with the Plans but does not constitute part of them.

12. One year prior to the expiry of the interim period, the Board shall draw the attention of the administration concerned to this fact and request it to notify in due time the deletion of the assignment from the Master Register and the Interim List.

13. If, notwithstanding the reminders by the Board, an administration does not reply to its request sent in application of paragraph 12, the Board shall, at the termination of the interim period:

- a) enter a symbol in the Remarks Column of the Master Register to indicate the lack of response and that the entry is for information only;
- b) not take into account that assignment in the Interim List;
- c) inform the administrations concerned and affected of its action.

14. Where an administration confirms the termination of the use of the interim assignment, the Board shall delete the assignment concerned from the Interim List and the Master Register. Any corresponding assignment in the Plan(s), suspended earlier, may then be brought into use.

15. An administration which considers that its interim system may continue to be used after the expiry of the interim period may extend it by not more than two years and to this effect shall apply the procedure described in this Annex.

16. Where an administration applies the procedure in accordance with paragraph 15, but was unable to obtain the agreement of one or more affected administrations, the Board shall indicate this situation by inserting an appropriate symbol in the Master Register. Upon receipt of a complaint of harmful interference, the administration shall immediately cease operation of the interim assignment.

17. Where an administration, having been informed of a complaint of harmful interference, does not cease transmission within a period of thirty days after the receipt of complaint, the Board shall apply the provisions of paragraph 13.

ANNEX 2

[DRAFT] RESOLUTION [COM6/C]

**Relating to the Use of Interim Systems [in Region 2] in
the Broadcasting-Satellite and Fixed-Satellite
(Feeder Link) Services in Region 2
for the Bands Covered by Appendix 30
[and Appendix [30A]]**

The World Administrative Radio Conference on the Use of the Geostationary Orbit and the Planning of the Space Services Utilizing It, First Session, Geneva, 1985,

considering

- a) that the Regional Administrative Radio Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, prepared a Plan for the broadcasting-satellite service in the band 12.2 - 12.7 GHz and a Plan for the associated feeder links in the band 17.3 - 17.8 GHz with the provision of implementing Interim Systems in accordance with Resolution 2(SAT-R2);
- [b) that this Conference, in incorporating the decisions of the Region 2 Conference into the Radio Regulations, decided to make the provisions of that Resolution available to all Regions;]
- c) that in the implementation of their assignments in the Plans, administrations [of Region 2] may find it more appropriate to adopt a phased approach and initially use characteristics different from those appearing in the appropriate Regional Plan;
- d) that some administrations [of Region 2] may cooperate in the joint development of a space system with a view to covering two or more service areas from the same orbital position or to use a beam which would encompass two or more service areas;
- e) that some administrations [in Region 2] may cooperate in the joint development of a space system with a view to using two or more feeder-link service areas from the same orbital position or to use a beam which encompasses two or more feeder-link service areas;
- f) that interim systems shall not adversely affect the Plans nor hamper the implementation and evolution of the Plans;
- g) that the number of assignments to be used in an interim system shall not in any case exceed the number of assignments appearing in the [appropriate Regional/Region 2] Plan which are to be suspended;
- h) that the interim systems shall not in any case use orbital positions that are not in the [appropriate Regional/Region 2] Plan;
- i) that an interim system shall not be introduced without the agreement of all administrations whose space and terrestrial services are considered to be affected;

resolves

that administrations and the IFRB shall apply the procedure contained in the Annex to this Resolution.

ANNEX TO RESOLUTION ORB RES-B

1. An administration or a group of administrations [in Region 2] may, after successful application of the procedure contained in this Annex, use an interim system during a specified period not exceeding 12 years in order:

1.1 for an interim system in the broadcasting satellite service

- a) to use an increased e.i.r.p in any direction relative to that appearing in the [appropriate Regional/Region 2] Plan provided that the power flux-density does not exceed the limits given in Annex [5] of Appendix 30;
- b) to use modulation characteristics¹ different from those appearing in the Annexes to the [appropriate Regional/Region 2] Plan and resulting in an increased probability of harmful interference or in a wider assigned bandwidth;
- c) to change the coverage area by displacing boresight, or by increasing the major or minor axis or by rotating them;
- d) to use a coverage area appearing in the [appropriate Regional/Region 2] Plan or a coverage area encompassing two or more coverage areas appearing in the [appropriate Regional/Region 2] Plan from an orbital position which shall be one of the corresponding orbital positions appearing in the [appropriate Regional/Region 2] Plan;
- e) to use a polarization different from that in the [appropriate Regional/Region 2] Plan.

1.2 for an interim feeder-link system

- a) to use an increased e.i.r.p in any direction relative to that appearing in the Region 2 feeder-link Plan;
- b) to use modulation characteristics¹ different from those appearing in the Annexes to the Plan and resulting in an increased probability of harmful interference or in a wider assigned bandwidth;
- c) to change the feeder-link beam area by displacing the boresight, or by increasing the major or minor axis or by rotating them;
- d) to use a feeder-link beam area appearing in the Region 2 feeder-link Plan or a feeder-link beam area encompassing two or more feeder-link beam areas appearing in the Region 2 feeder-link Plan in relation to an orbital position which shall be one of the corresponding orbital positions appearing in the Region 2 feeder-link Plan;
- e) to use a polarization different from that in the Region 2 feeder-link Plan.

¹ For example, modulation with sound channels frequency-multiplexed within the bandwidth of a television channel, digital modulation of sound and television signals, or other pre-emphasis characteristics.

2. In all cases, an interim system shall correspond to assignments in the [appropriate Regional/Region 2] Plan; the number of assignments to be used in an interim system shall not in any case exceed the number of assignments appearing in the [appropriate Regional/Region 2] Plan which are to be suspended. During the use of an interim system, the use of the corresponding assignments in the [appropriate Regional/Region 2] Plan is suspended; they shall not be brought into use before the cessation of the use of the interim system. However, the suspended assignments, but not the interim system's assignments, of an administration shall be taken into account when other administrations apply the procedure of Article 4 of Appendix 30 and of Appendix [30A], as appropriate, in order to modify the Plans, or the procedure of this Annex in order to bring an interim system into use. [The assignments of interim systems shall not be taken into account in applying the procedure of Article 7 of Appendix 30 and Appendix 30A.]

3. When an administration proposes to use an assignment in accordance with paragraph 1, it shall communicate to the IFRB the information listed in Annex 2 of Appendix 30 or Appendix [30A] as appropriate not earlier than five years but, preferably, not later than twelve months before the date of bringing into use. The administration shall also indicate:

- a) the maximum specified period during which the interim assignment is intended to remain in use;
- b) the assignments in the appropriate Regional Plan the use of which will remain suspended for the duration of the use of the corresponding interim assignment;
- c) the names of the administrations with which an agreement for the use of the interim assignment has been reached, together with any comment relating to the period of use so agreed and the names of administrations with which an agreement may be required but has not yet been reached.

4. An administration is considered to be affected:

4.1 for an interim system in the broadcasting-satellite service

- a) for an interim system of an administration of Region 2, an administration of Region 2 is considered to be affected if any overall protection margin of one of its assignments in the Region 2 Plan, calculated in accordance with Annex [6] to Appendix 30 including the cumulative effect of all interim use during the maximum specified period of use of the interim system, but excluding the corresponding suspended assignments (paragraph 3b), becomes negative or a former negative value is made more negative;
- [b) for an interim system of an administration of Region 1 or 3, an administration of Region 1 or 3 is considered to be affected if the protection margin of one of its assignments in the Regions 1 and 3 Plan, calculated in accordance with Annex [6] of Appendix 30 including the cumulative effect of all interim use during the maximum specified period of use of the interim system, but excluding the corresponding suspended assignments (paragraph 3b), becomes negative or a former negative value is made more negative;]

- c) for an interim system of [either the Regions 1 and 3 Plan or of] the Region 2 Plan, an administration of [the other Regional Plan/Region 1 or 3] is considered to be affected if there is an overlap of the necessary bandwidths and if the possibly affected administration has an assignment which is in conformity with the appropriate Regional Plan contained in Appendix 30 to the Radio Regulations or in respect of which modifications have been published by the Board in accordance with the provisions of that Appendix and the appropriate limits of Annex 1 of Appendix 30 are exceeded;
- d) if it has a frequency assignment in the fixed satellite service which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. 1060 of the Radio Regulations or under Article 7 of Appendix 30 or under Article [...] of Appendix [30A] or which has been published in accordance with No. 1044 of the Radio Regulations or of paragraph [...] of Appendix 30 or of paragraph [...] of Appendix [30A] and the appropriate limits of Annex 1 of Appendix 30 are exceeded;
- e) if, although having no frequency assignment in the appropriate Regional Plan in the channel concerned, it nevertheless would receive on its territory a power flux-density value which exceeds the limits given in Annex 1 as a result of the proposed interim assignment;
- f) if it has a frequency assignment to a space station in the broadcasting-satellite service in the band 12.5 - 12.7 GHz in Region 3 with a necessary bandwidth any portion of which falls within the necessary bandwidth of the proposed assignment, and which:
- is recorded in the Master Register; or
 - has been coordinated or is being coordinated under the provisions of Resolution 33; or
 - appears in a Region 3 plan to be adopted at a future administrative radio conference, taking account of modifications which may be introduced subsequently in accordance with the Final Acts of that Conference,
- and the appropriate limits of Annex 1 to Appendix 30 are exceeded.

[Note: the rest of the Resolution is the same as Resolution 2(SAT-R2) from para 4.2 to the end with some editorial changes]

4.2 *for interim feeder-link systems*

- a) if any overall equivalent protection margin of one of its assignments in the Plan, calculated in accordance with Annex 3 to Part II of these Final Acts, including the cumulative effect of all interim uses during the maximum specified period of use of the interim system, but excluding the corresponding suspended assignment(s) (paragraph 3.b), becomes negative or a former negative value is made more negative;
- b) if it has a frequency assignment in the fixed-satellite service which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. 1060 of the Radio Regulations and the appropriate limits of Annex 1 to Part II of these Final Acts are exceeded;
- c) if it has a frequency assignment in the band 17.7 - 17.8 GHz to a terrestrial station, in use or intended to be brought into use within three years of the projected date of bringing into use of the feeder-link earth station, which is located within the coordination area of the feeder-link earth station concerned and the appropriate limits of Annex 1 to Part II of these Final Acts are exceeded;

5. The Board shall publish in a special section of its weekly circular the information received under paragraph 3, together with the names of the administrations it has identified in application of paragraph 4.

6. When the Board finds that the suspended assignment of an administration having an interim system is not affected, it shall examine the projected interim system with respect to the interim system of that administration and if there is an incompatibility, it shall request the two administrations concerned to adopt any measures that may enable the new interim system to be operated.

7. The Board shall send a telegram to the administrations listed in the special section of the weekly circular drawing their attention to the information it contains and shall send them the results of its calculations.

8. Any administration not listed in the special section which considers that its planned interim assignment may be affected shall so inform the administration responsible for the interim system and the Board, and the two administrations shall endeavour to resolve the difficulty before the proposed date of bringing the interim assignment into use.

9. An administration which has not sent its comments either to the administration seeking agreement or to the Board within a period of four months following the date of the weekly circular referred to in paragraph 5 shall be understood as having agreed to the proposed interim use.

10. On the expiry of four months following the date of publication of the weekly circular referred to in paragraph 5, the Board shall review the matter and, depending on the results obtained, shall inform the administration proposing the interim assignment that:

- a) it may notify its proposed use under Article 5 of Part I or Part II of these Final Acts, as appropriate, if no agreement is required or the required agreement has been obtained from the administrations concerned. In this case the Board shall update the Interim List;
- b) it may not bring into use its interim system before having obtained the agreement of the administrations affected, either directly or by applying the procedure described in Article 4 of Part I or Part II of these Final Acts, as appropriate, as a means of obtaining that agreement.

11. The Board shall include all the interim assignments in an Interim List in two parts, one each for the broadcasting-satellite service and the feeder-link assignments, and shall update it in accordance with this Annex. The Interim List shall be published together with the Plans but does not constitute part of them.

12. One year prior to the expiry of the interim period, the Board shall draw the attention of the administration concerned to this fact and request it to notify in due time the deletion of the assignment from the Master Register and the Interim List.

13. If, notwithstanding the reminders by the Board, an administration does not reply to its request sent in application of paragraph 12, the Board shall, at the termination of the interim period:

- a) enter a symbol in the Remarks Column of the Master Register to indicate the lack of response and that the entry is for information only;
- b) not take into account that assignment in the Interim List;
- c) inform the administrations concerned and affected of its action.

14. Where an administration confirms the termination of the use of the interim assignment, the Board shall delete the assignment concerned from the Interim List and the Master Register. Any corresponding assignment in the Plan(s), suspended earlier, may then be brought into use.

15. An administration which considers that its interim system may continue to be used after the expiry of the interim period may extend it by not more than two years and to this effect shall apply the procedure described in this Annex.

16. Where an administration applies the procedure in accordance with paragraph 15, but was unable to obtain the agreement of one or more affected administrations, the Board shall indicate this situation by inserting an appropriate symbol in the Master Register. Upon receipt of a complaint of harmful interference, the administration shall immediately cease operation of the interim assignment.

17. Where an administration, having been informed of a complaint of harmful interference, does not cease transmission within a period of thirty days after the receipt of complaint, the Board shall apply the provisions of paragraph 13.

Sources: Documents DT/58, 193

WORKING GROUP 6B

Draft report from Working Group 6B ad hoc to Working Group 6B

INTERSESSIONAL ACTIVITIES RELATING TO THE PLANNING
OF THE FEEDER LINKS FOR THE BSS IN REGIONS 1 AND 3

1. Introduction

In order to facilitate the task of planning the feeder links to BSS at 12 GHz to be carried out at the second session of the WARC-ORB Conference, Working Group 6B recommends the establishment of the requirements of administrations during the intersessional period.

The Working Group has also noted that the existing computer software, developed by the Board to carry out the Region 2 BSS planning, may be of use for the planning of feeder links for BSS in Regions 1 and 3.

2. Submission of requirements

A requirement is defined as the need to provide a feeder-link assignment from a specific location area(s) on the Earth to a specified orbital position.

2.1 In requesting a feeder-link assignment an administration shall provide the following information:

- a) country symbol and IFRB serial number (beam identification) of the corresponding BSS down link assignment shown in column 1 of Article 11 of Appendix 30;
- b) frequency band preferred for each requirement;

An administration shall indicate a preference either for 14 GHz, 17 GHz or that it has no preference.

- c) service area for the feeder links;

The service area can be defined as the geographical area(s) on the surface of the Earth within the feeder-link beam area(s) within which the administration responsible for the service wishes to locate transmitting earth stations for the purpose of providing feeder links to broadcasting-satellite space stations.

Each geographical area of the service area for the purpose of feeder-link planning shall be defined using either:

- i) by a minimum of six points defined by geographical coordinates; or
 - ii) geographical coordinates of the boresight, major and minor axes of the elliptical cross section of the satellite receiver antenna beam and the orientation.
- d) test points;

An administration shall provide the preferred test points, maximum of 20, within the service area to be used for the calculations. This information shall be in the form of:

- i) geographical coordinates;
 - ii) average height above mean sea level;
 - iii) rain climatic zone.
- e) sense of polarization (for circular polarization);

Either the same or opposite to the sense of polarization of the down-link (see report of the first session...).

- f) feeder link channel numbers;

The channel number of the feeder link, if the administration wishes to specify a different number to that derived from linear frequency translation (see report of the first session...).

- g) special requirements:

- linear polarization;

Note 1 - More than one requirement (for feeder links) to a single down-link assignment will be regarded as a special requirement.

Note 2 - Coordinates of the earth station; prior to implementation, feeder-link earth station site(s) shall be coordinated with other equal primary services.

2.2 The Board shall prepare the appropriate form to be used by administrations in submitting their requirements.

2.3 The Board shall request before [1] administrations to submit their requirements to the Board prior to [2]. The Board will prepare a consolidated list of requirements and submit a report to the second session of the Conference at least [3] months before the start of the second session.

- 1) [18 months before the second session]
- 2) [12 months before the second session]
- 3) [6 months before the second session]

3. Computer software

The first session noted that the Board had developed computer software to analyze both the feeder link and down-links of the Region 2 BSS Plan and that this software could be modified with minimal effort. The Board shall prepare the appropriate software to enable the second session to analyze the feeder-link Plan and provide an overall analysis of both the feeder links and the down-links. This software must be adopted to perform both the intersessional planning exercise and the planning at the second session. To facilitate this task, requirements of the software must be identified during the current session.

Information gathered under section 2.1 will be the basis for the compilation of the "requirements file" and technical parameters for feeder-link planning given in the report of the first session ... will form the basis for the "parameter file" for the computer program.

The program should provide the frequency assignments and the total co-channel and adjacent channel carrier-to-interference ratios, for a given channel, at all test points.

In addition, it is recommended that a single orbit analysis program should be developed to facilitate efficient working at the second session. The Working Group 6B, ad hoc has noted that at least one administration has developed a computer program to perform this function. It is the opinion of this Group that the IFRB should explore the possibility of adapting an existing program with a view to making it available to administrations on microcomputers during the second session of the Conference.

4. Planning exercise

Using the information given in the above section and Table 1, the IFRB shall carry out two planning exercises and present the results of these planning exercises to the second session [six] months before the start of the second session. This planning exercise will be carried out on the basis of linear frequency translation except when an administration requests otherwise for its own channels.

The first planning exercise is to be based on using the 14 GHz band for those requirements for which administrations had indicated a preference for that band.

The second planning exercise is to be based on using the 17 GHz band to satisfy the requirements of those administrations who had indicated a preference for the 17 GHz band or for those who had indicated no preference to any particular band.

TABLE 1

Table of technical parameters for the feeder-link planning
exercise for Regions 1 and 3

(Frequency bands 17.3 - 18.1 GHz and 14.5 - 14.8 GHz)

Item	Parameter	Value
1.	Carrier-to-noise ratio	24 dB
2.	Co-channel carrier-to-interference ratio	40 dB
3.	Adjacent channel carrier-to-interference	21 dB
4.	Feeder link e.i.r.p. initial planning value	17/18 GHz - 84 dBW 14 GHz - 82 dBW
5.	Transmitting antenna	
a)	Diameter	17/18 GHz - 5 m 14 GHz - 6 m
b)	On-axis gain	57 dBi
c)	Co-polar off-axis radiated power	E-25-25 log φ (dBW) for $1^\circ \leq \varphi \leq 48^\circ$, E-67(dBW) for $\varphi > 48^\circ$
d)	Cross-polar off-axis radiated power	E-30(dBW) for $0^\circ \leq \varphi \leq 1.6^\circ$, E-25-25 log φ (dBW) for $1.6^\circ < \varphi \leq 48^\circ$, E-67(dBW) for $\varphi > 48^\circ$
6.	Earth station mispointing loss	1 dB

TABLE 1 (continued)

Item	Parameter	Value
7.	Satellite receiving antenna	
a)	Cross section of beam	elliptical or circular
b)	Co-polar response pattern	<p>relative gain (dB)</p> $-12\left(\frac{\varphi}{\varphi_0}\right)^2 \text{ for } 0 < \frac{\varphi}{\varphi_0} < 1.30$ $-17.5 - 25 \log\left(\frac{\varphi}{\varphi_0}\right) \text{ for } \frac{\varphi}{\varphi_0} > 1.30$ <p>After intersection with curve C: as curve C. (see Figure 2 - curve A)</p>
c)	Cross-polar response pattern	<p>relative gain (dB)</p> $-30 - 12\left(\frac{\varphi}{\varphi_0}\right)^2 \text{ for } 0 < \frac{\varphi}{\varphi_0} < 0.5$ $-33 \text{ for } 0.5 < \frac{\varphi}{\varphi_0} < 1.67$ $\left\{ -40 + 40 \log\left \frac{\varphi}{\varphi_0} - 1\right \right\} \text{ for } 1.67 < \frac{\varphi}{\varphi_0}$ <p>After intersection with curve C: as curve C. (see Figure 2 - curve B)</p>
8.	Satellite receiving antenna pointing accuracy	0.2°
9.	Satellite system noise temperature	1800
10.	Type of polarization	Circular
11.	Sense of polarization	(opposite to down-link) Note 3
12.	Propagation	See Report of the first session
13.	AM-to-PM conversion	2.0 dB

Note 3 - For planning during the second session either the same or opposite may be adopted for each orbital position.

WORKING GROUP 6B

Draft report from Working Group 6B, ad hoc to Working Group 6B

INTERSESSIONAL ACTIVITIES RELATING TO THE PLANNING
OF THE FEEDER LINKS FOR THE BSS IN REGIONS 1 AND 3

1. Introduction

In order to facilitate the task of planning the feeder links to BSS at 12 GHz to be carried out at the second session of the WARC-ORB Conference, Working Group 6B recommends the establishment of the requirements of administrations during the intersessional period.

The Working Group has also noted that the existing computer software, developed by the Board to carry out the Region 2 BSS planning, may be of use for the planning of feeder links for BSS in Regions 1 and 3.

2. Submission of requirements

A requirement is defined as the need to provide a feeder-link assignment from a specific location area(s) on the Earth to a specified orbital position.

2.1 In requesting a feeder-link assignment an administration shall provide the following information:

- a) country symbol and IFRB serial number (beam identification) of the corresponding BSS down link assignment shown in column 1 of Appendix 30;
- b) frequency band preferred for each requirement;

An administration shall indicate a preference either for 14 GHz, 17 GHz or that it has no preference.

- c) service area for the feeder links;

The service area can be defined as the area(s) on the surface of the Earth within the feeder-link beam area(s) within which the administration responsible for the service wishes to locate transmitting earth stations for the purpose of providing feeder links to broadcasting-satellite space stations.

Each geographical area for the purpose of feeder link planning shall be defined using either

- i) by a minimum of six points defined by geographical coordinates, or
 - ii) geographical coordinates of the boresight, major and minor axes of the elliptical cross section of the satellite receiver antenna beam and the orientation.
- d) test points;

An administration shall provide the preferred test points, maximum of 20, within the service area to be used for the calculations. This information shall be in the form of

- i) geographical coordinates;
 - ii) average height above mean sea level;
 - iii) rain climatic zone.
- e) coordinates of the earth station - 14.5 - 14.8 GHz; 17.7 - 18.1 GHz (for those assignments in Appendix 30 using channels 25 to 40);

Note - This information is required for coordination with other services.

f) Special requirements

- i) linear polarization;
- ii) circular polarization, same sense as the down link;
- iii) feeder-link channel numbers corresponding to the down link if linear frequency translation is not utilized.

2.2 The Board shall prepare the appropriate form to be used by administrations in submitting their requirements.

2.3 The Board shall request before 1 administrations to submit their requirements to the Board prior to 2. The Board will prepare a consolidated list of requirements and submit a report to the second session of the Conference at least 3 months before the start of the second session.

- 1) 15 months before the second session
- 2) 12 months before the second session
- 3) 6 months before the second session

3.* Computer software

The first session noted that the Board had developed computer software to analyze both the feeder link and down-links of the Region 2 BSS Plan and that this software could be modified with minimal effort. The Board shall prepare the appropriate software to enable the second session to analyze the feeder-link Plan and provide an overall analysis of both the feeder links and the down-links. This software shall be based on the technical standards and parameters contained in [] of this report. 7

4.* Planning exercise

Using the requirements referred to in 1. above, the computer software described in section [] and the technical criteria and planning approach contained in section [], the Board will carry out two planning exercises and present the results of these planning exercises to the second session. [x] months before the start of the second session.

The first planning exercise is to be based on using only the 17 GHz band for all feeder links and using a direct frequency translation of the Plan in Appendix 30.

The second planning exercise is to be based on using the 14 GHz band for those requirements for which administrations had indicated a preference for the 14 GHz band. The method of planning in the use of the 14 GHz band is covered in section [].

D. JAYASURIYA
Chairman of Working Group 6B, ad hoc

* Matters which are not yet assigned to the Working Group 6B, ad hoc.

WORKING GROUP 4B

Note from Sub-Working Group 4B-2

DRAFT NOTE ON SHARING CRITERIA BETWEEN FEEDER LINKS
WHICH NEED TO BE DEVELOPED DURING THE INTERSESSIONAL PERIOD

(Agenda item 3.3)

1. Deliberations within [Committee 4] on sharing between feeder links and other services have drawn attention to the need for intersessional studies on the criteria to be adopted for the threshold for coordination required between feeder links in different regions intended to operate in the band 17.3 - 17.8 GHz.
2. As part of the fixed-satellite service, the threshold for BSS feeder links might be expected to reflect the value in Appendix 29 of 4%. However, it could be that an even more stringent value might more correctly reflect the appropriate C/I required for BSS feeder links.
3. On the other hand the threshold value of $\Delta T/T$ adopted in the provisions of RARC-SAT R2 was 10% within the Plan itself, although a value of 4% was adopted for modifications.
4. Intersessional studies are needed to determine the appropriate threshold value, or values, whether it would be preferable to express it in terms of $\Delta T/T$ or C/I, and whether it would be desirable to establish a common value between the regions.
5. It would seem appropriate for the need for the intersessional studies thus identified to be drawn to the attention of the appropriate Working Groups of Committee 6, and to the ad hoc Group considering intersessional studies.

K.R.E. DUNK
Chairman of Sub-Working Group 4B-2

Draft

CHAPTER (8)

SATELLITE SOUND BROADCASTING SYSTEMS FOR
INDIVIDUAL RECEPTION BY PORTABLE AND AUTOMOBILE RECEIVERS
(Agenda item 4)

8.1 Introduction

Satellites are one of the possible solutions for nation-wide sound broadcasting. However, current frequency allocations do not provide for the particular needs of satellite sound broadcasting serving portable receivers and receivers in automobiles. The selection of the appropriate frequency band has been the subject of various studies and experiments whose results are described in CCIR Report 955 (MOD I).

The interest of administrations, in the subject of satellite sound broadcasting at the 1979 WARC, resulted in Resolution No. 505 which resolved:

- "1. that administrations shall be encouraged to carry out experiments with a broadcasting-satellite service (sound) within the band 0.5 - 2 GHz, in appropriately placed narrow sub-bands, subject to agreement of administrations concerned. One area where such a sub-band may be placed is the band 1 429 - 1 525 MHz;
2. that the CCIR shall continue and expedite studies relating to the technical characteristics of a satellite sound-broadcasting system for individual reception by portable and automobile receivers, the feasibility of sharing with terrestrial services, and the appropriate sharing criteria;
3. that the next world administrative radio conference dealing with space radiocommunication services in general or with a specific space radiocommunication service shall be authorized to consider the results of various studies and to take appropriate decisions regarding the allocation of a suitable frequency band;
4. that the aforementioned conference shall also develop appropriate procedures for protection, and if necessary re-accommodation in other bands of assignments to stations of terrestrial services which may be affected."

Consequently, the Administrative Council, in Resolution No. 895, decided that in order to meet the objectives of Resolution No. 505 of the WARC-79, WARC-ORB(1) was to consider the question in the light of experience gained by administrations and the results of studies in the CCIR and make appropriate Recommendations for the attention of the WARC-ORB(2).

This chapter reviews the progress of the work invited by Resolution No. 505 (resolves 1 and 2). Technical characteristics of example systems are given. Conclusions are drawn and areas for further study are defined. Recommendations are made for the attention of WARC-ORB(2), in accord with agenda item 4 and based upon the information available at the time of WARC-ORB(1).

8.2 Results of studies and analysis

The CCIR in response to Resolution No. 505 of the WARC-79 has produced Report 955 concerning satellite sound broadcasting with portable receivers and receivers in automobiles. Several administrations and agencies have conducted experiments and undertaken studies to assess system feasibility within the 0.5 - 2.0 GHz band.

Annex YY (the information of Annex 7 of the CPM Report) gives technical information regarding sound broadcast satellite systems analyzed and studied. The following sections give the general characteristics of systems studied and discuss the major considerations pertinent to an allocation decision.

8.2.1 System description

The satellite sound-broadcasting service could provide for three types of reception: portable receivers, mobile receivers such as car radios and permanently installed receivers. Such a service implies elevation and frequency-dependent link budgets. Both aspects are discussed in Annex YY of this report.

Two models have been studied. The first model uses FM with parameters compatible with terrestrial FM-broadcasting and provides monophonic reception in the case of portable and mobile receivers or stereophonic reception in the case of permanent installations where obstructions can be minimized and larger antennas can be used. The second model uses digital modulation and can provide a wider range of facilities independent of the type of reception.

Service quality and availability objectives are developed in Annex YY, § YY.2.2. Service availability has been assumed for 90% of locations. This service availability will depend on fading due to obstructions and multipath effects. Low latitudes could be served with rather moderate transmit power levels while higher latitudes would require higher levels. In both system models, it is considered that Cases A and B discussed in Annex YY, § YY.2.3 would provide satisfactory reception under all except very severe conditions.

The FM and digital models have been chosen as representative of possible methods of providing services. The selection of FM for a lower quality service does not necessarily imply that an FM system cannot provide a service quality equivalent to that from a digital system, since many other technical factors need to be taken into account.

A comparison of link budgets indicates that the digital model would require about twice the satellite transmit power of the FM model. The resulting technical requirements can be satisfied for some examples as given in Annex YY, with satellite and receiver technology available now or in the near future.

[The attention of administrations is drawn to the technical factors having a bearing on costs involved in the implementation of a satellite sound broadcasting system.] Examples of space-segment cost estimates can be found in Annex YY. [Technical and economic studies in one country have been reported since the CPM 1984 and have indicated that a satellite system could be several times more expensive than an equivalent terrestrial system. Other studies by another country for different geographical areas and based upon the costs of terrestrial television broadcast systems have indicated that a sound broadcasting satellite system could be several times less expensive than an equivalent terrestrial system. The relative cost depends on the geographical location of the service area, the shape and size of the territory, the number of programmes, technological solutions chosen and other factors. Further studies by the CCIR into those technical factors which have a bearing on costs, are required.]

8.2.2 Frequency, bandwidth and frequency sharing considerations

Three elements of importance to making an allocation decision are the appropriate frequency for operation, the bandwidth required and the possibilities for frequency sharing.

8.2.2.1 Operating frequencies

Studies examined by ORB(1) have used frequencies in the range 0.5 - 2.0 GHz. An increase in operating frequencies would require a corresponding increase in the satellite transmit power levels which in turn will increase with latitude. A decrease in operating frequency would require an increase in the antenna diameter and would put terrestrial receivers in an environment of higher man-made noise.

8.2.2.2 Bandwidth

The bandwidth required for a UHF satellite sound broadcasting service depends on the modulation method and on the extent of coverage overlap. Studies performed by EBU and ESA for almost the whole of Africa and Europe, and by Canada in Region 2, arrive at a required bandwidth of 9 to 11 MHz for providing one national sound broadcast programme per country when this is transmitted by frequency modulation. Digital modulation tends to require a somewhat larger bandwidth. The study made in Canada for Region 2 countries concluded that some 13 MHz are needed for one monophonic programme per country. These results are believed to be representative for national services.

8.2.2.3 Frequency sharing considerations

Primary users of the 0.5 - 2.0 GHz band include broadcasting, mobile and fixed services. Besides that, substantial allocations are provided for aeronautical radionavigation and radiolocation services.

Sharing studies have been conducted for frequency modulation and digital modulation techniques. Frequency modulation allows very limited energy dispersal while digital modulation techniques offer a significant energy dispersal advantage. However, even the most optimistic studies for the latter modulation demonstrate that the obtainable power flux-density levels are still too high to allow frequency sharing with the broadcasting, fixed or mobile services within the service area and in large areas around it.

It can be concluded that frequency sharing will not be possible in a systematic manner. This suggests that, taking into account the existing criteria, the development of national sound broadcasting-satellite services in the frequency range 0.5 - 2.0 GHz will only be possible through the allocation of an appropriate frequency band on an exclusive basis.

8.2.3 Conclusions

The studies conducted by the CCIR on the BSS (sound) in the range 0.5 - 2.0 GHz indicate that this service is feasible from the technical point of view but, due to sharing difficulties, the implementation of such a service will not be possible unless an appropriate frequency band is allocated for it on an exclusive basis. Further work is needed to fully define practical system parameters that would more readily permit the implementation of such a service.

8.3 Further work

Studies performed by the CCIR and the experiments and studies undertaken by administrations have shown that accommodation of the satellite sound broadcasting service in the frequency range 0.5 - 2.0 GHz would cause considerable difficulties, but the possibilities of sharing need further investigation.

The following study areas have been identified as requiring further work.

8.3.1 Quality of service

The quality of service impacts upon overall system characteristics and sharing with other services. Different administrations may desire different quality levels. It is suggested that at least medium and high quality systems be studied, with high quality possibly being attained by the use of permanently installed receivers.

8.3.2. Frequency of operation

A number of administrations indicated that they would be unable to accommodate the sound BSS in the band 0.5 - 2.0 GHz on an exclusive allocation basis. Additional study is desired to identify possible frequencies where the sound BSS might be implemented within the band 0.5 - 2.0 GHz, using the technical parameters identified for further study. In addition, studies are requested for frequencies near the 0.5 - 2.0 GHz range where the possibilities for sharing or other accommodations may be greater.

8.3.3 Modulation type

Changes in modulation format may reduce the power required for sound BSS transmitters and may enhance the possibilities for sharing with other services. In this respect the technical characteristics of practicable digital systems need further determination.

8.3.4 Bandwidth required

The change in modulation type or the use of other digital systems may alter the bandwidth required from the values given in the example systems discussed in this report.

8.3.5 Receivers

Signal processing techniques, the possibility of use of existing receivers, and the possibility for the commonality of receiver design were identified as areas of study.

8.3.6 Antenna design

Spacecraft antennas with improved side-lobes and multiple spot beams are necessary to be studied to increase sharing possibilities.

8.3.7 Feeder links

Technical characteristics of required feeder links need to be identified.

8.3.8 Appropriate sharing criteria

Sharing criteria are needed to determine possibilities for sharing with all services using frequency bands in which the sound BSS might operate. In particular, studies need to be directed towards sharing on a geographical basis, that is, among and within regions or among groups of administrations.

8.3.9 Costs

Several input studies were available to determine space segment costs, total sound BSS system costs and costs of alternative coverage by terrestrial sound broadcast systems. Additional study is needed to identify more precisely these costs for practicable systems.

8.3.10 Compliance with Provision 2674 of the Radio Regulations

The ability of present and future technology to comply with Provision 2674 must also be studied.

8.3.11 Multiple user satellite

Investigation is required into the technical implications of multiple administrations using the same satellite to satisfy their individual requirements.

8.4 Recommendations

After considering sound broadcasting by satellites in the light of experience gained by administrations and the results of studies in the CCIR, ORB(1) recommends:

1. that the CCIR conducts additional studies on the feasibility of implementing a satellite sound broadcasting system using the approximate frequency range 500 - 2 000 MHz as a guideline. These studies should be guided by the information contained in section ZZ.3 of this Report on future work and Annex YY;
2. that the second session of this Conference should consider the results of the various up-to-date studies and, in reviewing the situation prevailing at that time, be authorized to take appropriate decisions regarding the allocation of a suitable frequency band;

3. that the Administrative Council, in response to Resolution No. 505, include the topic of satellite sound broadcasting on the agenda for the second session of the Conference.

E.F. MILLER
Chairman of Working Group 4A

Source: DL/21(Rev.1)

WORKING GROUP 4A

Draft

CHAPTER (ZZ)

SATELLITE SOUND BROADCASTING SYSTEMS FOR
INDIVIDUAL RECEPTION BY PORTABLE AND AUTOMOBILE RECEIVERS
(Agenda item 4)

ZZ.1 Introduction

Satellites are one of the possible solutions for nation-wide sound broadcasting. However, current frequency allocations do not provide for the particular needs of satellite sound broadcasting serving portable receivers and receivers in automobiles. The selection of the appropriate frequency band has been the subject of various studies and experiments whose results are described in CCIR Report 955 (MOD I).

The interest of administrations. in the subject of satellite sound broadcasting at the 1979 WARC, resulted in Resolution No. 505 which resolved:

1. that administrations shall be encouraged to carry out experiments with a broadcasting-satellite service (sound) within the band 0.5 - 2 GHz, in appropriately placed narrow sub-bands, subject to agreement of administrations concerned. One area where such a sub-band may be placed is the band 1 429 - 1 525 MHz;
2. that the CCIR shall continue and expedite studies relating to the technical characteristics of a satellite sound-broadcasting system for individual reception by portable and automobile receivers, the feasibility of sharing with terrestrial services, and the appropriate sharing criteria;
3. that the next world administrative radio conference dealing with space radiocommunication services in general or with a specific space radiocommunication service shall be authorized to consider the results of various studies and to take appropriate decisions regarding the allocation of a suitable frequency band;
4. that the aforementioned conference shall also develop appropriate procedures for protection, and if necessary re-accommodation in other bands, of assignments to stations of terrestrial services which may be affected.

Consequently, the Administrative Council, in Resolution No. 895, decided that in order to meet the objectives of Resolution No. 505 of the WARC-79, WARC-ORB(1) was to consider the question in the light of experience gained by administrations and the results of studies in the CCIR and make appropriate Recommendations for the attention of the WARC-ORB(2).

This chapter reviews the progress of the work invited by Resolution No. 505 (resolves 1 and 2). Technical characteristics of example systems are given. Conclusions are drawn and areas for further study are defined. Recommendations are made for the attention of WARC-ORB(2), in accord with agenda item 4 and based upon the information available at the time of WARC-ORB(1).

ZZ.2 Results of studies and analysis

The CCIR in response to Resolution No. 505 of the WARC-79 has produced Report 955 concerning satellite sound broadcasting with portable receivers and receivers in automobiles. Several administrations and agencies have conducted experiments and undertaken studies to assess system feasibility within the 0.5 - 2.0 GHz band.

Annex YY (the information of Annex 7 of the CPM Report) gives technical information regarding sound broadcast satellite systems analyzed and studied. The following sections give the general characteristics of systems studied and discuss the major considerations pertinent to an allocation decision.

ZZ.2.1 System description

The satellite sound-broadcasting service could provide for three types of reception: portable receivers, mobile receivers such as car radios and permanently installed receivers. Such a service implies elevation and frequency-dependent link budgets. Both aspects are discussed in Annex YY of this report.

Two models have been studied. The first model uses FM with parameters compatible with terrestrial FM-broadcasting and provides monophonic reception in the case of portable and mobile receivers or stereophonic reception in the case of permanent installations where obstructions can be minimized and larger antennas can be used. The second model uses digital modulation and can provide a wider range of facilities independent of the type of reception.

Service quality and availability objectives are developed in Annex YY, § YY.2.2. Service availability has been assumed for 90% of locations. This service availability will depend on fading due to obstructions and multipath effects. Low latitudes could be served with rather moderate transmit power levels while higher latitudes would require higher levels. In both system models, it is considered that Cases A and B discussed in Annex YY, § YY.2.3 would provide satisfactory reception under all except very severe conditions.

The FM and digital models have been chosen as representative of possible methods of providing services. The selection of FM for a lower quality service does not necessarily imply that an FM system cannot provide a service quality equivalent to that from a digital system, since many other technical factors need to be taken into account.

A comparison of link budgets indicates that the digital model would require about twice the satellite transmit power of the FM model. The resulting technical requirements can be satisfied for some examples as given in Annex YY, with satellite and receiver technology available now or in the near future.

The attention of administrations is drawn to the technical factors having a bearing on costs involved in the implementation of a satellite sound broadcasting system. Examples of space-segment cost estimates can be found in Annex YY. Technical and economic studies in one country have been reported since the CPM 1984 and have indicated that [in some cases], a satellite system could be several times more expensive than an equivalent terrestrial system, but in other cases for different areas the satellite system can be less expensive as indicated in a study by another country. The relative cost depends on the geographical location of the service area, the shape and size of the territory, the number of programmes, technological solutions chosen and other factors. Further studies by the CCIR into those technical factors which have a bearing on costs, are required.

ZZ.2.2 Frequency, bandwidth and frequency sharing considerations

Three elements of importance to making an allocation decision are the appropriate frequency for operation, the bandwidth required, and the possibilities for frequency sharing.

ZZ.2.2.1 Operating frequencies

Studies examined by ORB(1) have used frequencies in the range 0.5 - 2.0 GHz. An increase in operating frequencies would require a corresponding increase in the satellite transmit power levels which in turn will increase with latitude. A decrease in operating frequency would require an increase in the antenna diameter and would put terrestrial receivers in an environment of higher man-made noise.

ZZ.2.2.2 Bandwidth

The bandwidth required for a UHF satellite sound broadcasting service depends on the modulation method and on the extent of coverage overlap. Studies performed by EBU and ESA for almost the whole of Africa and Europe, and by Canada in Region 2, arrive at a required bandwidth of 9 to 11 MHz for providing one national sound broadcast programme per country when this is transmitted by frequency modulation. Digital modulation tends to require a somewhat larger bandwidth. The study made in Canada for Region 2 countries concluded that some 13 MHz are needed for one monophonic programme per country. These results are believed to be representative for national services.

ZZ.2.2.3 Frequency sharing considerations

Primary users of the 0.5 - 2.0 GHz band include broadcasting, mobile and fixed services. Besides that, substantial allocations are provided for aeronautical radionavigation and radiolocation services.

Sharing studies have been conducted for frequency modulation and digital modulation techniques. Frequency modulation allows very limited energy dispersal while digital modulation techniques offer a significant energy dispersal advantage. However, even the most optimistic studies for the latter modulation demonstrate that the obtainable power flux-density levels are still too high to allow frequency sharing with the broadcasting, fixed or mobile services within the service area and in large areas around it.

It can be concluded that frequency sharing will not be possible in a systematic manner. This suggests that, taking into account the existing criteria, the development of national sound broadcasting-satellite services in the frequency range 0.5 - 2.0 GHz will only be possible through the allocation of an appropriate frequency band on an exclusive basis.

ZZ.2.3 Conclusions

The studies conducted by the CCIR on the BSS (sound) in the range 0.5 - 2.0 GHz indicate that this service is feasible from the technical point of view but, due to sharing difficulties, the implementation of such a service will not be possible unless an appropriate frequency band is allocated for it on an exclusive basis.

ZZ.3 Further work

Studies performed by the CCIR and the experiments and studies undertaken by administrations have shown that accommodation of the satellite sound broadcasting service in the frequency range 0.5 - 2.0 GHz would cause considerable difficulties, but the possibilities of sharing need further investigation. Further work is needed to fully define practical system parameters that would more readily permit the implementation of such a service.

The following study areas have been identified.

ZZ.3.1 Quality of signal

The quality of received signal impacts upon overall system characteristics and sharing with other services. Different administrations may desire different quality levels. It is suggested that at least medium and high quality systems be studied, with high quality possibly being attained by the use of permanently installed receivers.

ZZ.3.2 Frequency of operation

A number of administrations indicated that they would be unable to accommodate the sound BSS in the band 0.5 - 2.0 GHz on an exclusive allocation basis. However, two administrations indicated that they may be able to accommodate an allocation within the band 1 429 - 1 525 MHz. Additional study is desired to identify possible frequencies where the sound BSS might be implemented within the band 0.5 - 2.0 GHz, and using the technical parameters identified for further study. In addition, studies are requested for frequencies near the 0.5 - 2.0 GHz range where the possibilities for sharing other accommodations may be greater.

ZZ.3.3 Modulation type

Changes in modulation format may reduce the power required for sound BSS transmitters and may enhance the possibilities for sharing with other services.

ZZ.3.4 Digital systems

The technical characteristics of practicable digital systems need further determination.

ZZ.3.5 Bandwidth required

The change in modulation type or the use of other digital systems may alter the bandwidth required from the values given in the example systems discussed in this report.

ZZ.3.6 Receivers

Signal processing techniques and the possibility of use of existing receivers were identified as areas of study.

ZZ.3.7 Antenna design

Spacecraft antennas with improved side-lobes and multiple spot beams are necessary to be studied to increase sharing possibilities.

ZZ.3.8 Feeder links

Technical characteristics of required feeder links need to be identified.

ZZ.3.9 Appropriate sharing criteria

Sharing criteria are needed to determine possibilities for sharing with all services using frequency bands in which the sound BSS might operate. In particular, studies need to be directed towards sharing on a geographical basis, that is among and within regions or among groups of administrations.

ZZ.3.10 Costs

Several input studies were available to determine space segment costs, total sound BSS system costs, and costs of alternative coverage by terrestrial sound broadcast systems. Additional study is needed to identify more precisely these costs for practicable systems.

ZZ.3.11 Compliance with Provision 2674 of the Radio Regulations

The ability of present and future technology to comply with Provision 2674 must also be studied.

ZZ.3.12 Multiple user satellite

Investigation is required into the technical implications of multiple administrations using the same satellite to satisfy their individual requirements.

ZZ.4 Recommendations

After considering sound broadcasting by satellites in the light of experience gained by administrations and the results of studies in the CCIR, ORB(1) recommends:

1. that the CCIR conduct additional studies on the feasibility of implementing a satellite sound broadcasting system using the approximate frequency range 500 - 2 000 MHz as a guideline. These studies should be guided by the information contained in section ZZ.3 of this Report on future work and Annex YY;
2. that the second session of this Conference should consider the results of the various up-to-date studies and, in reviewing the situation prevailing at that time, be authorized to take appropriate decisions regarding the allocation of a suitable frequency band;

3. that the Administrative Council, in response to Resolution No. 505, include the topic of satellite sound broadcasting on the agenda for the second session of the Conference.

E.F. MILLER
Chairman of Working Group 4A

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/61-E
28 August 1985
Original: English

Source: DL/27(Rev.1)

WORKING GROUP 4B

DRAFT ELEMENT ON SHARING CRITERIA BETWEEN FEEDER LINKS
AND OTHER SERVICES (SPACE AND TERRESTRIAL)
WHICH NEED TO BE DEVELOPED DURING THE INTERSESSIONAL PERIOD
(Agenda item 3.3)

1. General

The Report of the Conference Preparatory Meeting (CPM) of the CCIR addresses the sharing criteria required between feeder links and other equal primary services in chapter 10. Further relevant material is to be found in chapter 8 of the CPM Report and additional detail in Annex 5.4 and Annex 6.

Administrations appeared to be in general agreement with the CPM Report comment on agenda item 3.3.

The relevant sections call for additional studies on many aspects of sharing. The following addresses those aspects directly relevant to intersessional studies, in the context of the frequency bands in which frequency plans for feeder links are to be developed. In this context, the criteria are those necessary for inclusion in the Radio Regulations.

2. Frequency bands

The sharing criteria are required for feeder links in the following frequency bands and sharing with the following services:

2.1 Frequency band 14.5 - 14.8 GHz

FIXED
MOBILE

2.2 Frequency band 17.7 - 18.1 GHz

FIXED
FIXED-SATELLITE (space-to-Earth)
MOBILE

3. Interference modes

The modes of interference which can occur are the following:

- Mode a) Transmitting feeder-link earth station interfering with receiving terrestrial station (fixed or mobile);
- Mode b) Transmitting terrestrial station (fixed or mobile) interfering with receiving feeder-link space station;
- Mode c) Transmitting space station in the fixed-satellite service interfering with receiving feeder-link space station (for the 17.7 - 18.1 GHz band);
- Mode d) Transmitting feeder-link earth station interfering with receiving earth station (for the 17.7 - 18.1 GHz band).

4. Sharing criteria available under various provisions of the Radio Regulations

4.1 Mode a) is covered for both frequency bands in question by Appendix 28 (Table 1). Note (5) in Table 1 states:

"The parameters associated with these columns are for feeder links to broadcasting satellites and are provisional pending further study by the CCIR: see Resolution No. 101."

For the time being no other parameters than those in Table 1 are available. Moreover, it should be noted that sharing criteria for bands below 15 GHz are restricted to analogue-modulated terrestrial systems so that parameters for digital systems need to be developed. Intersessional studies should review the values associated with these parameters.

It is noted that Appendix 28 does not cover the case of aeronautical mobile receiving stations. Since these are permitted under the Radio Regulations, intersessional studies may be needed to provide the necessary sharing criteria, and appropriate method of application.

In addition there is a need for intersessional studies to take account of the occasionally simultaneous nature of relatively constant interference from the fixed-satellite service space transmitters and the short-term interference anomalously propagated from feeder-link earth stations at the limit of the coordination area determined by Appendix 28. It could be expected that there will be relatively few feeder-link earth stations on any particular frequency.

4.2 Mode b) is covered in Article 27 by RR 2503, RR 2505, RR 2508 and RR 2510 for the frequency band 14.5 - 14.8 GHz with the Footnote No. 2510.2 stating:

"The application of the limits in this frequency band is provisional (see Resolution No. 101).";

and by RR 2505, RR 2508 and RR 2511 for the frequency band 17.7 - 18.1 GHz with the Footnote No. 2511.2 (see No. 2510.1) stating:

"The equality of right to operate when a band of frequencies is allocated in different Regions to different services of the same category is established in No. 346. Therefore any limits concerning interregional interference which may appear in CCIR Recommendations should, as far as practicable, be observed by administrations."

It is, however, relevant to recall the view of the Report of the CPM on the need for pointing/e.i.r.p. restrictions. Chapter 12, section 12.6, responded to Recommendation No. 4 (COM6/4) of RARC-SAT R2 as follows:

"Recommendation No. 4 (COM6/4) requests the CCIR to study the need for limits on e.i.r.p. in the direction of the GSO to be imposed on FS transmitters in the 17.3 - 17.8 GHz band to protect BSS feeder links. Report 952 (MOD I) discusses this matter for the 17.7 - 18.1 GHz band, and concludes that with the present e.i.r.p. limit of 55 dBW in Article 27, interference situations will be rare. Further, draft new Report AB/4-9 indicates that under worst-case conditions an FS digital radio-relay transmission around 18 GHz, interfering with a feeder-link receiver, will cause a maximum degradation of 0.12 dB to the nominal received broadcasting-satellite C/N ratio in the Region 2 Plan. This assumes a feeder-link e.i.r.p. of 86 dBW but does not take into account other factors that may further reduce the effect of terrestrial interference, such as feeder-link receive antenna discrimination and power spectral density reductions due to differences in channel bandwidths. Since the effect of terrestrial interference is considered negligible, and the additional factors may further reduce the interference, it is concluded that it is unnecessary to have restrictions as to the direction of maximum radiation for terrestrial transmitters."

It will be evident that the additional factors, which might collectively contribute 10 dB or more in additional discrimination, could alternatively be seen as permitting the use of lower feeder-link e.i.r.p. values than 86 dBW without the effect of terrestrial interference causing more than the 0.12 dB degradation which is considered to be negligible.

However, intersessional studies would be able to confirm that these conclusions regarding the fixed services are also applicable to the aeronautical mobile service.

4.3 Mode c) - Transmitting space station in the fixed-satellite service interfering with receiving feeder-link space station

There are two situations where interference might result:

- when satellites are separated by a small orbital arc,
- when satellites are at nearly antipodal positions.

Appendix 29 contains a procedure for determination of whether coordination is required which is applicable for both situations.

Intersessional studies are needed to determine the appropriate threshold value to trigger coordination, whether it would be preferable to express it in terms of $\Delta T/T$ (as in Appendix 29) or C/I, and whether it is desirable to establish common criteria for all three Regions.

As part of the fixed-satellite service, the threshold of BSS feeder links might be expected to reflect the value in Appendix 29 of 4%. However, it could be that a more stringent value might more correctly reflect the appropriate C/I required for BSS feeder links.

On the other hand, the threshold value of $\Delta T/T$ adopted in the provisions of RARC-SAT R2 was in fact 10% for intersatellite geometric angular separations less than 10° or greater than 150° . However, coordination is not required in the latter case if the free-space power flux-density of the transmitting space station in the fixed-satellite service does not exceed a value of $-123 \text{ dB(W/m}^2/24 \text{ MHz)}$ on the Earth's surface at the equatorial earth limb.

4.4 Mode d) concerning the frequency band 17.7 - 18.1 GHz which is allocated for bidirectional use, i.e. by the BSS feeder links in the Earth-to-space direction and by the FSS down-links in the space-to-Earth direction; this mode is not covered by any provisions of the Radio Regulations; however, RARC-SAT R2 did develop an approach based on the use of Appendix 28 to deal with this mode. This approach was further developed at the CPM where it appears as Annex 8 to the Report. Intersessional studies may help to confirm the efficacy of the method.

Note should also be made of the possibility of the occasionally simultaneous nature of the short-term interference anomalously propagated from feeder-link earth stations at the limit of their coordination area, and of terrestrial fixed service transmitters at the limit of their coordination area, together with the relatively constant interference from the space stations of the fixed-satellite service. Intersessional studies on the cumulative effect of the three categories of potential interferences, taking account of the time distribution of the terrestrially propagated interference, appear necessary.

It could be expected that there will be relatively few feeder-link earth stations transmitting on one frequency at one time.

K.R.E. DUNK
Chairman of Sub-Working Group 4B-2

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Addendum 2 to
Document DT/62-E
30 August 1985
Original: English

WORKING GROUP 5A

Note from Chairman of Working Group 5A

PLANNING PRINCIPLES

Efficiency

Any planning method should ensure efficient and economical use of the geostationary orbit and frequency bands allocated to space services.

Provisions for multi-source and multi-band networks

Any planning method should be able to accommodate multi-service and/or multi-band satellite networks, without imposing undue constraints to planning.

Others

The cost of the development and application of the planning method must be as low as possible.

[The GSO must be used exclusively for peaceful purposes, and its planning must thus rule out any consideration contrary to those purposes.

F.S.C. PINHEIRO
Chairman of Working Group 5A

WORKING GROUP 5A

Note from Chairman of Working Group 5A

PLANNING PRINCIPLES

Provisions for multi-administration networks

Any planning method shall accommodate the use of multi-administration networks on the basis of equality between them and other national and international requirements.

Any method must take account of specific technical constraints applying to the design of multi-administration systems in order to enable them to continue to meet the evolving requirements of administrations for international services as well as in many cases for domestic services.

Flexibility

Any planning method should provide means to accommodate unforeseen requirements and modification of requirements of administrations. It should also be capable of accommodating advances in technology and do not prevent the use of technologies which are well proven and widely available.

Different planning solutions in different circumstances

A world-wide planning solution would be the most suitable, but the possibility of having different planning methods for different regions, frequency bands or orbital arcs shall not be excluded. In this case, the planning would be done at the same World Conference.

F.S.C. PINHEIRO
Chairman of Working Group 5A

WORKING GROUP 5A

Note from Chairman of Working Group 5A

PLANNING PRINCIPLES

Guarantee of access and equitability

To guarantee in practice for all countries equitable access to the geostationary satellite orbit and the frequency bands allocated to the space services utilizing it, taking into account the special needs of developing countries and the geographical situation of particular countries.

Sharing with other services

Where frequency bands allocated to one space service using the geostationary satellite orbit are also allocated to other space services and/or to terrestrial services on an equal primary basis any planning methods adopted must fully respect the equality of rights to operate in these bands. Therefore, any planning method and associated regulations must not impose additional constraints on terrestrial services sharing the band on an equal basis.

[Any planning method and associated regulations for a given space service and band must take into account restrictions which are imposed by or on other space services sharing the band with equality of rights.]

[Any planning method adopted by the Conference for a space service can only be applied to the bands which are allocated to the planned service as the sole primary space service.]

Reservation of resources

The planning method should consider the full orbit/spectrum resource. The possibility of setting aside portions of the resources to accommodate unforeseen requirements and requirements of future members of the Union shall be considered after all requirements are satisfied.

[The equatorial states shall preserve the corresponding segments of the geostationary orbit superjacent to their territories for the opportune and appropriate utilization of the orbit by all states, particularly the developing countries.]

[Any planning approach must be consistent with the universally accepted principle, that administrations or groups of administrations are not entitled to permanent priority in the use of particular frequencies and GSO positions in such a way as to foreclose access by other administrations to the GSO and frequency bands allocated to space services.]



Special geographical situations

Any planning method should take into account the relevant technical aspects of the special geographical situation of particular countries.

Consideration of existing systems

Any planning method shall take into account the existing systems. If necessary, these systems shall be subjected to some adjustments to allow for the accommodation of new systems. The degree of adjustment to which a system would be subjected would depend upon the development of the system.

Different planning solutions in different circumstances

Although a world-wide planning solution would be the most suitable, the possibility of having different planning methods for different regions, frequency bands or orbital arcs may be more efficient and shall not be excluded. In this case, the planning would be done at the same world conference.

F.S.C. PINHEIRO
Chairman of Working Group 5A

Source: Document DL/26(Rev.1)

WORKING GROUP 4A

DRAFT RESOLUTION/RECOMMENDATION*

**Satellite sound broadcasting systems for individual
reception by portable and automobile receivers**

The World Administrative Radio Conference on the Use of the
Geostationary Orbit and the Planning of the Space Services Utilizing It (first
session, Geneva 1985),

considering

1. that the World Administrative Radio Conference, Geneva 1979, adopted Resolution No. 505;
2. that satellite sound broadcasting is technically feasible;
3. that several administrations made proposals to WARC 79 concerning frequency band allocations for broadcasting-satellite service (sound) in the range 0.5 - 2 GHz;
4. that the CCIR at its Conference Preparatory Meeting in June-July 1984 indicated that further work would be needed to define the system parameters;
5. that studies of the CCIR up to now found that, due to sharing problems, the implementation of such a service will not be possible in the band 0.5 - 2 GHz unless an appropriate frequency band is allocated for it on an exclusive basis;
6. that at the first session of this Conference studies were not far enough advanced to make a Recommendation for any long term solution;
7. that a number of administrations have expressed the view at WARC-ORB 85 that there is a future need for a broadcasting-satellite service (sound);

is of the opinion

- a) that due to the existing situation it is not possible to allocate in the band 0.5 - 2 GHz an exclusive band to the broadcasting-satellite service (sound) on a world-wide basis now;
- b) that an allocation to the broadcasting-satellite service (sound) can possibly only be found in the longer term;

* This text has been prepared to be either a Resolution or a Recommendation. It is recognized that this document may not persist as an independent text and that it might be incorporated into other composite output documents.

resolves/recommends

1. that administrations shall be encouraged to carry out studies on the following subjects: quality of signal, frequency of operation (0.5 - 2 GHz approximately as a guideline), modulation type, digital systems, bandwidth required, receivers, antenna designs, geographical sharing, feeder links, appropriate sharing criteria and costs; and should be guided by the information given in Chapter ZZ.3 and the associated annex of the report of this conference;
2. that the second session of this Conference should consider the results of the various up-to-date studies and in reviewing the situation prevailing at that time take appropriate decisions regarding the allocation of a suitable frequency band;

requests

the Administrative Council to include this Resolution/Recommendation in the agenda for the second session of the Conference which is envisaged for 1988;

invites the CCIR

to undertake studies as indicated in resolves/recommends 2 in order to define the practical system parameters for satellite sound broadcasting.

E.F. MILLER
Chairman of Working Group 4A

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/64-E
30 August 1985
Original: English

WORKING GROUP 6A

FINAL REPORT OF SUB-WORKING GROUP 6A-1 TO WORKING GROUP 6A

Sub-Working Group 6A-1 held its last meeting on 28 August.

The Sub-Working Group did not complete its mandate but agreed, in order to save time, to put before Working Group 6A directly Document 191 on the sharing between the BSS in Region 2 and the terrestrial services in Regions 1 and 3.

The criteria used in this analysis were derived from Document DT/46(Rev.2) as agreed by the Sub-Working Group. It was noted that the French text of DT/46(Rev.2) needed to be aligned with the English text.

Turning to the problem of the incompatibilities between the Region 2 BSS and the FSS services in Regions 1 and 3, the Sub-Working Group noted that informal discussions were ongoing and an ad hoc Group was set up to prepare a document on this subject.

The Sub-Working Group agreed that this ad hoc Group should report directly to Working Group 6A.

After an examination of the energy dispersal requirements within the Region 2 plan in Document 167, the Sub-Working Group agreed that 22 dB energy dispersal will be used universally within the Region 2 plan and Working Group 6A is requested to ask Sub-Working Group 6A-2 to include this as appropriate within their considerations.

G.H. RAILTON
Chairman of Sub-Working Group 6A-1

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

Document DT/65-E

29 August 1985

Original: French

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Source: Document 174

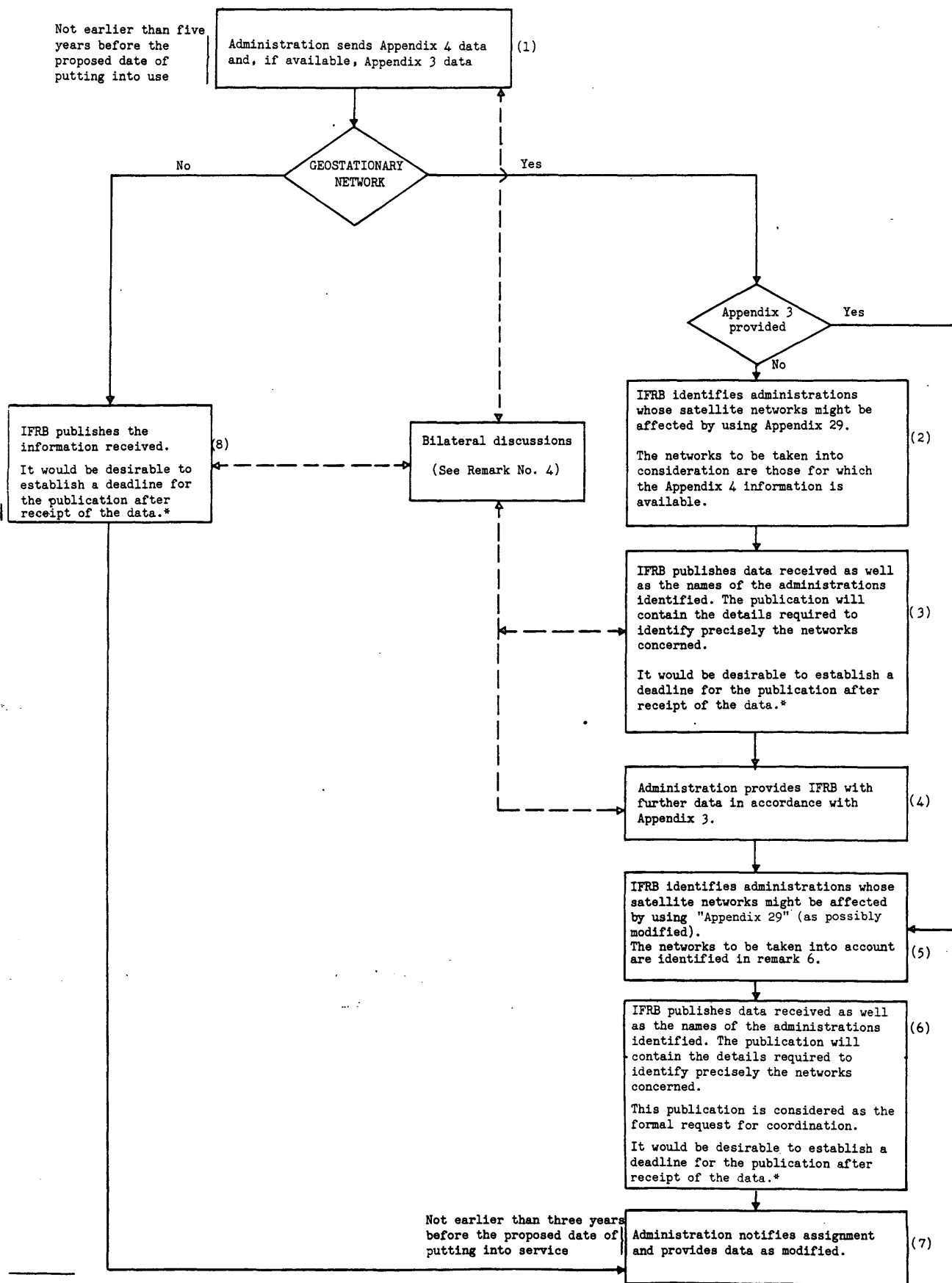
WORKING GROUP 5B

Draft

REPORT OF SUB-WORKING GROUP 5B-2 TO WORKING GROUP 5B

POSSIBLE MODIFICATION OF SECTIONS I AND II OF ARTICLE 11

The possible modifications to Sections I and II of Article 11 have been considered by Sub-Working Group 5B-2 and are submitted to Working Group 5B.



REMARKS

1. Appendices 3 and 4 are merged in order to avoid duplication of information: Appendix 4 would be the first section of Appendix 3. The second section would contain the necessary information required to carry out detailed and precise calculations.
2. The coordination procedure should be carried out on the basis of a satellite network and not for each frequency assignment.

The coordination of an earth station will only be required when its characteristics exceed those taken into account in the coordination procedure.
3. Only one special section is published per satellite network. It will be updated, if necessary, as the definition of the characteristics becomes more precise.
4. Bilateral discussions at the Advance Publication stage are presently covered by RR1047 to RR1053. These provisions do not specify which existing and planned services should be taken into account: the second session should consider these provisions and modify them if so decided. The second session should also be requested to provide for the assistance the IFRB may give in the framework of the Advance Publication (RR1054).
5. An "improved Appendix 29" (to be used in box (5)) may permit identification of the networks affected with more precision, and so reduce the number of cases where coordination is required.
6. /When an administration communicates Appendix 4 and Appendix 3 information at the same time, they may be published at the same time: the first (Appendix 4) shall be considered as the Advance Publication, the second (Appendix 3) shall be considered as the request for coordination.]

The satellite networks to be taken into account in box 5 are:

 - any satellite network for which at least one assignment is recorded in the Master Register;
 - any satellite network, the detailed characteristics of which (Appendix 3), have been received by the IFRB. However, when this information is received by the Board at the same time as the Appendix 4 information, as well as in cases where the Board receives this information less than six months after the date of the Advance Publication, the satellite network will be taken into account only at the expiry of this period of six months.
- 6A. An administration may request that it be included in the coordination process if it decides that due to the technical characteristics of a satellite network /in a given service/ that network will limit or render difficult its future access to the orbit/spectrum resource for the introduction of a similar service in its country.

7. The second session of the WARC-ORB-85 should consider how to treat the amendments to the initial characteristics communicated under the Advance Publication or the Coordination procedures.

J.L. BLANC
Chairman of Sub-Working Group 5B-2

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

Document DT/66-E

30 August 1985

Original: English

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Source: DL/29, DL/31, DL/34

WORKING GROUP 4C

SECOND BATCH OF OUTPUT ELEMENTS ON SHARING WITHIN THE FSS

Document DT/43 contains the text of four elements agreed in Working Group 4C around 20 August, on a provisional basis pending review when Committee 5 has come to decisions of principle. The present document contains three more elements, agreed on the same basis on 29-30 August, on the following subjects:

- 1) harmonization;
- 2) the problem of global coverage and narrow service arcs;
- 3) generalized parameters.

The following documents have been taken into account in developing these texts.

Document 3 (CPM Report)
Document 5 (USA)
Document 9 (USSR)
Document 10 (Spain)
Document 12 (France)
Document 18 (UK)
Document 21 (Netherlands)
Document 25 (China)
Document 26 (China)
Document 30 (USA)

Document 31 (FRG)
Document 33 (Sweden)
Document 37 (Brazil)
Document 54 (India)
Document 75 (Algeria)
Document 76 (France)
Document 88 (USA)
Document 114 (USA)
Document 145 (Canada)
Document 157 (Japan)

D.J. WITHERS
Chairman of Working Group 4C

Annexes: 3

ANNEX 1

Harmonization

1. Introduction

The purpose of the harmonization phase is to identify and resolve system interactions according to some agreed technical and operational criteria. This phase is particularly important when apparent conflicts are noted in the identification phase. During the harmonization phase, the agreed threshold for identifying potential interference among systems is applied, followed by a process of harmonizing any incompatibilities.

The following is a description of the technical background of the present frequency and orbit coordination procedure. Measures are described that permit effective harmonization of interfering networks which use adjacent or nearby orbital locations.

2. Present coordination procedure from a technical viewpoint

2.1 The technical basis for coordination within the FSS

The regulation of interference arising from sharing between fixed-satellite networks, without degrading the performance of circuits below recommended objectives, is achieved in the following way:

- a hypothetical reference circuit (HRC) or its equivalent is defined;
- a maximum level of total degradations from all sources is determined for that circuit;
- some fraction of that level of degradation is allocated to interference from all other networks of the FSS: this is called "permissible interference";
- some fraction of the total permissible interference is recommended to be the level of interference which a network should permit from any other network. This is called the "single-entry" value;
- frequency coordination is used to make sure that the single-entry limit is not exceeded, the relationship between the single-entry value and the total permissible entry having been chosen so that the aggregate of single entries will not exceed the recommended total value.

HRCs are defined for various types of circuits (analogue, digital, voice, TV) in the relevant CCIR Recommendations. For these HRCs specific allowances for the permissible interference levels have been established. To cite only one example, Recommendation 353-4 (MOD I) recommends that the noise power in any telephone channel in an FDM-FM system conforming to the HRC defined in Recommendation 352-4 shall not exceed 10 000 pWOp for more than 20% of any month. Recommendation 466-3 (MOD I) recommends that the noise level in such a circuit due to interference from other fixed-satellite networks should not exceed 2 000 pWOp under the same conditions. Exceptionally, the maximum level of permissible interference should be reduced to 1 000 pWOp for networks which had already reached the planning stage by 1978. The corresponding recommended maximum levels of interference entering from any single network are 600 pWOp and 400 pWOp respectively.

Considerable attention continues to be given to the question of what constitutes an acceptable level of interference. The gain of earth and space-station antennas decreases with increasing angle off the direction of maximum gain. These antenna characteristics may be the only source of isolation between networks, in which case there is an inverse relationship between the interference level and the separation angles. Thus, the greater the permissible interference between two networks serving the same or adjacent areas on the Earth's surface, the smaller can be the orbital separation between the space stations of the two networks. Similarly, the greater the permissible interference between two networks whose space stations are in approximately the same orbit location and serve different areas on the Earth's surface through narrow-beam antenna, the closer can those service areas be to each other, and the greater the number of times that the frequency band can be reused in different parts of the world.

The total interference in a network of the FSS, or other services which make use of large numbers of satellites, is due to contributions from many other networks. The question arises of how to determine all the individual entries so that their cumulative total does not materially exceed the level that the network has been designed to be capable of accommodating. The answer depends on the method used for coordinating or planning the use of the spectrum and the orbit.

The Radio Regulations, Article 13 requires the characteristics of all new or modified satellite networks to be coordinated bilaterally with all other networks if the test of need to coordinate set out in the Radio Regulations, Appendix 29, gives an affirmative result. This process of bilateral coordination allows the worst-case single-entry interference level between the subject network and each of the other networks to be constrained to a pre-determined value. The ratio between the total permissible interference level and the maximum single-entry value must be chosen so that the latter is as large as it may be without permitting the aggregate of all the single entries to exceed the former under worst-case conditions.

2.2 Interference calculations in the Advanced Publication and Coordination phase of the present Radio Regulations

The interference calculations in the "Advanced Publication phase" follow Appendix 29 and are based on the data about the published satellite network as contained in Appendix 4. Due to the general nature of these data, the calculated result is not very specific, although the calculations themselves tend to be laborious if they have to be done for many networks.

The calculation gives the relative increase in the equivalent noise temperature $\Delta T/T$ of the interfered with satellite network. If the $\Delta T/T$ exceeds the threshold value of 4%, then it is assumed, under the present Radio Regulations, that the permissible interference may be exceeded and the need for coordination is established.

In some cases administrations can assess at this stage the actual interference situation by exchanging additional data. Normally, however, this assessment will be made in the "coordination phase" when the more detailed data of Appendix 3 are available. In addition to the $\Delta T/T$ values the actual interference levels caused by the carriers of the two networks can now be calculated.

It is obvious that the proper values of the $\Delta T/T$ threshold and the permissible single-entry interference values in relation to the aggregate interference values, along with the calculation methods itself are of crucial importance for the current coordination process. Possible improvements will be discussed in paragraph 3.1.5 and section 4.

3. Technical measures for optimizing orbit/spectrum occupation

For the sake of clarity these measures are subdivided into two subsets, namely individual technical elements and methods to combine those elements.

3.1 Individual technical measures

Five technical measures are listed below; the list is not exhaustive. The preferred approach in any specific case will depend greatly upon the circumstances.

3.1.1 Flexibility in the positioning of satellites

Changes in the positions of existing satellites and in the proposed positions of new satellites can be an important way of harmonizing different satellite networks, because it can make use of the large differences in the gain in the radiation patterns of earth station antennas. The problems of implementing changes in satellite locations, particularly for satellites which are already in service, are considered in sections and

3.1.2 Adjustment of carrier parameters

When a relatively small proportion of carriers in a network suffer excessive interference, it may be feasible to reduce that interference to the recommended level without an unacceptable loss of the satellite capacity by increasing the carrier power or, in digital systems, by using error correction. In cases where interference from terrestrial stations or from other satellite networks is likely to be small, an interference entry in excess of the recommended value may be accepted without exceeding total interference limits. Alternatively it may be feasible to reduce circuit noise or bit errors arising within the wanted network from other causes, by error correction or increase of FM deviation and carrier power, so that a higher single interference entry does not cause failure to achieve the circuit performance standards. It may be feasible to reduce substantially interference entering a network at an earth-station receiver by means of an interference canceller. This latter technique, however, requires further study, especially as to its applicability to multiple or broadband interference carriers.

3.1.3 Spectrum segmentation to reduce spectrum overlap and inhomogeneity

It may sometimes be found when two networks are being coordinated that the interference criteria cannot be met over the whole frequency band. If so, then it may be necessary to consider segmenting the frequency band and thereby facilitating the coordination of more homogeneous bandwidth segments. Particular attention should first be given to interference from emissions with high spectral power density, such as FM television.

Carrier frequency interleaving could be one means to facilitate coordination. The extent to which closer satellite spacing and improved orbit/spectrum utilization may be achieved by interleaving the carrier frequencies of one satellite with those of a neighbouring satellite is critically dependent on the type of modulation (e.g., FM or PSK) and the multiple-access technique (e.g., single carrier or FDMA) applied to the wanted and interfering carriers. For the case of frequency-modulated FDM telephony an

improvement in required carrier-to-interference ratio is obtained when interleaved carrier frequencies are used. The improvement is found to be up to about 12 dB, depending upon the modulation indices. Little improvement in satellite spacing requirements is to be obtained by interleaving digital signals. Sharing can frequently be facilitated by the use of carrier energy dispersal. However, in the case of FM TV interference into SCPC it may be necessary to trade off the dispersal bandwidth with potential loss of transponder capacity in order to optimize the separation between satellites. Carrier energy dispersal may sometimes increase interference between interleaved FDM/FM carriers.

Another approach which holds considerable promise has been designated by the term "spectrum segmentation". Spectrum segmentation is based on the fact that high spectral density carriers like TV-FM and high-capacity FDM-FM cause higher interference to carriers such as SCPC and low-capacity FDM-FM, as compared to other similar types of carriers. The use of the same frequency by high-density and low-capacity carriers in two potentially interfering networks produces inhomogeneity and leads to a relatively large intersatellite spacing requirement. Efficiency of use of the GSO could be improved if frequencies of high density and low-capacity carriers could be segregated, particularly for TV-FM and SCPC carriers.

Frequency band segmentation can be achieved by various means. One approach could be called macro-segmentation, where frequency bands are segmented into large blocks typically many transponder widths wide. In contrast to this, micro-segmentation would be based on small blocks typically the width of a transponder or less. Still another way to achieve (flexible) segmentation would be first to define the two edges of a frequency band and then place TV carriers from one edge of the band onwards and SCPC carriers from the other end onwards in the reverse direction.

At this stage it is not yet possible to visualize how spectrum segmentation should be best implemented.

One item that has to be considered are the needs of international systems with their special traffic patterns. Also assumptions about the size of future network populations might be necessary before reaching any conclusions. Future studies in this area should therefore give careful consideration to each band situation to determine whether rules should have mandatory force or should have more the status of recommendations, guidelines or preferences.

In principle, spectrum segmentation, if flexibly applied, is clearly desirable. However, intersessional studies are recommended to identify the potential benefits of spectrum segmentation and the way in which they may be best achieved.

3.1.4 Improvements in satellite and earth station antenna radiation pattern

One potentially important way of improving the efficiency of the utilization of the GSO is by improving antenna radiation patterns. Therefore, in principle, recommendations on their performance characteristics should be as stringent as necessary and practicable.

3.1.5 Acceptance of higher interference values

The interference to be accepted by administrations is defined in the relevant CCIR Recommendations. The impact of the growing number of satellites in the GSO on interference can be divided into two phases.

In the first phase existing satellite networks may have to accept higher interference levels than they presently have. This is a part of the burden-sharing approach described in § 3.2.3 and Harmonization M3 mentioned in § 3.2.2.

Since the recommended CCIR values have a bearing on the number of satellites that can be accommodated, the CCIR undertakes studies in this area for the second phase. It is for example estimated that an increase in the permissible interference level in FDM-FM networks from 2 000 pWOp to 2 500 pWOp would allow the separation of satellites used solely in that mode to be usefully reduced.

There are, however, also disadvantages:

- the extent of the loss by the system operator of control of the performance of the system is substantial;
- interference takes various forms and may lead to degradations of types not simply constrainable by a bound on channel noise power; for example, impulsive interference might develop;
- the capacity of the satellites is reduced if their characteristics remain unchanged;
- the feasibility of a large measure of frequency reuse within a satellite network, which may be in itself a very powerful method of increasing the efficiency of use of orbit spectrum, is reduced by the presence of so much external interference.

In view of the potential benefits, intersessional studies on interference levels, including the relationship between single-entry value and aggregate value, are recommended. These studies should also take into account that the implementation of modified values has to be time-phased and that the relevant CCITT circuit quality objectives have to be met.

3.2 Methods to make combined use of these technical measures

3.2.1 Computer programs

The main functions of computer optimization is, ideally, to find the best satellite orbital positions, satellite beam shapes and frequency assignments. Several computer programs (e.g. Orbit II, CAP-N, SOAP) exist already which individually do not yet fulfil the overall requirements. Furthermore, the basic parameters to be used in the optimization process need defining.

The assumptions made for these computational aids depend to some degree on the studies to be carried out concerning the technical measures, described in the previous paragraphs, such as beam pattern, frequency plans and spectrum segmentation.

While it is recognized that the assumption of elliptical beams may simplify the computer calculations, it should also be kept in mind that antenna beam characteristics with a fast roll-off pattern result in better orbit utilization.

3.2.2 Harmonization M3

One example of how to combine some of the technical measures mentioned in § 3.1 is Harmonization M3. This method, as described in the CPM Report is based on "spectrum segmentation", "relocation of satellites" and the conceptual element of "equitable interference".

3.2.3 Equitable burden-sharing related to achieving harmonization

As already discussed, the various elements which relate to harmonization may present different technical and operational problems for actual implementation. These various elements can be conceived as a "burden" to be shared between existing and new networks.

The concept of burden-sharing includes the "equitable interference" and "relocation" aspects of Harmonization M3 together with additional technical and operational factors.

The penalty of burden-sharing depends to a large extent on the stages of communication satellite development. More as a starting point for further discussion than to prejudge later decisions the following stages could be considered.

Initial Concept and Design

A satellite system in this category has been sufficiently defined such that technical information is available to meet the data requirements of Appendix 4 to the Radio Regulations. This includes specifications of orbit location and frequency, and while the paper design may have been completed implementation has not begun.

Implementation

Typically it may take several years to implement a satellite system. This includes construction of the satellite up to, but not including, actual launch. Also during this time earth stations are designed and constructed and the system would have obtained regulatory recognition. Depending on the progress of the implementation programme there can be opportunities to make design changes to accommodate burden-sharing. Appendix 3 data on the system should be available.

Operation

At this stage the satellite system has been built, launched and is operating from a particular orbit location, with its associated earth segments. Many of the system design features are fixed, although there may be some built-in flexibility such as beam repointing, transponder gain settings, carrier frequency planning, etc.

Second generation satellite system

At the end of the useful life of a communication satellite, typically 10 years, it is likely to be replaced. At this time, there will be in place an extensive array of earth station users. Therefore, there are a number of transmission parameters which must be retained in order to preserve continued service. On the other hand, the opportunity does exist to incorporate design changes which can assist in burden-sharing. A second generation satellite thus has some of the characteristics of each of the three previous stages.

Technical and operational burdens such as satellite relocation, interference increase, earth station antenna side-lobe performance, spacecraft antenna side-lobe performance and traffic planning can be defined.

Conclusions

The potential value to the harmonization process could be better assessed if this concept of burden-sharing were studied in more detail to determine the extent of parameter adjustments (burdens) practicable over a period of time.

It is therefore recommended to include the concept of equitable burden-sharing in studies during the intersessional period.

4. Impact of threshold parameters used in the present coordination procedure (see § 2.2)

This section is intended to draw attention to the experience obtained with the present threshold parameters.

Experience has shown that in many cases the present threshold value of 4% for the $\Delta T/T$ criterion was too low. This has led to some unnecessary requests for coordination being initiated, posing an additional workload on administrations and the IFRB. It is also true that the calculations are very time consuming.

Some data in Appendix 4 are probably not very relevant for determining whether a request for coordination is necessary.

In addition, as already mentioned in previous paragraphs, there may be room for the acceptance of higher interference levels.

Studies concerning the technical aspects of coordination procedures are necessary.

- Were the present procedures, as far as their basic philosophy is concerned, to be maintained, then the following studies would be desirable from a technical point of view:
 - possibility of a higher $\Delta T/T$ threshold value, also taking into account that in future higher interference values may have to be accepted (see § 3.1.5);
 - development of simpler, though still accurate interference calculation methods.
- In recognition of the fact that the interference potential depends on the type of the respective interfering carriers, it would be conceivable to define for coordination calculation purposes, types of carriers identified by means of a standard classification. Depending on the combinations of these standard carriers more than one $\Delta T/T$ threshold value could be established. This might permit identification of the networks affected with more precision.

It is, however, apparent that this approach would necessitate having more data available than those contained in the present Appendix 4. Strict reliance on a variable $\Delta T/T$ approach could cause difficulties to late changes in the transponder plan.

For this kind of approach it would be desirable, from a technical viewpoint, to study what would be the benefit of several $\Delta T/T$ thresholds and what these values should be.

5. Summary and conclusion

The following list is a summary of individual elements of efficient harmonization considered in this section:

- flexibility in the positioning of satellites (§ 3.1.1);
- spectrum segmentation to reduce spectrum overlap and inhomogeneity (§ 3.1.3);
- improvement of satellite and earth station antenna radiation pattern (§ 3.1.4);
- acceptance of higher interference values (§ 3.1.5);
- computer programs (§ 3.2.1);
- Harmonization M3 (§ 3.2.2 together with 3.1.1, 3.1.3 and 3.1.5);
- the equitable burden-sharing concept (§ 3.2.3).

The status of present studies on these elements indicate their usefulness, and, although not at a sufficiently advanced stage to enable firm recommendations to be made, intersessional studies are clearly warranted.

ANNEX 2

The problem of global coverage and narrow service arcs

1. Introduction

Some telecommunications satellite systems are required to cover much or the whole of the visible portion of the Earth. Such applications include major international and regional systems, and perhaps also some national systems with dispersed or wide territories or population centres.

2. Satellite beams covering very large areas

Use of global beams by satellites is at present a common means of providing such coverage. However, from the standpoint of efficient orbit/spectrum use, global beams do not usually constitute the most satisfactory solution. Problems with them include inhomogeneity relative to systems using spot beams, and very wide potential coordination areas.

Further, the "arc of mutual visibility" as reduced by other constraints in an FSS system to the "service arc" is an absolute limitation on the choice of an orbital location if service is to be provided between any two earth stations at the extremities of the service area(s) and at a nominal minimum elevation angle of 3° at the Earth's surface (see RR 2550).

3. Application of inter-satellite links

Due to sharing constraints, some portions of the GSO may not be available for satellites used to provide fixed-satellite networks in global coverage or very large coverage area systems. A possible solution is the use of direct satellite-to-satellite relays. In this manner, a satellite serving earth stations widely dispersed in longitude, and therefore having an unavoidably short service arc, can be replaced by two satellites with direct interconnections, each with a long service arc, thus introducing much greater flexibility in the choice of an orbital location. The use of inter-satellite links (ISLs), among other techniques, may facilitate coordination between global or large coverage area systems and domestic or small coverage area systems to the extent that they reduce inhomogeneity through reduced coverages and higher e.i.r.p.

The introduction of inter-satellite links, however, depends on technical and economic considerations and on the availability of a mature level of technology.

The technical feasibility of the use of inter-satellite links has already been experimentally demonstrated. However, in the short to medium term, the use of ISLs to provide wide-area coverage is likely to carry a large implementation and economic penalty. As a result, the use of ISLs to reduce the need for global beams is not considered a practical option, at present, and thus does not warrant specific study during the inter-sessional period. In the long term ISLs may become economically attractive for some applications. Thus the continued study by the CCIR of their characteristics, advantages and penalties is warranted.

4. Conclusions

It is very desirable that global beams should be used only when strictly necessary, and with their use limited, as far as practicable, to a specified portion of the allocated band, thus facilitating spectrum harmonization. Studies and experiments should be conducted with a view to developing a more efficient system to replace this type of beam in the medium or long term.

The requirements of global and other satellite systems covering large areas, which are different from those of satellite systems covering only limited areas, must be given due consideration.

In summary, it is concluded that inter-satellite links will not offer a viable alternative to the use of global beams for at least the next 10 to 15 years for most applications. As a result, the continuing use of global beams is warranted and can be expected to continue for some considerable time, but their use should be employed to the minimum extent necessary.

ANNEX 3

Generalized parameters

1. Introduction

There have been various proposals for using generalized parameters to manage the orbit/spectrum resource. This would provide the maximum in flexibility to the users with respect to meeting their requirements while, at the same time, providing for control of the interaction between networks. Specific proposals have also been made on particular sets of such parameters to accomplish this purpose.

Generalized parameters can be employed for several purposes:

- a) to provide network design guidelines containing the elements necessary to produce a certain level of orbit utilization efficiency while retaining degrees of flexibility for the network designer;
- b) to establish threshold conditions to identify the need for coordination;
- c) to expedite the resolution of some problems without the need for detailed examination during the coordination process.

Particular generalized parameters have been used in the past for very specific applications, for example delta-T for the coordination threshold. Others have been studied for the purpose of improving efficiency of orbit utilization through constraints, for example, the ABCD parameters. Still others can be, and have been, developed for particular application and include characteristic orbital spacing (COS), isolation and variants of the ABCD parameters.

Although there are a number of possibilities, it should be noted that all derive from the same basic interference relationships among the system characteristics. In their simplest form, each interference term is composed of the ratio of the interfering and wanted carrier e.i.r.p.s reduced by the discrimination available from earth station and spacecraft antennas and the absolute e.i.r.p. levels are not material to the level of interference. To minimize the interference the total discrimination should be maximized.

There are examples of the application of generalized parameters in existence, although not necessarily for the purpose contemplated here. They are usually contained in Recommendations of the CCIR and in Articles of the Radio Regulations. The parameters generally define one or more aspects of the interference environment which results from the simultaneous use of the same frequencies by systems of the same or different services. The particulars include power flux-density (pfd), e.i.r.p. density, and terms establishing the interference susceptibility of systems.

An important aspect in considering the use of such parameters is that associated with the objectives of a) in section 1 above. A given set of parameters can be improved or upgraded with time to permit greater orbit utilization to meet growing demand. Such improvements can be based on a specific technology effecting only one parameter, or can be more generally based on a need to establish an overall better orbit utilization which may be essential to permit accommodation of new networks in the future. Such improvements would likely carry additional constraints.

2. Generalized parameter specifics

2.1 Parameters A, B, C and D

The study of this particular set of parameters began in 1977 by Interim Working Party 4/1 of the CCIR.

The parameters, as defined in CCIR Report 453, are as follows:

- Parameter A: The maximum up-link e.i.r.p. per unit bandwidth in the direction of the geostationary-satellite orbit radiated at an angle θ to the axis of the main beam of the earth-station antenna.
- Parameter B: The up-link sensitivity, defined as the minimum interference spectral pfd at the geostationary-satellite orbit which corresponds to the recommended maximum single entry of interference in a channel.
- Parameter C: The maximum spectral pfd produced at the Earth's surface by the satellite emissions.
- Parameter D: The down-link sensitivity, defined as the minimum interference spectral pfd at the Earth's surface arriving at an angle θ to the direction of the wanted signal which corresponds to the recommended maximum single entry of interference in a channel.

Efforts to define prescribed values have not been successful primarily because of consequential constraints on systems and detailed study has been virtually abandoned in recent years.

A general observation on the ABCD parameters is they are not precise in characterizing actual interference, requiring some assumptions regarding actual individual transmission characteristics. In particular, A and C characterize the interference potential of transmissions only by the highest spectral density in a relatively narrow bandwidth while B and D reflect only the receiving system characteristics and not the specific characteristics of individual carriers. Two systems with the same ABCD parameters can therefore have widely different interference characteristics.

Parameter A is currently limited in the 6 GHz band by CCIR Recommendation 524, while parameter C is limited in various frequency bands in Article 28 of the Radio Regulations. Constrained in these ways, parameters A and B in combination will yield one value for satellite spacing while parameters C and D in combination will yield a different one unless specifically chosen to yield the same result. Both pairs are dependent upon the assumption of a

particular value of delta-T, for the up-link for A and B and for the down-link for C and D. This provides a degree of refinement not possible with the current delta-T concept, but requires that up- and down-link contributions to interference be known.

2.2 Variations on ABCD

A particular variation of the ABCD parameters involves modification to the parameters B and C to reflect their impact on the environment outside of the intended coverage while maintaining A and D in the usual form. While this appears to improve on some of the perceived shortcomings of the original ABCD set, the amount of study and detailed examination necessary to confirm this has not been done. The ability to establish realistic values for B and C in this variation also relies on appropriate definition of spacecraft antenna characteristics.

A second variation presented is nearly the same as the above except that A* is dependent upon the size of the service area, and B* and D* are not related to the single entry interference criterion, but to the aggregate interference level. This is aimed at the orbit congestion situation in which all systems are already at the aggregate limit or nearly so, and at this time the single entry has little meaning. This particular set would also require the definition of an appropriate bandwidth unit to be used that would likely be different from the one used with the original ABCD parameters.

Implementation in this particular situation is based on a simplified calculation of the aggregate C/I which would be used to support a planning exercise by specifying limits which take into account coverage and various reference parameters. It is also suggested that in an evolutionary environment, the values for A*, B*, C*, and D* would be those actually used by existing systems and would be used to optimize the satellite locations.

As in the general ABCD case, a number of limitations exist and the possibilities for particular constraints are present for each of the variants. For planning purposes, other series of generalized parameters could be prepared which might be more satisfactory, depending on the planning method chosen.

2.3 Isolation

Isolation between two networks may be defined as the C/I required for protection, normalized with respect to the necessary carrier-to-noise densities (C/N_0) of the two transmissions. This concept is derived from network parameters with the intent of establishing a high level of orbit efficiency as contained in the concept of "equivalent satellite spacing". The efficiency which can be expected or is needed can be identified with all of the network parameters which produce this limit. The presentation is in a form which separates those elements which can be standardized easily and those which cannot.

In this regard the isolation concept is considered to yield a precise measure of actual interference between carrier pairs and can be used with knowledge of only major network design characteristics. As a result, its general use as a criterion would result in systems which are sufficiently compatible that successful coordination is likely. In this sense, isolation also provides a realistic threshold for establishing need for coordination.

There would be a need to establish the relationship between isolation and C/I for actual coordination purposes.

2.4 Characteristics orbital spacing

The "Characteristic orbital spacing (COS)" of a network is defined as the minimum spacing required between a hypothetical series of identical satellites serving a given service area, with the satellites assumed to be spaced equally across the visible arc.

The approach would be to select a value for COS which would in turn reflect the technical characteristics for all interference parameters collectively. Alternatively, various parameters such as C/I or antenna patterns could be selected and the useable COS so defined.

In use, the actual spacing would be the COS reduced by the satellite antenna discrimination that might be obtained. The reduction factor is particularly simple to derive when off-axis e.i.r.p. density of the Earth and the space stations (parameters A and C of ABCD) are standardized or confined to a small range.

Another aspect is the possibility for checking the aggregate interference by adding only the actual separation angles for nominal cases.

The COS is in essence, a property of a given network. It applies whether or not in practice there are more than one satellite serving a given service area and it is readily quantifiable, without necessitating the detailed consideration of technical parameters, traffic types used, interference standards, etc. Due to its quantifiable nature, it can be readily standardized, and used as a basis for equitably defining any sharing scheme for the spectrum orbit resource.

3. Observations

A number of interesting possibilities have been considered and the following observations are made:

- 1) generalized parameters can be useful in technical management of the GSO regardless of specific planning approaches while providing some degree of flexibility;
- 2) they can also be useful in establishing coordination thresholds and resolution of some coordination problems. When use for this purpose is considered, particular attention would have to be paid to assessing the noise of the satellite link as a whole;

- 3) all of the particular approaches examined would appear to produce some constraints, although these constraints are applied to the general parameters which are made up of specific parameters. Some degree of variation is then possible for each constituent parameter;
 - 4) an area of particular concern that was identified are those parameters that may depend upon current practice in operational systems as it is expected they will result in a wide range of values to be accommodated;
 - 5) it is not possible at present to establish how well any of the particular approaches identified would achieve their stated objectives and further study of each is needed in the intersessional period.
-

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/67-E
31 August 1985
Original: English

Sources: DL/37, DL/38, DL/39

WORKING GROUP 4C

THIRD BATCH OF OUTPUT ELEMENTS ON SHARING WITHIN THE FSS

Two documents already distributed contain the text of seven elements agreed in Working Group 4C by mid-day on 30 August on a provisional basis pending review when Committee 5 has come to decisions of principle. The present document contains three more elements, agreed on the same basis in the afternoon of 30 August. They are on the following subjects:

- 1) the radiation pattern of earth station antennas;
- 2) accommodation of spare satellites in orbit;
- 3) elimination of sources of physical interference.

The following documents have been taken into account in developing these texts:

Document 3 (CPM Report)
Document 18 (United Kingdom)
Document 26 (China)
Document 71 (Colombia)
Document 82 (Malaysia, Singapore, Thailand)
Document 87 (Iraq)

D.J. WITHERS
Chairman of Working Group 4C

Annexes: 3

ANNEX 1

The radiation pattern of earth station antennas

The side-lobe radiation pattern of the earth-station antenna, more particularly in the first 10° from the principal axis and in the direction of the GSO, is one of the most important factors in determining the interference between systems using geostationary satellites. A reduction in side-lobe gain levels would reduce the minimum orbital separations required between satellites and increase the efficiency of utilization of the orbit significantly.

Technical improvements are being made in the design of these antennas, reducing side-lobe gain levels. The definition by the CCIR of recommended performance objectives for new antennas should lead to further improvements. In the course of time, the cost of high performance antennas will fall and their use should become more general. Nevertheless, the cost of earth station antennas is a major element in the economics of networks which use large numbers of small-diameter antennas with low traffic density, above all in dispersed territory situations and where centres of population are dispersed. Such situations are typical of the networks of developing countries, and it is important that the opportunity remains available for antennas of well-established, mature technology with low unit cost to be used in such networks.

The following earth station antenna radiation patterns should be assumed in determining any generalized performance criteria required during the first planning period.

- a) In frequency bands and orbital arcs where recognition is given to the special needs of the developing countries, the gain of the side-lobe peaks at an angle ϕ from the boresight direction will not exceed:

$$32 - 25 \log \phi \text{ dBi (where } \phi \text{ is between } 1^\circ \text{ and } 48^\circ)$$

and

$$-10 \text{ dBi (where } \phi \text{ is greater than } 48^\circ)$$

if the diameter of the main reflector is greater than 100 times the wavelength. For smaller antennas, performance should be related to the diameter/wavelength ratio, D/λ , such that the gain of the side-lobe peak will not exceed:

$$10 \log D/\lambda - 25 \log \phi \text{ dBi (where } \phi \text{ is between } \frac{100\lambda}{D} \text{ and } 48^\circ)$$

and

$$10 - 10 \log D/\lambda \text{ dBi (where } \phi \text{ is greater than } 48^\circ).$$

- b) In other frequency bands and orbital arcs, a more stringent standard should apply within the solid angle where unwanted radiation has the most serious effect on other networks. For antennas for which D/λ exceeds 150, it should be assumed that the gain of 90% of the side-lobe peaks within 3° of the geostationary-satellite orbit and for which $1^\circ \leq \phi \leq 20^\circ$ will not exceed

$$29 - 25 \log \phi \text{ dBi.}$$

The notes on the interpretation of "90% of the side-lobe peaks" in CCIR Recommendation 580 should be applied. In other directions, the assumptions given in a) above should be assumed in this case also.

The performance to be assumed for antennas smaller than 150λ needs to be determined in intersessional studies.

It is to be expected that many existing earth station antennas will not achieve the standard stated in b) above. However, it is foreseen that the generalized performance criteria to be developed for planning purposes will allow considerable flexibility in the way in which the criteria are met, permitting such antennas to remain in service. This should be verified when the criteria are under study.

From time to time, on occasions which might be related to Plenary Assemblies of the CCIR, the side-lobe gain assumptions used for determining planning criteria should be reviewed in the light of then-current CCIR Recommendations and the cost of equipment. The procedures for implementing these reviews should be included within the framework of any planning method suggested.

ANNEX 2

Accommodation of spare satellites in orbit

The provision of spare satellites in orbit reduces greatly the risk of serious loss of availability of satellite facilities due to spacecraft failures in service. Three situations commonly arise.

1. With appropriate telecommand and telemetry design, a spare satellite can be co-located with the operational satellite. In this case, the spare satellite does not increase the requirements of the system for orbit or spectrum.
2. Where a common spare satellite is used to protect services via two or more operational satellites which are close together in orbit, co-location of the spare satellite with any one of the operational satellites would not be satisfactory. For example, with that arrangement it would not be feasible to transfer services to the spare satellite from one of the operational satellites with which it was not normally co-located without first moving the spare satellite away from its nominal location and preferably to the location of the failed satellite. This would involve a long period of loss of service, a significant expenditure of thruster fuel and the possibility of interference with other satellites during the transit period. A common spare would have to occupy a planned or coordinated orbit location of its own, permitting rapid point-over from a failed satellite to the spare. This practice clearly increases the total orbit/spectrum occupancy of the system without a corresponding increase in the traffic carried.
3. However, it is currently usual for a spare satellite to carry pre-emptible traffic when it is not carrying traffic displaced from a failed satellite. A spare satellite which is used in this way needs its own orbit assignment, which increases the total orbit/spectrum occupancy of the system, but it increases the total traffic carried as well.

ANNEX 3

Elimination of sources of physical interference

In the geostationary-satellite orbit there is a risk of collision with active spacecraft and blockage of beams of operational satellites due to the presence of uncontrolled man-made objects. At present, the probability of such physical interference is very low, though the number of satellites is expected to increase over time. It is advisable therefore, to urge the CCIR to develop in the intersessional period a better understanding of this physical interference process leading to:

- an identification of the relevant factors of what is thought at present to be a theoretical problem;
- an evaluation of the risks that this phenomenon could present in the future, and
- a recommendation for a solution to the problem should the study results justify further action.

The second session of WARC-ORB is invited to review the progress of these CCIR studies.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/68-E
31 August 1985
Original: English

WORKING GROUP 5B

Note by the Chairman

RESOLUTION No. 4 OF WARC-79 AND OTHER RESOLUTIONS
RELATING TO SPACE SERVICES

1. Noting that section 3.9 of the IFRB Report (Document 4) indicates that experience to date is not sufficient to permit the value of Resolution No. 4 to be assessed, and further noting that notification of a long period of validity may put at a disadvantage assignments notified with a shorter period, it is suggested that this question merits further consideration in Working Group 5-B.
2. Other Resolutions relating to space services are drawn to the attention of this session of the Conference in section 3.2 of the IFRB Report (Document 4). It is suggested that Committee 5 should consider these as appropriate.

S.M. CHALLO
Chairman of Working Group 5B

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

Document DT/69(Rev.1)-E

4 September 1985

Original: English

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Source: DT/42, DT/68, DT/69 + Corr.1

WORKING GROUP 5B

Draft

FIRST REPORT OF WORKING GROUP 5B TO COMMITTEE 5

After eight meetings, Working Group 5B has concluded its consideration of procedures applicable to those bands and services which the first session of this Conference does not identify for planning (item 2 b) of the Working Group's terms of reference).

It was decided by the Working Group that simplified and/or improved procedures based on the existing regulatory provisions should be adopted.

A draft report to Committee 5 covering the decisions made in Working Group 5B is annexed. It is divided into five sections as follows:

Section I: Guidelines concerning Sections I and II of Article 11

Section II: Guidelines concerning Article 13

Section III: Guidelines concerning Article 14.

Section IV: Guidelines concerning Resolution No. 4 of WARC-79 and other Resolutions relating to space services.

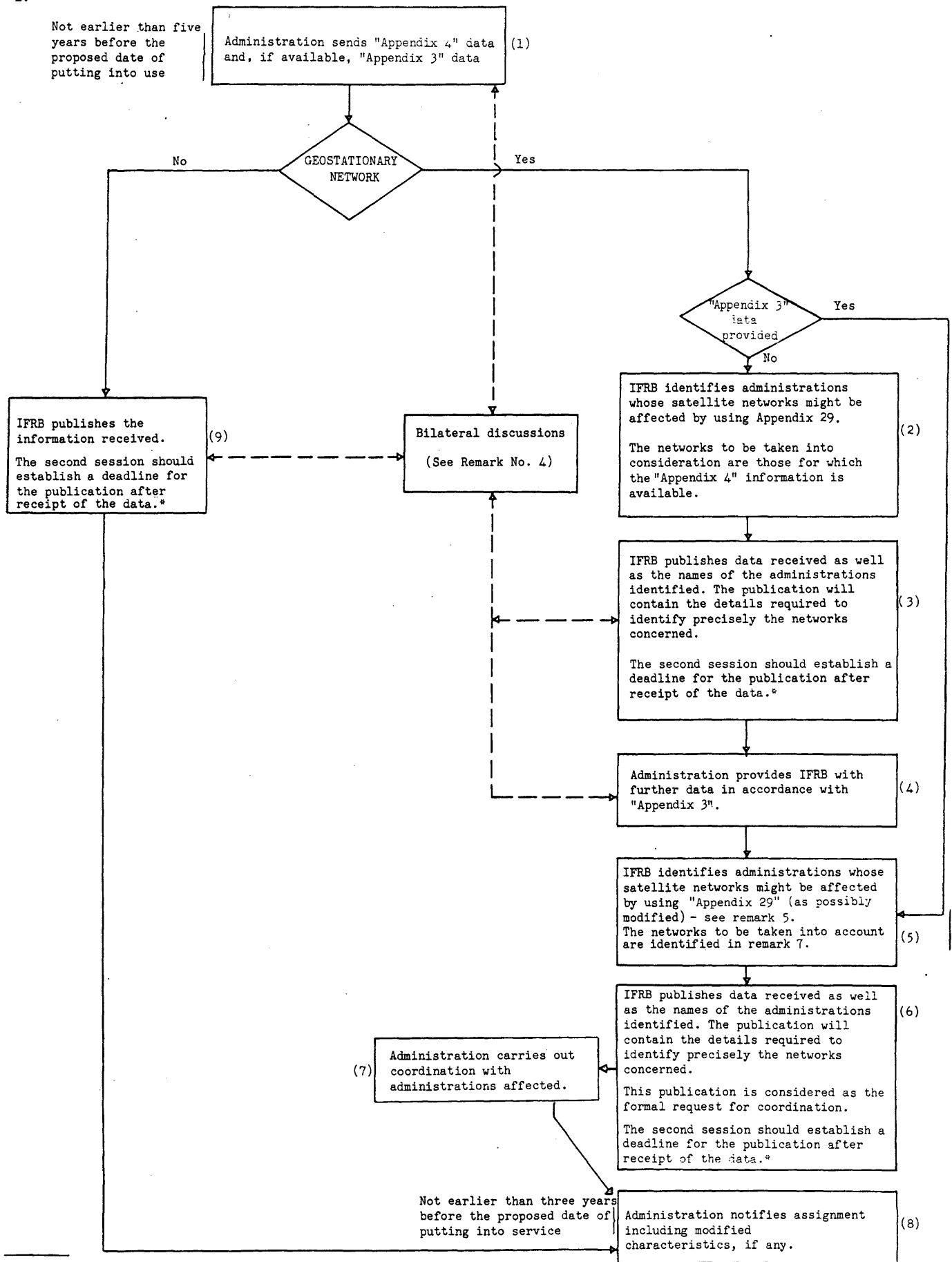
Section V: Concerning simplified Handbooks.

It should be noted that one administration has reserved the right to re-visit the questions of Section III, sub-sections 1.3 and 2.7.

S.M. CHALLO
Chairman of Working Group 5B

SECTION I: Guidelines concerning Sections I and II of Article 11

1.



* A period of six weeks was proposed.

Remarks relating to the flowchart

1. Appendices 3 and 4 are merged in order to avoid duplication of information. The first section of the merged appendix would contain the information required for Advance Publication (referred to as "Appendix 4" data); the second section would contain the information required to carry out detailed and precise calculations (referred to as "Appendix 3" data). The use of the merged Appendix in application of Article 14 should also be considered.

2. The coordination procedure should be carried out on the basis of a satellite network and between satellite networks and not on an assignment by assignment basis.

The coordination of an earth station with a space station will only be required when its characteristics exceed those taken into account in the coordination procedure (i.e. when application of "Appendix 29" shows coordination to be necessary).

3. Only one special section is published per satellite network. It will be updated, if necessary, as the definition of the characteristics becomes more precise.

4. Bilateral discussions at the Advance Publication stage are presently covered by RR 1047 to RR 1053. These provisions do not specify which existing and planned services should be taken into account: the second session should consider these provisions and modify them if so decided. The second session should also be requested to provide for the assistance the IFRB may give in the framework of the Advance Publication (RR 1054).

5. An "improved Appendix 29" (to be used in box (5)) may permit identification of the networks affected with more precision, and so reduce the number of cases where coordination is required.

6. When an administration communicates "Appendix 4" and "Appendix 3" data at the same time, they may be published at the same time: the first ("Appendix 4") shall be considered as the Advance Publication, the second ("Appendix 3") shall be considered as the request for coordination.

7. The satellite networks to be taken into account in box (5) are:

- any satellite network for which at least one assignment is recorded in the Master Register;
- any satellite network, the detailed characteristics of which ("Appendix 3" data) have been received by the IFRB. However, when this information is received by the Board at the same time as the "Appendix 4" information, as well as in cases where the Board receives this information less than six months after the date of the Advance Publication, the satellite network will be taken into account only at the expiry of this period of six months.

8. The second session of the Conference should [be requested] when reviewing Article 11 [to] retain the principle contained in RR 1080.

Note - The second session of the Conference should consider how to treat any modification to the characteristics communicated under the Advance Publication or the Coordination procedures.

2. Working Group 5B noted that a change of orbit location may lead to a situation where a given satellite may be afforded protection in more than one orbit location, thus causing difficulties for other administrations in the planning, coordination and notification of their space systems. It is recommended that the second session of this Conference should study the problem and make an appropriate decision on the matter, which may also concern Article 13.

3. The Working Group noted that in some instances different networks with overlapping time frames may be notified in a single orbit location by the same administration. This situation could lead to excessive coordination difficulties and inefficient use of the OSR. The second session should therefore consider this problem and take an appropriate decision on this matter.

Section II: Guidelines concerning Article 13

1. During discussion in Working Group 5B, concern was expressed over the Board's views on the difficulty of notification and registration of data at the network level as proposed by one administration as opposed to the assignment level as at present (Document 192 refers).

It was agreed that the present session should request the Board to prepare a report supplementing the information in Document 192 during the intersessional period and distribute it at the latest six months before the second session for the information and study of all administrations. The second session should consider this matter further.

2. It is recommended that the provisions of RR 1503 should be clarified to state expressly that examination of a notice shall include verification that the notified date of putting the assignment into use falls within the permitted period of time following the date of receipt by the IFRB of the advance information.

3. A draft Resolution concerning the application of Section VI of Article 13 is annexed hereto, relating to improvement of the accuracy of the records held by the IFRB and the information provided to administrations.

4. Working Group 5B, having noted the difficulties experienced by some administrations in the application of RR 1550, recommends that that provision should be modified to enable an extension of up to 18 months to be granted (instead of the present four months), and in exceptional circumstances to permit the IFRB to provide a further extension, taking into account Resolution No. 2, the justification provided by the administration, and any limit on the extension which may be imposed by the second session of this Conference.

Section III: Guidelines concerning Article 14*

1. Factors which need to be taken into account

1.1 The procedures of Article 14 must be applied to assignments of space and terrestrial services where a footnote of the Table of Frequency Allocations requires the application of that Article.

1.2 The first session of this Conference does not have the competence to effect any changes to the Table nor to any of the footnotes thereto, nor otherwise alter the status of the services concerned.

1.3 It has been noted that the precise interpretation of certain footnotes which refer to Article 14 is ambiguous or unclear. The Report of the IFRB (Document 4) was considered, and in accordance with the explanation given by the Board it was noted that the successful application of Article 14 to footnotes where the only condition is the application of that Article shall lead to primary status for assignments in that service. In this regard the assignments to stations of a space service under RR 747 and RR 750 shall be considered as primary on successful completion of the procedure, except however that the space-to-space assignments would operate on a non-interference basis (RR 435) only in relation to other space services.

1.4 It was noted that, as in the case of other assignments, the Board accepts notifications under RR 342 of assignments which are subject to application of the Article 14 procedure at any stage of the application of that procedure.

1.5 It was noted that administrations in their bilateral relationships may accord a status other than that prescribed in a footnote under which application of Article 14 is required, provided that the services of other administrations are not thereby affected.

1.6 In developing the guidelines given in section 2 below, the question of the application of the Article 14 procedure to the broadcasting-satellite service was not addressed.

2. Guidelines

The following guidelines are recommended for consideration by the second session and any intersessional work which may be scheduled.

2.1 The provisions of Article 14 as concerned with assignments to stations in space services should be reviewed and modified in such a way that they are applicable to a satellite network instead of individual assignments: therefore, the data requirements should be reviewed and specified accordingly.

2.2 The relevance of Article 14 to assignments for reception should be considered and clarified.

* It was noted that there may be consequential matters relevant to Articles 11 and 13 arising from the decisions of the second session concerning Article 14.

2.3 The procedure should include a means by which "affected administrations" are identified. During the intersessional period, administrations should review the technical standards adopted by the IFRB and, if necessary, propose alternative standards for consideration.

2.4 The procedure to be applied in unresolved cases of disagreement should be included in the Regulations. Objections to agreement under Article 14 must be based on valid technical grounds which demonstrate non-compatibility. It is noted that decisions of the Board have supported this principle (see Document 4, section 4.3.2.4). The second session should consider the matter of technical information to be supplied in such cases.

2.5 The meaning of the term "planned assignment" (RR 1617 and RR 1618) should be considered. It is suggested that assignments on which an objection has been based would normally be expected to be brought into use within a reasonable period (perhaps 5 years). It was concluded that such assignments should be notified to the IFRB in accordance with RR 1214 or RR 1488, as appropriate, in order to ensure that the objection raised on the basis of these assignments continues to be valid.

2.6 The question of modification to a network which has successfully completed the Article 14 procedure should be considered. The second session might decide that if the modification:

- for a transmitting station results in a reduction of potential interference, and
- for a receiving station, the administration accepts the probability of increased interference to its assignment,

then Article 14 need not be reapplied in respect of the modified network.

2.7 The second session should consider the matter of priority of dates (paragraph 4.3.2.3.1 of the IFRB Report refers). Radio Regulations should specify that an assignment which has successfully completed the Article 14 procedure is to be taken into account by an administration applying the procedure at a later date for an assignment which would achieve the same status after successful completion.

Section IV: Guidelines concerning Resolution No. 4 of WARC-79 and other Resolutions relating to space services

1. Noting that section 3.9 of the IFRB Report (Document 4) indicates that experience to date is not sufficient to permit the provisions of Resolution No. 4 to be fully assessed, and further noting that notification of a long period of validity may put at a disadvantage assignments notified with a shorter period, it was decided that this question merits further consideration by the second session, and the second session should take the necessary course of action in this regard.

2. Other Resolutions relating to space services are drawn to the attention of this session of the Conference in section 3.2 of the IFRB Report (Document 4). It is suggested that Committee 5 should consider these as appropriate.

Section V: Concerning simplified Handbooks

Working Group 5B decided that it would be preferable to consider the matter of simplified Handbooks at the second session of WARC-ORB after administrations have had time to consider the usefulness of the IFRB Handbook on Regulatory Procedures and in the light of changes made to the Radio Regulations as a result of the Final Acts of WARC-ORB (1988). Meantime documents prepared by the Board for its seminars may be circulated to administrations as a simplified description of the regulatory procedures.

Annex: 1

ANNEX

DRAFT RESOLUTION []

**Relating to Improvement of the Accuracy of the Records
Held by the IFRB and the Information Provided to Administrations**

The World Administrative Radio Conference on the Use of the
Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It
(First Session - Geneva, 1985),

considering

- a) that accurate and up-to-date information is required to enable the second session of this Conference to carry out its work effectively;
- b) the importance to administrations of an accurate and up-to-date record in the Master Register, the International Frequency List and List VIIA;
- c) that certain difficulties have been encountered by the IFRB in implementing the provisions of RR 1569;

resolves

- 1. that the IFRB shall apply the relevant provisions of Section VI of Article 13 in full;
- 2. that administrations be urged to implement the provisions of RR 1573 within the time limit prescribed therein;
- 3. that administrations be urged to cooperate fully in application of the provisions of RR 1570 and RR 1574;

invites the IFRB to prepare for the second session of this Conference a report on the application of this Resolution and to submit any recommendations it may deem to be appropriate.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Corrigendum 1 to
Document DT/69-E
2 September 1985
Original: English

WORKING GROUP 5B

Draft

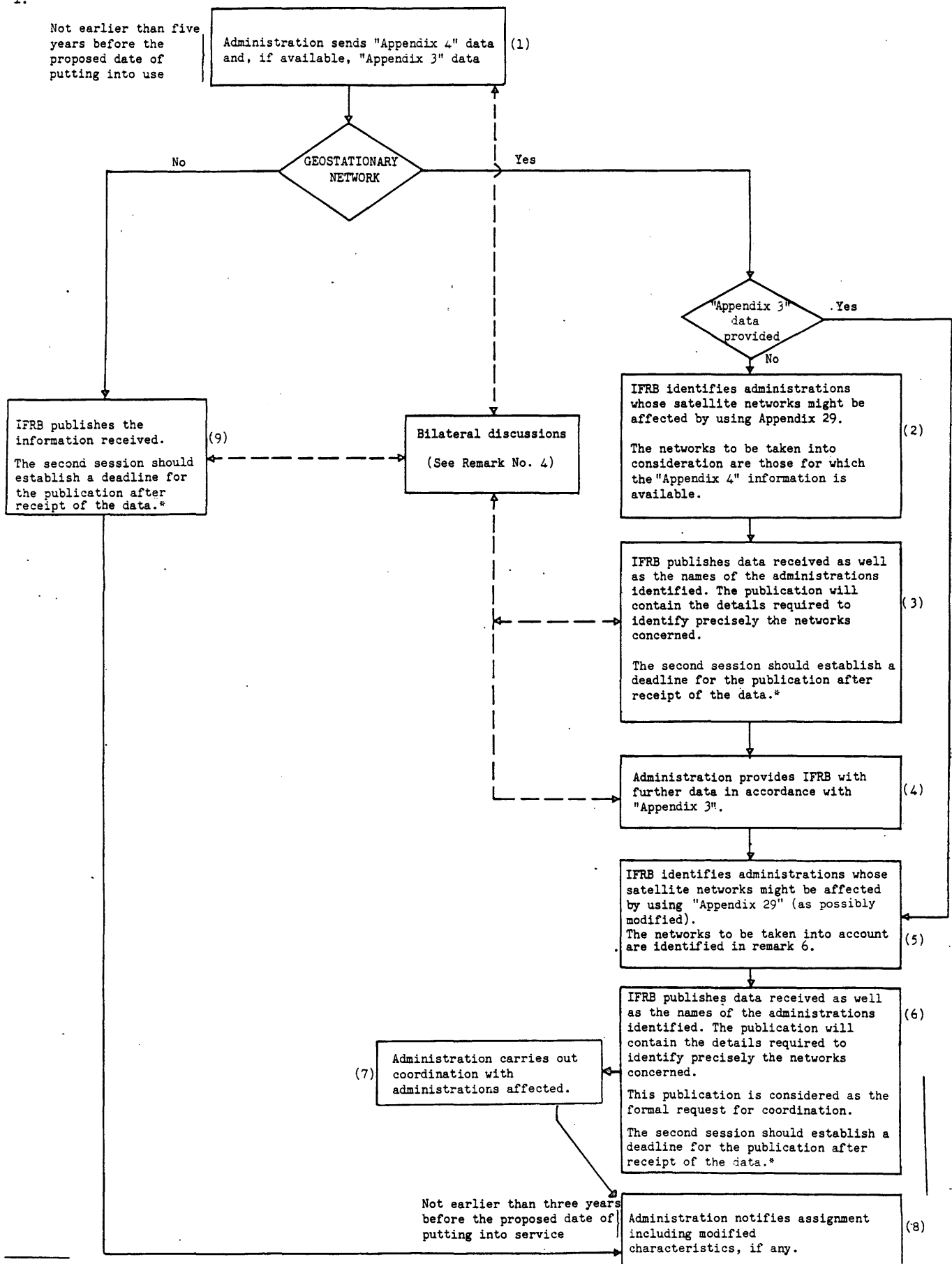
FIRST REPORT OF WORKING GROUP 5B TO COMMITTEE 5

Please replace pages 2 and 3 of Document DT/69 with the annexed corrected pages.

S.M. CHALLO
Chairman of Working Group 5B

SECTION I: Guidelines concerning Sections I and II of Article 11

1.



* A period of six weeks was proposed.

Remarks relating to the flowchart

1. Appendices 3 and 4 are merged in order to avoid duplication of information. The first section of the merged appendix would contain the information required for Advance Publication (referred to as "Appendix 4" data); the second section would contain the information required to carry out detailed and precise calculations (referred to as "Appendix 3" data). The use of the merged Appendix in application of Article 14 should also be considered.

2. The coordination procedure should be carried out on the basis of a satellite network and between satellite networks and not on an assignment by assignment basis.

The coordination of an earth station with a space station will only be required when its characteristics exceed those taken into account in the coordination procedure (i.e. when application of "Appendix 29" shows coordination to be necessary).

3. Only one special section is published per satellite network. It will be updated, if necessary, as the definition of the characteristics becomes more precise.

4. Bilateral discussions at the Advance Publication stage are presently covered by RR 1047 to RR 1053. These provisions do not specify which existing and planned services should be taken into account: the second session should consider these provisions and modify them if so decided. The second session should also be requested to provide for the assistance the IFRB may give in the framework of the Advance Publication (RR 1054).

5. An "improved Appendix 29" (to be used in box (5)) may permit identification of the networks affected with more precision, and so reduce the number of cases where coordination is required.

6. When an administration communicates "Appendix 4" and "Appendix 3" data at the same time, they may be published at the same time: the first ("Appendix 4") shall be considered as the Advance Publication, the second ("Appendix 3") shall be considered as the request for coordination.

The satellite networks to be taken into account in box (5) are:

- any satellite network for which at least one assignment is recorded in the Master Register;
- any satellite network, the detailed characteristics of which ("Appendix 3" data) have been received by the IFRB. However, when this information is received by the Board at the same time as the "Appendix 4" information, as well as in cases where the Board receives this information less than six months after the date of the Advance Publication, the satellite network will be taken into account only at the expiry of this period of six months.

Note - The second session of the Conference should consider how to treat any modification to the characteristics communicated under the Advance Publication or the Coordination procedures.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/69-E
31 August 1985
Original: English

Source: DT/55(Rev.1), DT/65

WORKING GROUP 5B

Draft

FIRST REPORT OF WORKING GROUP 5B TO COMMITTEE 5

After seven meetings, Working Group 5B has concluded its consideration of procedures applicable to those bands and services which the first session of this Conference does not identify for planning (item 2 b) of the Working Group's terms of reference).

It was decided by the Working Group that simplified and/or improved procedures based on the existing regulatory provisions should be adopted.

A draft report to Committee 5 covering the decisions made in Working Group 5B is annexed. It is divided into three sections as follows:

Section I: Guidelines concerning Sections I and II of Article 11

Section II: Guidelines concerning Article 13

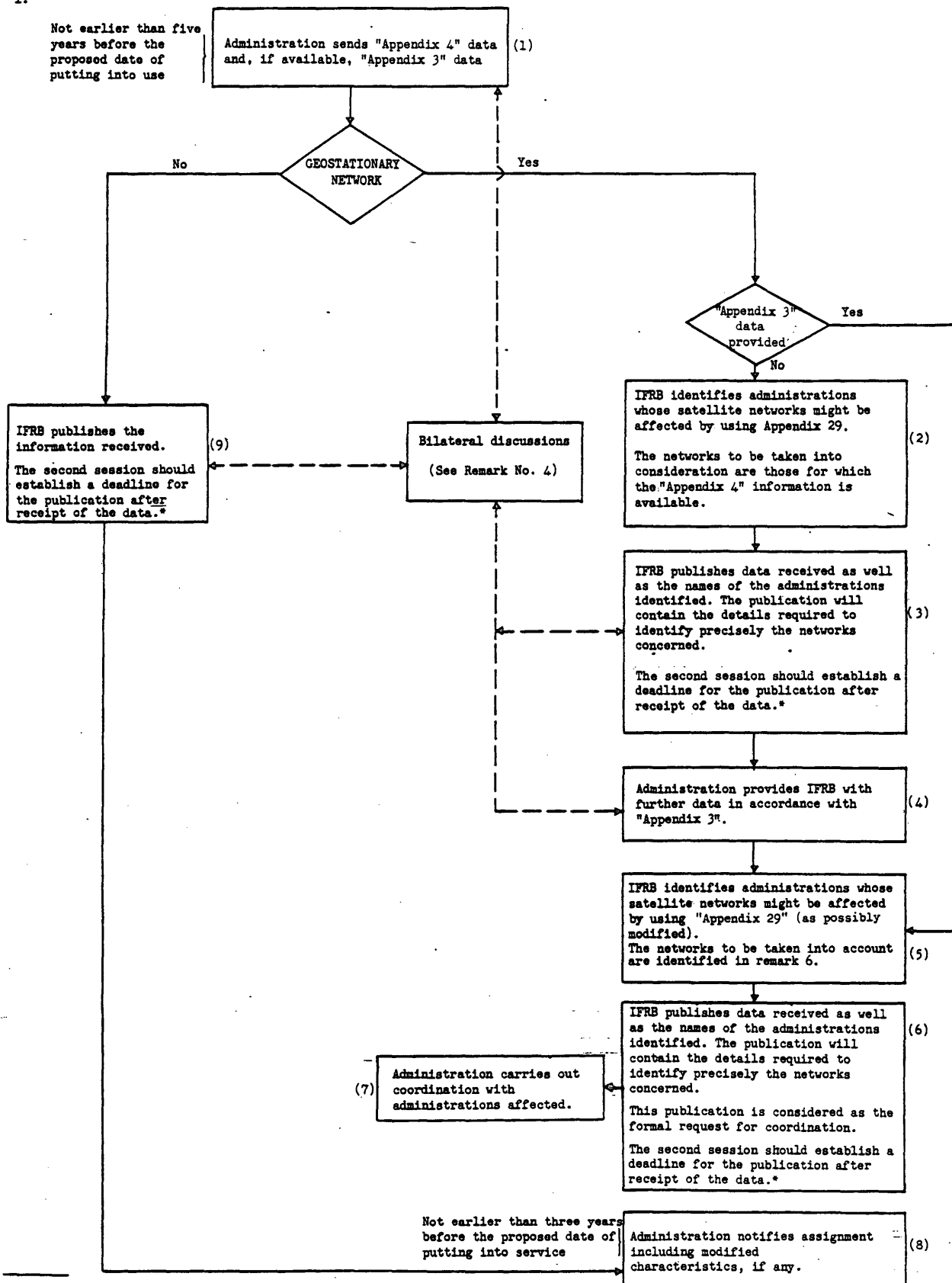
Section III: Guidelines concerning Article 14.

It should be noted that one administration has reserved the right to re-visit the questions of Section III, sub-sections 1.3 and 2.7.

S.M. CHALLO
Chairman of Working Group 5B

SECTION I: Guidelines concerning Sections I and II of Article 11

1.



* A period of six weeks was proposed.

Remarks

1. Appendices 3 and 4 are merged in order to avoid duplication of information. The first section of the merged appendix would contain the information required for Advance Publication: (referred to as "Appendix 4" data), the second session would contain the information required to carry out detailed and precise calculations (referred to as "Appendix 3" data). The use of the merged Appendix in application of Article 14 should also be considered.

2. The coordination procedure should be carried out on the basis of a satellite network and between satellite networks with a space station and not for each frequency assignment.

The coordination of an earth station will only be required when its characteristics exceed those taken into account in the coordination procedure (i.e. when application of "Appendix 29" shows coordination to be necessary).

3. Only one special section is published per satellite network, it will be updated, if necessary, as the definition of the characteristics becomes more precise.

4. Bilateral discussions at the Advance Publication stage are presently covered by RR 1047 to RR 1053. These provisions do not specify which existing and planned services should be taken into account: the second session should consider these provisions and modify them if so decided. The second session should also be requested to provide for the assistance the IFRB may give in the framework of the Advance Publication (RR 1054).

5. An "improved Appendix 29" (to be used in box (5)) may permit identification of the networks affected with more precision, and so reduce the number of cases where coordination is required.

6. When an administration communicates "Appendix 4" and "Appendix 3" data at the same time, they may be published at the same time: the first ("Appendix 4") shall be considered as the Advance Publication, the second ("Appendix 3") shall be considered as the request for coordination.

The satellite networks to be taken into account in box (5) are:

- any satellite network for which at least one assignment is recorded in the Master Register;
- any satellite network, the detailed characteristics of which ("Appendix 3" data) have been received by the IFRB. However, when this information is received by the Board at the same time as the "Appendix 4" information, as well as in cases where the Board receives this information less than six months after the date of the Advance Publication, the satellite network will be taken into account only at the expiry of this period of six months.

Note - The second session of the Conference should consider how to treat any modification to the characteristics communicated under the Advance Publication or the Coordination procedures.

2. Working Group 5B noted that a change of orbit location may lead to a situation where a given satellite may be afforded protection in more than one orbit location, thus causing difficulties for other administrations in the planning, coordination and notification of their space systems. It is recommended that the second session of this Conference should study the problem and make an appropriate decision on the matter, which may also concern Article 13.

Section II: Guidelines concerning Article 13

1. During discussion in Working Group 5B, concern was expressed over the Board's views on the difficulty of notification and registration of data at the network level as proposed by one administration as opposed to the assignment level as at present (Document 192 refers).

It was agreed that the present session should request the Board to prepare a report supplementing the information in Document 192 during the intersessional period and distribute it in due time for the information and study of all administrations. The second session should consider this matter further.

2. It is recommended that the provisions of RR 1503 should be clarified to state expressly that examination of a notice shall include verification that the notified date of putting the assignment into use falls within the permitted period of time following the date of receipt by the IFRB of the advance information.

3. A draft Resolution concerning the application of Section VI of Article 13 is annexed hereto, relating to improvement of the accuracy of the records held by the IFRB and the information provided to administrations.

4. Working Group 5B, having noted the difficulties experienced by some administrations in the application of RR 1550, recommends that that provision should be modified to enable an extension of up to 18 months to be granted (instead of the present four months), and in exceptional circumstances to permit the IFRB to provide a further extension, taking into account Resolution No. 2, the justification provided by the administration, and any limit on the extension which may be imposed by the second session of this Conference.

Section III: Guidelines concerning Article 14*

1. Factors which need to be taken into account

1.1 The procedure of Article 14 must be applied to assignments being made under different kinds of footnote allocations including the space and terrestrial services and in certain situations to allocations in the frame of the Table of Frequency Allocations (Article 8).

1.2 The first session of this Conference does not have the competence to effect any changes to the Table nor to any of the footnotes thereto, nor otherwise alter the status of the services concerned.

* It was noted that there may be consequential matters relevant to Articles 11 and 13 arising from the decisions of the second session concerning Article 14.

1.3 It has been noted that the precise interpretation of certain footnotes which refer to Article 14 is ambiguous or unclear. The Report of the IFRB (Document 4) was considered, and in accordance with the explanation given by the Board it was noted that the successful application of Article 14 to footnotes where the only condition is the application of that Article shall lead to primary status for assignments in that service. In this regard the assignments to stations of a space service under RR 747 and RR 750 shall be considered as primary on successful completion of the procedure, except however that the space-to-space assignments would operate on a non-interference basis (RR 435) only in relation to other space services.

1.4 It was noted that, as in the case of other assignments, the Board accepts notifications under RR 342 of assignments which are subject to application of the Article 14 procedure at any stage of the application of that procedure.

1.5 It was noted that administrations in their bilateral relationships may accord a status other than that prescribed in a footnote under which application of Article 14 is required, provided that the services of other administrations are not thereby affected.

1.6 In developing the guidelines given in section 2 below, the question of the application of the Article 14 procedure to the broadcasting-satellite service was not addressed.

2. Guidelines

The following guidelines are recommended for consideration by the second session and any intersessional work which may be scheduled.

2.1 The provisions of Article 14 as concerned with assignments to stations in space services should be reviewed and modified in such a way that they are applicable to a satellite network instead of individual assignments: therefore, the data requirements should be reviewed and specified accordingly.

2.2 The relevance of Article 14 to assignments for reception should be considered and clarified.

2.3 The procedure should include a means by which "affected administrations" are identified. During the intersessional period, administrations should review the technical standards adopted by the IFRB and, if necessary, propose alternative standards for consideration.

2.4 The procedure to be applied in unresolved cases of disagreement should be included in the Regulations. Objections to agreement under Article 14 must be based on valid technical grounds which demonstrate non-compatibility. It is noted that decisions of the Board have supported this principle (see Document 4, section 4.3.2.4). The second session should consider the matter of technical information to be supplied in such cases.

2.5 The meaning of the term "planned assignment" (RR 1617 and RR 1618) should be considered. It is suggested that assignments on which an objection has been based would normally be expected to be brought into use within a reasonable period (perhaps 5 years). It was concluded that such assignments should be notified to the IFRB in accordance with RR 1214 or RR 1488, as appropriate, in order to ensure that the objection raised on the basis of these assignments continues to be valid.

2.6 The question of modification to a network which has successfully completed the Article 14 procedure should be considered. The second session might decide that if the modification:

- for a transmitting station results in a reduction of potential interference, and
- for a receiving station, the administration accepts the probability of increased interference to its assignment,

then Article 14 need not be reapplied in respect of the modified network.

2.7 The second session should consider the matter of priority of dates (paragraph 4.3.2.3.1 of the IFRB Report refers). Radio Regulations should specify that an assignment which has successfully completed the Article 14 procedure is to be taken into account by an administration applying the procedure at a later date for an assignment which would achieve the same status after successful completion.

Annex: 1

ANNEX

DRAFT RESOLUTION []

**Relating to Improvement of the Accuracy of the Records
Held by the IFRB and the Information Provided to Administrations**

The World Administrative Radio Conference on the Use of the
Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It
(First Session - Geneva, 1985),

considering

- a) that accurate and up-to-date information is required to enable the second session of this Conference to carry out its work effectively;
- b) the importance to administrations of an accurate and up-to-date record in the Master Register, the International Frequency List and List VIIA;
- c) that certain difficulties have been encountered by the IFRB in implementing the provisions of RR 1569;

resolves

- 1. that the IFRB shall apply the relevant provisions of Section VI of Article 13 in full;
- 2. that administrations be urged to implement the provisions of RR 1573 within the time limit prescribed therein;
- 3. that administrations be urged to cooperate fully in application of the provisions of RR 1570 and RR 1574;

invites the IFRB to prepare for the second session of this Conference a report on the application of this Resolution and to submit any recommendations it may deem to be appropriate.

Document from the Chairman of Working Group 5A

ORGANIZATION OF WORK

This document is intended to identify the matters requiring decisions from Working Group 5A, to indicate the conclusions already reached on a provisional or final basis, and to propose means of reaching decisions for the remaining items.

The matters within the terms of reference of Working Group 5A may be grouped into the following four groups:

- Planning principles and questions of a general nature.
- Planning methods .
- Planning criteria.
- Questions relating to procedures.

1. PLANNING PRINCIPLES AND QUESTIONS OF A GENERAL NATURE

1.1 Having provisionally decided that the FSS is the only service to be considered for planning, Working Group 5A spent an important part of its past sessions in discussing proposed principles: some were considered as planning criteria or as being related to procedures and should be considered later in Working Group 5A or in Working Group 5B.

1.2 Questions of wider scope will be transferred to Committee 5.

2. PLANNING METHOD FOR THE FSS

Having considered in detail all the proposals and taking account of the discussions which took place in Working Group 5A, I reached the conclusion that the planning method that may result from the work of the Conference cannot be based exclusively on a single approach. A planning method consisting of two parts is presented below.

2.1 An allotment plan (that may be derived from proposals of administrations) shall permit each administration to satisfy requirements for national services from at least one orbital position, within a predetermined arc and predetermined band(s). A bandwidth specified by the Conference shall be associated with each such orbital position.

2.2 Improved procedures (that may be derived from proposals of administrations) shall satisfy requirements in addition to those appearing in the allotment plan. These procedures shall be applied in those parts of the planned bands / and arcs / which are not covered by the allotment plan.

3. Both parts of the planning method will need to conform to the planning principles provisionally adopted by Working Group 5A.

4. SHARING BETWEEN EQUAL PRIMARY SERVICES

The allotment plan must preserve the rights of other services having equal primary status in the bands to which this approach is to be applied. This will necessitate the adoption and application of appropriate sharing criteria.

5. The planning criteria for the allotment plan are contained in Annex 1. The planning criteria for the procedural approach are contained in Annex 2.

F.S.C. PINHEIRO
Chairman of Working Group 5A

Annexes: 3

ANNEX 1

Planning criteria for the allotment plan

1. SERVICE AREA

The allotment plan shall be limited to national systems providing domestic services. The procedures associated to this plan should contain provisions permitting administrations with adjacent territories to combine all or part of their allotments with the view to ensure a sub-regional service.

2. STANDARD PARAMETERS

The allotment plan shall be prepared on the basis of standard generalized parameters applicable to all allotments in the plan. Committee 4 should be requested to consider and define these parameters.

3. GUARANTEE OF ACCESS

All ITU Members shall have at least one allotment in the plan consisting in

- one orbital position in a predetermined arc;
- a minimum bandwidth within the band(s) defined in section 9.

In order to make the Plan more flexible, the associated procedures should make it possible to modify this orbital position within the limits of the predetermined arc and to define the conditions for such modifications. Committee 4 should be asked to consider this question.

4. PREDETERMINED ARC

The proposed planning refers to "a predetermined arc" as a means of increasing the flexibility of the allotment plan. The size of such an arc would require consideration by Committee 4 and, if necessary, may necessitate intersessional studies.

5. DURATION OF THE PLAN

The allotment plan is established for a period of 10 years. It shall be included as an integral part of the Radio Regulations and as such may be revised, if necessary, following the pertinent provisions of the Convention.

The WARC-ORB(2) shall be asked to adopt a resolution urging the Administrative Council when establishing the agenda for future reviewing conferences to ensure that an allotment in the plan is not removed without the agreement of the administration concerned.

6. MODIFICATIONS TO THE PLAN

Working Group 5B shall be requested to develop guidelines for:

- the procedures to be applied by administrations wishing to modify their allotments appearing in the plan; and
- simple procedures to be applied by administrations when bringing their allotment into use and so convert them into assignments.

7. ADDITIONAL USES

Working Group 5B shall be requested, to take account of the following criteria when establishing guidelines for the procedures to be applied to additional requirements in the bands covered by the allotment plan (see section 9).

An additional requirement in a band covered by the allotment Plan shall be accommodated to the extent that it will not introduce limitations to the bringing into use of an allotment in the plan except if agreed by the administrations concerned. It shall not affect assignments in use which are in conformity with the Plan.

8. EXISTING SYSTEMS

Irrespective of the bands which are to be the subject of the allotment plan, existing systems shall be included in the plan on an equal basis with planned allotments and should be subject to some adjustments. The degree of adjustment to which a system would be subjected would depend upon the stage of development of the system.

9. FREQUENCY BANDS

The parts of the planned bands in which an allotment plan shall be established are:

ANNEX 2

Improved procedures for application to FSS bands which
are not to be subject to the allotment planning approach

1. The guidelines for improved procedures required by item 2.4 of the agenda of the WARC-ORB(1) shall be developed for application to the planned FSS bands which are not covered by the allotment plan.
2. The overall aim of these improved procedures shall be to guarantee in practice for all countries equitable access to the orbit/spectrum resources in the relevant bands.
3. These guidelines for procedures shall combine the best features of the proposals made by administrations including as appropriate the following non-exhaustive list of items:
 - a) simplification of the advance publication procedure of Article 11 and combination with the coordination procedure for space stations of the FSS (see Document DT/65 of Working Group 5B);
 - b) the adoption of a cyclical process (annual, biennial or otherwise) for the application of the procedures;
 - c) the employment of "burden-sharing" for possible use in assistance in ensuring access to the orbit/spectrum resources;
 - d) the introduction of measures for the possible use of arbitration or conciliation in the event of difficulty;
 - e) the use of further technical measures for use in resolving problems of space station coordination.
4. The stage of development of these improved procedures shall be sufficient to enable administrations in their inter-sessional work to develop detailed proposals for the second session of the WARC-ORB.

ANNEX 3

Information received from the Ad Hoc Group
established by the Chairman of the Conference

2

1. Basis for discussion

After discussion, participants agreed to try and find a possible composite consensus on the basis of information contained in Document DT/70.

2. Items for discussion

All resulting working instructions shall remain provisional until a consensus has been found comprising all aspects still under discussion: planning methods, frequency bands, existing and multi-administration systems and juridical matters.

3. Planning

3.1 Subject to the above qualification, it was agreed:

- to use the planning method based on the dual approach indicated in paragraph 2 of DT/70;
- to use for the allotment plan: 4500 - 4800 MHz and 300 MHz in the band 6425 - 7075 MHz;
- to think over the following bands for the possible use of the allotment plan: 10.70 - 10.95 GHz, 11.20 - 11.45 GHz and 12.75 - 13.25 GHz;
- to use the application of the improved procedures in the other parts of the 4/6 GHz and 11-12/14 GHz bands allocated to the FSS.

3.2 The following frequency bands, that are also allocated to the FSS in Article 8 of the Radio Regulations, were not considered by the Group in detail: 3.4 - 3.7 GHz, 7/8 GHz, 20/30 GHz.

Views were expressed to introduce into the allotment plan the entire 11/12-14 GHz band, while other views stated that none of the 11/12-14 GHz bands should be covered by an allotment plan.

4. Existing systems

It was agreed that existing systems are those:

- a) recorded in the Master International Frequency Register;
- b) for which the coordination procedure was initiated; and
- c) for which the information relating to the advance publication was received by the Board before 8.8.85.

4.1 Consideration of existing systems in the plan

Paragraph 8 of Annex 1 of DT/70 is the basis for the treatment of existing systems:

"Irrespective of the bands which are to be the subject of the allotment plan, existing systems shall be included in the plan on an equal basis with planned allotments and may be subject to some adjustments. The degree of adjustment to which an existing system would be subjected would depend upon the stage of development of the system.

4.2 Consideration of existing systems in the procedural approach

The existing systems may be subjected to some adjustments to allow for the accommodation of new systems, if necessary. The degree of adjustment to which a system would be subjected would depend upon the stage of development of the system.

5. Multi-administration systems

The following text has been proposed to the Ad Hoc Group and was not accepted:

"Bearing in mind paragraph 2.1 of DT/70, consideration of multi-administration systems is limited to the procedural part of the planning approach. Consequently, the second session would be requested to consider, when developing the details of the procedure, permitting multi-administration systems to continue their operation.

6. Juridical matters

In regard to the claims to sovereignty to the geostationary orbit presented to this Conference, the Plenary will decide whether or not the Conference has the competence to treat the matter.

The Secretary-General would then inform the United Nations, including COPUOS, of the conclusion/decision reached by the Conference.

WORKING GROUP 5A

Information received from the Ad Hoc Group
established by the Chairman of the Conference

1. Basis for discussion

After discussion, participants agreed to try and find a possible composite consensus on the basis of information contained in Document DT/70.

2. Items for discussion

All resulting working instructions shall remain provisional until a consensus has been found comprising all aspects still under discussion: planning methods, frequency bands, existing and multi-administration systems and juridical matters.

3. Planning

3.1 Subject to the above qualification, it was agreed:

- to use the planning method based on the dual approach indicated in paragraph 2 of DT/70;
- to use for the allotment plan: 4500 - 4800 MHz and 300 MHz in the band 6425 - 7075 MHz;
- to think over the following bands for the possible use of the allotment plan: 10.70 - 10.95 GHz, 11.20 - 11.45 GHz and 12.75 - 13.25 GHz;
- to use the application of the improved procedures in the other parts of the 4/6 GHz and 11-12/14 GHz bands allocated to the FSS.

3.2 The following frequency bands, that are also allocated to the FSS in Article 8 of the Radio Regulations, were not considered by the Group in detail: 3.4 - 3.7 GHz, 7/8 GHz, 20/30 GHz.

Views were expressed to introduce into the allotment plan the entire 11/12-14 GHz band, while other views stated that none of the 11/12-14 GHz bands should be covered by an allotment plan.

4. Existing systems

It was agreed that existing systems are those:

- a) recorded in the Master International Frequency Register and operational;
- b) for which the coordination procedure was initiated; and
- c) for which the information relating to the advance publication was received by the Board before 8.8.85.

4.1 Consideration of existing systems in the plan

Paragraph 8 of Annex 1 of DT/70 is the basis for the treatment of existing systems:

"Irrespective of the bands which are to be the subject of the allotment plan, existing systems shall be included in the plan on an equal basis with planned allotments and may be subject to some adjustments. The degree of adjustment to which an existing system would be subjected would depend upon the stage of development of the system.

4.2 Consideration of existing systems in the procedural approach

The existing systems may be subjected to some adjustments to allow for the accommodation of new systems, if necessary. The degree of adjustment to which a system would be subjected would depend upon the stage of development of the system.

5. Multi-administration systems

The following text has been proposed to the Ad Hoc Group and was not accepted:

"Bearing in mind paragraph 2.1 of DT/70, consideration of multi-administration systems is limited to the procedural part of the planning approach. Consequently, the second session would be requested to consider, when developing the details of the procedure, permitting multi-administration systems to continue their operation.

6. Juridical matters

In regard to the claims to sovereignty to the geostationary orbit presented to this Conference, the Plenary will decide whether or not the Conference has the competence to treat the matter.

The Secretary-General would then inform the United Nations, including COPUOS, of the conclusion/decision reached by the Conference.

COMMITTEE 5A

Document from the Chairman of Working Group 5A

ORGANIZATION OF WORK

This document is intended to identify the matters requiring decisions from Working Group 5A, to indicate the conclusions already reached on a provisional or final basis, and to propose means of reaching decisions for the remaining items.

The matters within the terms of reference of Working Group 5A may be grouped into the following four groups:

- Planning principles and questions of a general nature.
- Planning methods .
- Planning criteria.
- Questions relating to procedures.

1. PLANNING PRINCIPLES AND QUESTIONS OF A GENERAL NATURE

1.1 Having provisionally decided that the FSS is the only service to be considered for planning, Working Group 5A spent an important part of its past sessions in discussing proposed principles: some were considered as planning criteria or as being related to procedures and should be considered later in Working Group 5A or in Working Group 5B.

1.2 Questions of wider scope will be transferred to Committee 5.

2. PLANNING METHOD

Having considered in detail all the proposals and taking account of the discussions which took place in Working Group 5A, I reached the conclusion that the planning method that may result from the work of the Conference cannot be based exclusively on a single approach. A possible combination of two different approaches is presented below.

2.1 An allotment plan that shall permit each administration to satisfy requirements for domestic services from an orbital position, within a predetermined arc and predetermined band(s). A bandwidth specified by the Conference shall be associated with each such orbital position.

2.2 Improved procedures (that may be derived from proposals of administrations) shall satisfy requirements in addition to those appearing in the allotment plan. These procedures shall be applied in those parts of the planned bands which are not covered by the allotment plan.

3. Both approaches will need to conform to the planning principles provisionally adopted by Working Group 5A.

4. SHARING BETWEEN EQUAL PRIMARY SERVICES

The allotment plan must preserve the rights of other services having equal primary status in the bands to which this approach is to be applied. This will necessitate the adoption and application of appropriate sharing criteria.

5. The planning criteria for the allotment plan are contained in Annex 1. The planning criteria for the procedural approach are contained in Annex 2.

F.S.C. PINHEIRO
Chairman of Working Group 5A

Annexes: 2

ANNEX 1

PLANNING CRITERIA FOR THE ALLOTMENT PLANNING APPROACH

1. SERVICE AREA

The allotment plan shall be limited to national systems providing domestic services. The procedures associated to this plan should contain provisions permitting administrations with adjacent territories to combine all or part of their allotments with the view to ensure a sub-regional service.

2. STANDARD PARAMETERS

The allotment plan shall be prepared on the basis of standard generalized parameters applicable to all allotments in the plan. Committee 4 should be requested to consider and define these parameters.

3. GUARANTEE OF ACCESS

All ITU Members shall have at least one allotment in the plan consisting in

- one orbital position in a predetermined arc;
- a minimum bandwidth within the band(s) defined in section 9.

4. PREDETERMINED ARC

The proposed planning refers to "a predetermined arc" as a means of increasing the flexibility of the allotment plan. The size of such an arc would require consideration by Committee 4 and, if necessary, may necessitate intersessional studies.

5. DURATION OF THE PLAN

The allotment plan is normally established for a period of 10 years. It shall be included as an integral part of the Radio Regulations and as such may be revised, if necessary, following the pertinent provisions of the Convention.

The WARC-ORB(2) shall be asked to adopt a resolution urging the Administrative Council when establishing the agenda for future reviewing conferences to ensure that an allotment in the plan is not removed without the agreement of the administration concerned.

6. MODIFICATIONS TO THE PLAN

Working Group 5B shall be requested to develop guidelines for:

- the procedures to be applied by administrations wishing to modify their allotments appearing in the plan; and
- simple procedures to be applied by administrations when bringing their allotment into use and so convert them into assignments.

7. BURDEN-SHARING

Working Group 5B shall be requested, to take account of the following criteria when establishing guidelines for the procedures to be applied to additional requirements in the bands covered by the allotment plan (see section 9).

An additional requirement in a band covered by the allotment Plan shall be accommodated to the extent that it will not introduce limitations to the bringing into use of an allotment in the plan except if agreed by the administrations concerned. It shall not affect assignments in use which are in conformity with the Plan.

8. EXISTING SYSTEMS:

Irrespective of the bands which are to be the subject of the allotment plan, existing systems shall be included in the plan on an equal basis with planned allotments and should be subject to some adjustments. The degree of adjustment to which a system would be subjected would depend upon the stage of development of the system.

9. FREQUENCY BANDS

The parts of the planned bands in which an allotment plan shall be established are:

[to be determined]

ANNEX 2

IMPROVED PROCEDURES FOR APPLICATION TO FSS BANDS WHICH
ARE NOT TO BE SUBJECT TO THE ALLOTMENT PLANNING APPROACH

1. The guidelines for improved procedures required by item 2.4 of the agenda of the WARC-ORB(1) shall be developed for application to the planned FSS bands which are not covered by the allotment plan.
2. The overall aim of these improved procedures shall be to guarantee in practice for all countries equitable access to the orbit/spectrum resources in the relevant bands.
3. These guidelines for procedures shall combine the best features of the proposals made by administrations including as appropriate the following non-exhaustive list of items:
 - a) simplification of the advance publication procedure of Article 11 and combination with the coordination procedure for space stations of the FSS (see Document DT/65 of Working Group 5B);
 - b) the adoption of a cyclical process (annual, biennial or otherwise) for the application of the procedures;
 - c) the employment of "burden-sharing" for possible use in assistance in ensuring access to the orbit/spectrum resources;
 - d) the introduction of measures for the possible use of arbitration or conciliation in the event of difficulty;
 - e) the use of further technical measures for use in resolving problems of space station coordination.
4. The stage of development of these improved procedures shall be sufficient to enable administrations in their inter-sessional work to develop detailed proposals for the second session of the WARC-ORB.

A PROPOSED STRUCTURE FOR THE REPORT OF WORKING GROUP 4C
TO COMMITTEE 4 ON INTRA-SERVICE SHARING
IN THE FSS

(The contents of this report are subject to review when the discussions in Committee 5 have reached decisions of principle.)

1. Principles of effective use of orbit and spectrum by the FSS

1.1 Efficiency and cost in the use of orbit and spectrum

DT/43, § 1 ("Efficiency of use of orbit and spectrum").

1.2 Multi-band and multi-service factors

DT/43, § 2.

1.3 Systematic use of frequency bands

Document 184, § 4, being amended by deleting "Dependent upon the outcome of Committee 5 discussions" at the beginning of that section.

1.4 Homogeneity of orbit utilization

DT/43, § 3 ("Homogeneity and orbit sectorization").

1.5 Global coverage and short service arcs

DT/66, Annex 2 ("The problem of global coverage and short service arcs").

1.6 Reverse band working

DL/42, as agreed.

1.7 Polarization discrimination

DL/45, as agreed.

1.8 Climate and radio propagation

DL/43, as agreed ("Precipitation and sandstorm situations").

1.9 Accommodation of spare satellites in orbit

DT/67, Annex 2.

1.10 Frequency sub-bands for space operations

DL/41 (second subject), as agreed.

1.11 Elimination of sources of physical interference

DT/67, Annex 3.

2. Optimization of the arrangement of satellites and emissions of the FSS

2.1 Visible arc and service arc

DL/40 (first subject), as agreed.

2.2 Permissible interference

a) DT/66, Annex 1, § 2.1;

b) DT/66, Annex 1, § 3.1.5, with the first two paragraphs and the last paragraph deleted;

c) DL/44, as agreed.

2.3 Estimation of interference in the advance publication phase

a) DT/66, Annex 1, § 2.2 ("Interference calculation in the Advance Publication and Coordination phase of the present Radio Regulations");

b) DT/66, Annex 1, § 4 ("Impact of threshold parameters used in the present coordination procedure").

2.4 Technical measures for harmonizing the arrangement of specific neighbouring satellites

2.4.1 Introduction

a) DT/66, Annex 1, § 1 ("Introduction") with a new sentence added at the end of the second paragraph as follows: "These measures in some suitable form may usefully be incorporated into planning procedures also."

b) A new paragraph (replacing § 3 of Annex 1) as follows: "Consideration is given in section 2.5 to means of combining these various measures."

2.4.2 Flexibility in the positioning of satellites

a) DT/66, Annex 1, § 3.1.1 with the second sentence deleted;

b) DL/40 (second subject), as agreed.

2.4.3 Adjustment of carrier parameters

DT/66, Annex 1, § 3.1.2.

- 2.4.4 Spectrum segmentation to reduce inhomogeneity and the overlap of emission spectra
DT/66, Annex 1, § 3.1.3.
- 2.4.5 Improvements in satellite and earth station antenna radiation pattern
DT/66, Annex 1, § 3.1.4.
- 2.5 The combination of technical measures for harmonization
 - 2.5.1 Computer programs
DT/66, Annex 1, § 3.2.1.
 - 2.5.2 Harmonization M3
DT/66, Annex 1, § 3.2.2.
 - 2.5.3 Equitable burden-sharing to achieve harmonization
DT/66, Annex 1, § 3.2.3.

(It is proposed that DT/66, Annex 1, § 5 ("Summary and conclusions") be deleted.
- 3. Criteria and parameters for planning the FSS
 - 3.1 Satellite station-keeping
DL/41 (first subject), as agreed.
 - 3.2 Generalized parameters
DT/66, Annex 3.
 - 3.3 Earth station antennas
DT/67, Annex 1 ("The radiation pattern of earth station antennas").
 - 3.4 Satellite antennas and accuracy of beam-pointing
DL/46, as agreed.

D.J. WITHERS
Chairman of Working Group 4C

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/72-E
2 September 1985
Original: English

Source: Documents DL/40, DL/41

WORKING GROUP 4C

Note by the Chairman of Working Group 4C

FOURTH BATCH OF OUTPUT ELEMENTS ON SHARING WITHIN THE FSS

This document contains four more elements agreed in Working Group 4C, in addition to those in Documents DT/43, DT/66 and DT/67. These elements have also been agreed provisionally, subject to review when Committee 5 has come to decisions of principle. The subjects of the elements are:

- 1) visible arc and service arc;
- 2) flexibility of the nominal position of a satellite;
- 3) satellite station-keeping;
- 4) space operation functions for the FSS.

The following documents have been taken into account in developing these texts:

Document 3 (CPM Report)
Document 10 (Spain)
Document 18 (United Kingdom)
Document 21 (Netherlands)

Document 31 (FRG)
Document 35 (Canada)
Document 71 (Columbia)
Document 76 (France)

D.J. WITHERS
Chairman of Working Group 4C

Annexes: 3

ANNEX 1

Visible arc and service arc

The arc of the geostationary-satellite orbit within which a satellite must be located if it is to perform its mission satisfactorily is determined by the "visible arc" and the "service arc" of the network. The concept of these terms is explained in the Radio Regulations, Appendices 3 and 4.

A satellite located anywhere within the visible arc should be visible from any of the earth stations of the network at an angle of elevation not less than 10° . (It should be noted that CCIR Report 204 contains a definition of "visible arc" which is not precisely the same as the usage of the Radio Regulations.). The visible arc will be short in certain geographical situations, and particularly if the service area is very long in the East to West direction or if it includes territory at high latitudes. For small service areas, not at high latitudes, the visible arc will be very long.

The service arc is the arc of the orbit within which the space station could provide the required service. Ideally the service arc may be as long as the visible arc in the initial stages of the definitions of a satellite network; indeed it may be larger than the visible arc if an angle of elevation of less than 10° is acceptable at earth stations. If the climate in the service area involves heavy rain, such that performance would be severely impaired at low angles of elevation, the administration responsible for the network may determine the initial service arc so that the minimum angle of elevation at earth stations is greater than 10° , particularly if frequency bands above 10 GHz are to be used. Some such limitation may also be appropriate if there are sand or dust storms in the service area; however, little is known at present about the effect of sand or dust in the atmosphere on slant path propagation.

In terrain obstruction situations, where the propagation paths between earth stations and the satellite at low angles of elevation may be blocked by mountains, it may be possible to determine the visible arc taking into account the angle of elevation of the actual horizon as seen from all of the earth stations in the network. However, this may not always be possible, since the location of some of the earth stations may not be known at the time when the characteristics of the network are initially being determined. In such a case, it may be desirable to disregard terrain obstructions when determining the visible arc, and to determine the initial service arc so that the angle of elevation at all earth stations, relative to the horizontal plane, would not restrict the possible location of earth stations unduly. In a very mountainous country a suitable value for the minimum angle of elevation might be 30° , unless the latitude of the country was too high to allow such a figure.

ANNEX 2

Flexibility of the nominal position of a satellite

The service arc for a service area which is not very large may initially be long. However, as the design and manufacture of the equipment for the network progress, in step with the determination of the nominal location of the satellite, the service arc becomes shorter. Finally, when the spacecraft has been launched and the network is in service the service arc may become quite short, perhaps only a few degrees.

There will be a few cases where the coverage requirements of a satellite will be so critical that even a small change in the satellite position would impair service to some earth stations. On the other hand, there will be many cases where the design of the satellite and the associated earth stations is such that the need to change the satellite position slightly would not present any difficulty or penalty provided such changes were required only once or twice in the lifetime of a satellite. Flexibility of this kind could prove very useful in minimizing interference between systems in congested parts of the orbit and in implementing changes found to be desirable as a result of coordination for a new planned satellite.

It has also been shown that the length of the orbital arc that is needed for a number of satellites serving different service areas depends upon the relative positions of the various satellites. It was found that the minimum length of orbital arc that would be acceptable, for stated interference conditions, varied considerably depending upon the arrangement of the satellites in the orbit. Substantial savings in orbital arc occupations could be obtained in this way. It should also be noted that it is not possible to say with certainty which geographical areas would need to be covered at some time in the future from a given part of the orbit; full advantage could therefore be taken of this means of optimizing the use of the orbit only if networks were designed so that their satellites could be relocated, if necessary, within a service arc after having been put into service.

However, provision for more than quite a small amount of flexibility of orbital position may also raise substantial problems which have not been fully evaluated yet. For example:

- a) the design of satellite antennas to accommodate flexibility of satellite position without loss of coverage of parts of the service area may increase the cost of the antennas. Such design may also reduce the antenna gain to a small extent, with some consequential impact on the communications capacity of the network and possibly an effect on the required separation between satellites; it may also lead to some expansion of coverage areas;
- b) transfer of satellites from one location to another would involve the expenditure of a significant amount of thruster fuel if such transfers were rapid or frequent;

- c) substantial operational problems may arise when a working satellite is being moved, particularly if it must pass close to another working satellite whilst in transit. Service will often be interrupted for considerable periods. Non-tracking earth station antennas will have to be repointed, possibly several times if the transit is long or slow, which could be costly;
- d) there may be reasons why little or no significant flexibility is feasible in the nominal location of some specific satellites. The visible arc may be very small, for example, because the service area is very large or at a high latitude or because the service area includes mountainous terrain. Alternatively, flexibility may be constrained by the requirements of another service on a multi-service satellite or by FSS use of more than one frequency band pair.

In this context, there could be benefit in encouraging administrations to take up orbital locations for new space stations which would reduce the probability of any such need to re-locate. This may require careful consideration of the probable future occupation of an orbital arc when the initial location is selected.

Studies of these matters are in progress in CCIR. Intersessional studies are needed to provide a full evaluation of the technical, operational and economic issues, to enable WARC-ORB(2) to decide what regulatory action, if any, would be appropriate. These studies should consider two situations, firstly where the relative order of satellites in orbit remains unchanged but their relative angular separation is changed, and secondly where the order is changed.

ANNEX 3

Satellite station-keeping

Natural forces cause three main perturbations of the orbits of geostationary satellites. Relative to an earth station the apparent effects of these perturbations are as follows:

- a) there is a long-period east-west movement due to errors in the orbital period;
- b) there is a daily north-south movement, having also a small East-West component, due to orbital inclination;
- c) there are daily movements with an east-west component and another component involving movement towards the Earth and away from the Earth, due to ellipticity of the orbit.

The Radio Regulations, Article 29, apply limits to east-west movements, in order to maintain efficient orbit utilization. Most satellites of the FSS in the future will be required to remain within $\pm 0.1^\circ$ of their nominal position in the east-west plane. Some satellites in service are already controlled to within $\pm 0.05^\circ$. Precise station-keeping may provide benefits to the system.

At the present time there is no regulatory constraint on satellite movement in the north-south direction but many satellites now in operation are, in practice, controlled in the north-south direction within limits similar to the east-west tolerances. However, the cost to systems of a regulatory constraint in terms of thruster fuel could be substantial and it might, in some circumstances, lead to a requirement for a satellite to be withdrawn from service before its planned lifetime had expired. It is not evident at present that there is a need for regulation in this matter but it should be kept under review.

There is also no regulatory provision for limiting the ellipticity of orbits other than the constraint on the daily east-west component of motion provided by Article 29 of the Radio Regulations. However, it is possible that the relative motion, due to orbital ellipticity, of satellites which are adjacent in orbit would impede the application of reverse band working. There has been no study on this matter in CCIR to date. Intersessional studies may be required to investigate the possible need to apply regulatory constraints on orbital ellipticity in frequency bands where reverse band working is implemented.

ANNEX 4

Space operation functions for the FSS

The space operation service with its space telemetry, telecommand and tracking functions performs both crucial and routine duties for space missions. In many cases, the services performed in space operation bands are on a short-term basis (e.g. launch and positioning operations); thereafter they are routinely performed in bands other than those allocated to the space operation service (e.g. the mission bands of the satellite).

The placing on station and station-changing phases of geostationary satellites will increase in number over the next few years and their individual duration may be extended. In view of the importance of space operation during these phases, the frequency requirements must be examined with as much care as in the case of phases of normal use.

To reduce the risks of mutual interference between satellites already on station and satellites being manoeuvred, two solutions may be envisaged, one of them being to use frequencies selected from the bands allocated to the space operation service for the satellite being manoeuvred.

Another solution, which might be better from the economic standpoint and from that of optimum spectrum utilization, is to use frequencies chosen from the bands allocated to the service corresponding to the mission of each space system (FSS, MSS, BSS, etc.).

The feasibility of reserving a sub-band for operational functions in launch phases and manoeuvres should be the subject of future studies in the CCIR, along with other possible solutions. These studies should take into account the current practices and the needs of world-wide tracking networks.

Source: Document 207 *

COMMITTEE 4

CHAPTER (7)

SATELLITE SOUND BROADCASTING SYSTEMS FOR
INDIVIDUAL RECEPTION BY PORTABLE AND AUTOMOBILE RECEIVERS
(Agenda item 4)

7.1 Introduction

Satellites are one of the possible solutions for nation-wide sound broadcasting. However, current frequency allocations do not provide for the particular needs of satellite sound broadcasting serving portable receivers and receivers in automobiles. The selection of the appropriate frequency band has been the subject of various studies and experiments whose results are described in CCIR Report 955 (MOD I).

The interest of administrations, in the subject of satellite sound broadcasting at the 1979 WARC, resulted in Resolution No. 505 which resolved:

- "1. that administrations shall be encouraged to carry out experiments with a broadcasting-satellite service (sound) within the band 0.5 - 2 GHz, in appropriately placed narrow sub-bands, subject to agreement of administrations concerned. One area where such a sub-band may be placed is the band 1 429 - 1 525 MHz;
2. that the CCIR shall continue and expedite studies relating to the technical characteristics of a satellite sound-broadcasting system for individual reception by portable and automobile receivers, the feasibility of sharing with terrestrial services, and the appropriate sharing criteria;
3. that the next world administrative radio conference dealing with space radiocommunication services in general or with a specific space radiocommunication service shall be authorized to consider the results of various studies and to take appropriate decisions regarding the allocation of a suitable frequency band;
4. that the aforementioned conference shall also develop appropriate procedures for protection, and if necessary re-accommodation in other bands of assignments to stations of terrestrial services which may be affected."

* This DT reproduces the texts agreed at the eighth meeting of Committee 4. In addition, some square brackets remain to be resolved and section 7.3 has yet to be considered.

Consequently, the Administrative Council, in Resolution No. 895, decided that in order to meet the objectives of Resolution No. 505 of the WARC-79, WARC-ORB(1) was to consider the question in the light of experience gained by administrations and the results of studies in the CCIR and make appropriate Recommendations for the attention of the WARC-ORB(2).

This chapter reviews the progress of the work invited by Resolution No. 505 (resolves 1 and 2). Technical characteristics of example systems are given. Conclusions are drawn and areas for further study are defined. Recommendations are made for the attention of WARC-ORB(2), in accord with agenda item 4 and based upon the information available at the time of WARC-ORB(1).

7.2 Results of studies and analysis

The CCIR in response to Resolution No. 505 of the WARC-79 has produced Report 955 concerning satellite sound broadcasting with portable receivers and receivers in automobiles. Several administrations and agencies have conducted experiments and undertaken studies to assess system feasibility within the 0.5 - 2.0 GHz band.

Annex YY [Document 195] gives technical information regarding sound broadcast satellite systems analyzed and studied. The following sections give the general characteristics of systems studied and discuss the major considerations pertinent to an allocation decision.

7.2.1 System description

The satellite sound-broadcasting service could provide for three types of reception: portable receivers, mobile receivers such as car radios and permanently installed receivers. Such a service implies elevation and frequency-dependent link budgets. Both aspects are discussed in Annex YY of this report.

Two models have been studied. The first model uses FM with parameters compatible with terrestrial FM-broadcasting and provides monophonic reception in the case of portable and mobile receivers or stereophonic reception in the case of permanent installations where obstructions can be minimized and larger antennas can be used. The second model uses digital modulation and can provide a wider range of facilities independent of the type of reception.

Service quality and availability objectives are developed in Annex YY, § YY.2.2. Service availability has been assumed for 90% of locations. This service availability will depend on fading due to obstructions and multipath effects. Low latitudes could be served with rather moderate transmit power levels while higher latitudes would require higher levels. In both system models, it is considered that Cases A and B discussed in Annex YY, § YY.2.3 would provide satisfactory reception under all except very severe conditions.

The FM and digital models have been chosen as representative of possible methods of providing services. The selection of FM for a lower quality service does not necessarily imply that an FM system cannot provide a service quality equivalent to that from a digital system, since many other technical factors need to be taken into account.

A comparison of link budgets indicates that the digital model would require about twice the satellite transmit power of the FM model. The resulting technical requirements can be satisfied for some examples as given in Annex YY, with satellite and receiver technology available now or in the near future.

The attention of administrations is drawn to the technical factors having a bearing on costs involved in the implementation of a satellite sound broadcasting system. Examples of space-segment cost estimates can be found in Annex YY. Technical and economic studies in one country have been reported since the CPM 1984 and have indicated that a satellite system could be several times more expensive than an equivalent terrestrial system. In other cases, in particular in mountainous areas, the satellite system could be less expensive as indicated in a study by another administration based upon the cost of terrestrial systems. The relative cost depends on the geographical location of the service area, the shape and size of the territory, the number of programmes, technological solutions chosen and other factors. Further studies by the CCIR into those technical factors which have a bearing on costs, are required [in order to indicate to administrations if such a system is reasonable or not from an economic point of view] [in order to provide further information on cost trade-offs].

7.2.2 Frequency, bandwidth and frequency sharing considerations

Three elements of importance to making an allocation decision are the appropriate frequency for operation, the bandwidth required and the possibilities for frequency sharing.

7.2.2.1 Operating frequencies

Studies examined by ORB(1) have used frequencies in the range 0.5 - 2.0 GHz. An increase in operating frequencies would require a corresponding increase in the satellite transmit power levels which in turn will increase with latitude. A decrease in operating frequency would require an increase in the antenna diameter and would put terrestrial receivers in an environment of higher man-made noise.

7.2.2.2 Bandwidth

The bandwidth required for a UHF satellite sound broadcasting service depends on the modulation method and on the extent of coverage overlap. Studies performed [by EBU and ESA] for almost the whole of Africa and Europe, and [by Canada] in Region 2, arrive at a required bandwidth of 9 to 11 MHz for providing one national sound broadcast programme per country when this is transmitted by frequency modulation. Digital modulation tends to require a somewhat larger bandwidth. The study [made in Canada] for Region 2 countries concluded that some 13 MHz are needed for one monophonic programme per country. These results are believed to be representative for national services.

7.2.2.3 Frequency sharing considerations

Primary users of the 0.5 - 2.0 GHz band include broadcasting, mobile and fixed services. Besides that, substantial allocations are provided for aeronautical radionavigation and radiolocation services.

Sharing studies have been conducted for frequency modulation and digital modulation techniques. Frequency modulation allows very limited energy dispersal while digital modulation techniques offer a significant energy dispersal advantage. However, even the most optimistic studies for the latter modulation demonstrate that the obtainable power flux-density levels are still too high to allow frequency sharing with the broadcasting, fixed or mobile services within the service area and in large areas around it.

It can be concluded that frequency sharing will not be possible in a systematic manner. This suggests that, taking into account the existing criteria, the development of national sound broadcasting-satellite services in the frequency range 0.5 - 2.0 GHz will only be possible through the allocation of an appropriate frequency band on an exclusive basis.

7.2.3 Conclusions

The studies conducted by the CCIR on the BSS (sound) in the range 0.5 - 2.0 GHz indicate that this service is feasible from the technical point of view but, due to sharing difficulties, the implementation of such a service will not be possible unless an appropriate frequency band is allocated for it on an exclusive basis. These studies performed by the CCIR and the experiments and studies undertaken by administrations have shown that accommodation of the satellite sound broadcasting service in the frequency range 0.5 - 2.0 GHz would cause considerable difficulties.

It is necessary to investigate further the sharing possibilities between BSS (sound) and other services. Further work is also required to fully define practical system parameters that would more readily permit the implementation of such a service. The following study areas have been identified:

7.2.3.1 Quality of service

The quality of service impacts upon overall system characteristics and sharing with other services. Different administrations may desire different quality levels. It is suggested that at least medium and high quality systems be studied, with high quality possibly being attained by the use of permanently installed receivers.

7.2.3.2 Frequency of operation

A number of administrations indicated that they would be unable to accommodate the sound BSS in the band 0.5 - 2.0 GHz on an exclusive allocation basis. However, two administrations indicated that they may be able to accommodate, on a national basis, BSS (sound) in this band on an exclusive basis. Additional study is desirable to identify possible frequencies where the sound BSS might be implemented within the band 0.5 - 2.0 GHz, using the technical parameters identified for further study. [In addition, studies are requested for frequencies outside but near the 0.5 - 2.0 GHz range where the possibilities for sharing or other accommodations may be greater.]

7.2.3.3 Modulation type

Changes in modulation format may reduce the power required for sound BSS transmitters and may enhance the possibilities for sharing with other services. In this respect the technical characteristics of practicable digital systems need further determination.

7.2.3.4 Bandwidth required

The change in modulation type or the use of other digital systems may alter the bandwidth required from the values given in the example systems discussed in this report.

7.2.3.5 Receivers

Signal processing techniques, the possibility of use of existing receivers, and the possibility for the development of similar receiver design were identified as areas of study.

7.2.3.6 Antenna design

Spacecraft antennas with improved side-lobes and multiple spot beams and ground receiving antenna gain and directivity characteristics are necessary to be studied to increase sharing possibilities.

7.2.3.7 Feeder links

Technical characteristics of required feeder links need to be identified.

7.2.3.8 Appropriate sharing criteria (including geographical sharing)

Sharing criteria are needed to determine possibilities for sharing with all services using frequency bands in which the sound BSS might operate. In particular, studies need to be directed towards sharing on a geographical basis, that is, among and within regions or among groups of administrations.

7.2.3.9 Cost considerations

Several input studies were available to determine space segment costs, total sound BSS system costs and costs of alternative coverage by terrestrial sound broadcast systems. Additional study is needed to identify more precisely these costs for practicable systems.

7.2.3.10 Compliance with Provision 2674 of the Radio Regulations

The ability of present and future technology to comply with Provision 2674 must also be studied.

7.2.3.11 Multiple user satellite

Investigation is required into the technical implications of multiple administrations using the same satellite to satisfy their individual requirements.

7.3 Recommendations

After considering sound broadcasting by satellites in the light of experience gained by administrations and the results of studies in the CCIR, ORB(1) recommends:

- a) that administrations shall be invited to carry out additional studies on the feasibility of implementing satellite sound broadcasting systems within, as well as outside but near the frequency range 0.5 - 2.0 GHz.

These studies should be guided by the information contained in section 7.3 of this Report and Annex YY;

- b) that the CCIR shall be invited to undertake studies as indicated in Recommendation a) in order to define the practical system parameters for satellite sound broadcasting.
- c) that the second session of this Conference should consider the results of the various up-to-date studies and in reviewing the situation prevailing at that time take appropriate decisions regarding the allocation of a suitable frequency band.

R.G. AMERO
Chairman of Committee 4

SUB-WORKING GROUP 6A2

[DRAFT] RESOLUTION [COM6/3]

**Relating to the Use of Interim Systems in Region 2 in
the Broadcasting-Satellite and Fixed-Satellite
(Feeder Link) Services in Region 2
for the Bands Covered by Appendix 30
and Appendix 30A**

The World Administrative Radio Conference on the Use of the Geostationary Orbit and the Planning of the Space Services Utilizing It, First Session, Geneva, 1985,

considering

- a) that the Regional Administrative Radio Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, prepared a Plan for the broadcasting-satellite service in the band 12.2 - 12.7 GHz and a Plan for the associated feeder links in the band 17.3 - 17.8 GHz with the provision of implementing Interim Systems in accordance with Resolution 2(SAT-R2);
- b) that in the implementation of their assignments in the Plans, administrations of Region 2 may find it more appropriate to adopt a phased approach and initially use characteristics different from those appearing in the appropriate Regional Plan;
- c) that some administrations of Region 2 may cooperate in the joint development of a space system with a view to covering two or more service areas from the same orbital position or to use a beam which would encompass two or more service areas;
- d) that some administrations of Region 2 may cooperate in the joint development of a space system with a view to using two or more feeder-link service areas from the same orbital position or to use a beam which encompasses two or more feeder-link service areas;
- e) that interim systems shall not adversely affect the Plans nor hamper the implementation and evolution of the Plans;
- f) that the number of assignments to be used in an interim system shall not in any case exceed the number of assignments appearing in the Region 2 Plan which are to be suspended;
- g) that the interim systems shall not in any case use orbital positions that are not in the Region 2 Plan;
- h) that an interim system shall not be introduced without the agreement of all administrations whose space and terrestrial services are considered to be affected;

resolves

that administrations and the IFRB shall apply the procedure contained in the Annex to this Resolution.

ANNEX TO RESOLUTION [COM6/3]

1. An administration or a group of administrations in Region 2 may, after successful application of the procedure contained in this Annex and with the agreement of the affected administrations, use an interim system during a specified period not exceeding 12 years in order:

1.1 for an interim system in the broadcasting satellite service

- a) to use an increased e.i.r.p in any direction relative to that appearing in the Region 2 Plan provided that the power flux-density does not exceed the limits given in Annex [6] of Appendix 30;
- b) to use modulation characteristics¹ different from those appearing in the Annexes to the Region 2 Plan and resulting in an increased probability of harmful interference or in a wider assigned bandwidth;
- c) to change the coverage area by displacing boresight, or by increasing the major or minor axis or by rotating them, from an orbital position which shall be one of the corresponding orbital positions appearing in the Region 2 Plan;
- d) to use a coverage area appearing in the Region 2 Plan or a coverage area encompassing two or more coverage areas appearing in the Region 2 Plan from an orbital position which shall be one of the corresponding orbital positions appearing in the Region 2 Plan;
- e) to use a polarization different from that in the Region 2 Plan.

1.2 for an interim feeder-link system

- a) to use an increased e.i.r.p in any direction relative to that appearing in the Region 2 feeder-link Plan;
- b) to use modulation characteristics¹ different from those appearing in the Annexes to the Plan and resulting in an increased probability of harmful interference or in a wider assigned bandwidth;

¹ For example, modulation with sound channels frequency-multiplexed within the bandwidth of a television channel, digital modulation of sound and television signals, or other pre-emphasis characteristics.

- c) to change the feeder-link beam area by displacing the boresight, or by increasing the major or minor axis or by rotating them, in relation to an orbital position which shall be one of the corresponding orbital positions appearing in the Region 2 feeder-link Plan;
- d) to use a feeder-link beam area appearing in the Region 2 feeder-link Plan or a feeder-link beam area encompassing two or more feeder-link beam areas appearing in the Region 2 feeder-link Plan in relation to an orbital position which shall be one of the corresponding orbital positions appearing in the Region 2 feeder-link Plan;
- e) to use a polarization different from that in the Region 2 feeder-link Plan.

2. In all cases, an interim system shall correspond to assignments in the Region 2 Plan; the number of assignments to be used in an interim system shall not in any case exceed the number of assignments appearing in the Region 2 Plan which are to be suspended. During the use of an interim system, the use of the corresponding assignments in the Region 2 Plan is suspended; they shall not be brought into use before the cessation of the use of the interim system. However, the suspended assignments, but not the interim system's assignments, of an administration shall be taken into account when other administrations apply the procedure of Article 4 of Appendix 30 and of Appendix 30A, as appropriate, in order to modify the Plans, or the procedure of this Annex in order to bring an interim system into use. The assignments of interim systems shall not be taken into account in applying the procedure of Article 6 or Article 7 of Appendix 30 and the procedure of Article [...] of Appendix 30A.

3. When an administration proposes to use an assignment in accordance with paragraph 1, it shall communicate to the IFRB the information listed in Annex 2 of Appendix 30 or Appendix 30A as appropriate not earlier than five years but, preferably, not later than twelve months before the date of bringing into use. The administration shall also indicate:

- a) the maximum specified period during which the interim assignment is intended to remain in use;
- b) the assignments in the Region 2 Plans the use of which will remain suspended for the duration of the use of the corresponding interim assignment;
- c) the names of the administrations with which an agreement for the use of the interim assignment has been reached, together with any comment relating to the period of use so agreed and the names of administrations with which an agreement may be required but has not yet been reached.

4. Administrations are considered to be affected as follows:

4.1 for an interim system in the broadcasting-satellite service

- a) an administration of Region 2 is considered to be affected if any overall protection margin of one of its assignments in the Region 2 Plan, calculated in accordance with Annex [6] to Appendix 30 including the cumulative effect of all interim use during the maximum specified period of use of the interim system, but excluding the corresponding suspended assignments (paragraph 3b), becomes negative or a former negative value is made more negative;
- b) an administration of Region 1 or 3 is considered to be affected if there is an overlap of the necessary bandwidths and if the possibly affected administration has an assignment which is in conformity with the Regions 1 and 3 Plan contained in Appendix 30 to the Radio Regulations or in respect of which proposed modifications have already been published by the Board in accordance with the provisions of Article 4 of that Appendix and the appropriate limits of Annex 1 of Appendix 30 are exceeded;
- c) an administration of Region 1 or 3 is considered to be affected if it has a frequency assignment in the fixed satellite service which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. 1060 of the Radio Regulations or under Article 7 of Appendix 30 or under Article [...] of Appendix 30A or which has been published in accordance with No. 1044 of the Radio Regulations or of paragraph [...] of Appendix 30 or of paragraph [...] of Appendix 30A and the appropriate limits of Annex 1 of Appendix 30 are exceeded;
- d) an administration of Region 1 or 3 is considered to be affected if, although having no frequency assignment in the appropriate Regional Plan in the channel concerned, it nevertheless would receive on its territory a power flux-density value which exceeds the limits given in Annex 1 as a result of the proposed interim assignment, or if it has such an assignment for which its associated service area does not cover the whole of the territory of the administration, and in its territory outside that service area the power flux-density from the interim system space station exceeds the limits given in Annex 1;

e) an administration of Region 3 is considered to be affected if it has a frequency assignment to a space station in the broadcasting-satellite service in the band 12.5 - 12.7 GHz with a necessary bandwidth any portion of which falls within the necessary bandwidth of the proposed assignment, and which:

- is recorded in the Master Register; or
- has been coordinated or is being coordinated under the provisions of Resolution 33; or
- appears in a Region 3 plan to be adopted at a future administrative radio conference, taking account of modifications which may be introduced subsequently in accordance with the Final Acts of that Conference,

and the appropriate limits of Annex 1 to Appendix 30 are exceeded.

4.2 for interim feeder-link systems

- a) if any overall equivalent protection margin of one of its assignments in the Plan, calculated in accordance with [...], including the cumulative effect of all interim uses during the maximum specified period of use of the interim system, but excluding the corresponding suspended assignment(s) (paragraph 3.b), becomes negative or a former negative value is made more negative;
- b) if it has a frequency assignment in the fixed-satellite service which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. 1060 of the Radio Regulations and the appropriate limits of [...] are exceeded;
- c) if it has frequency assignment in the band 17.7 - 17.8 GHz to a terrestrial station, in use or intended to be brought into use within three years of the projected date of bringing into use of the feeder-link earth station, which is located within the coordination area of the feeder-link earth station concerned and the appropriate limits of [...] are exceeded;

5. The Board shall publish in a special section of its weekly circular the information received under paragraph 3, together with the names of the administrations the Board has identified in application of paragraph 4.

6. When the Board finds that the suspended assignment of an administration having an interim system is not affected, it shall examine the projected interim system with respect to the interim system of that administration and if there is an incompatibility, it shall request the two administrations concerned to adopt any measures that may enable the new interim system to be operated.

7. The Board shall send a telegram to the administrations listed in the special section of the weekly circular drawing their attention to the information it contains and shall send them the results of its calculations.

8. Any administration not listed in the special section which considers that its planned interim assignment may be affected shall so inform the administration responsible for the interim system and the Board, and the two administrations shall endeavour to resolve the difficulty before the proposed date of bringing the interim assignment into use.

9. An administration which has not sent its comments either to the administration seeking agreement or to the Board within a period of four months following the date of the weekly circular referred to in paragraph 5 shall be understood as having agreed to the proposed interim use.

10. On the expiry of four months following the date of publication of the weekly circular referred to in paragraph 5, the Board shall review the matter and, depending on the results obtained, shall inform the administration proposing the interim assignment that:

- a) it may notify its proposed use under Article 5 of Appendix 30 or Article [...] of Appendix 30A, as appropriate, if no agreement is required or the required agreement has been obtained from the administrations concerned. In this case the Board shall update the Interim List;
- b) it may not bring into use its interim system before having obtained the agreement of the administrations affected, either directly or by applying the procedure described in Article 4 of Appendix 30 or Article [...] of Appendix 30A, as appropriate, as a means of obtaining that agreement.

11. The Board shall include all the interim assignments in an Interim List in two parts, one each for the broadcasting-satellite service and the feeder-link assignments, and shall update it in accordance with this Annex. The Interim List shall be published together with the Region 2 Plans but does not constitute part of them.

12. One year prior to the expiry of the interim period, the Board shall draw the attention of the administration concerned to this fact and request it to notify in due time the deletion of the assignment from the Master Register and the Interim List.

13. If, notwithstanding the reminders by the Board, an administration does not reply to its request sent in application of paragraph 12, the Board shall, at the termination of the interim period:

- a) enter a symbol in the Remarks Column of the Master Register to indicate the lack of response and that the entry is for information only;
- b) not take into account that assignment in the Interim List;
- c) inform the administrations concerned and affected of its action.

14. Where an administration confirms the termination of the use of the interim assignment, the Board shall delete the assignment concerned from the Interim List and the Master Register. Any corresponding assignment in the Plan(s), suspended earlier, may then be brought into use.

15. An administration which considers that its interim system may continue to be used after the expiry of the interim period may extend it by not more than two years and to this effect shall apply the procedure described in this Annex.

16. Where an administration applies the procedure in accordance with paragraph 15, but was unable to obtain the agreement of one or more affected administrations, the Board shall indicate this situation by inserting an appropriate symbol in the Master Register. Upon receipt of a complaint of harmful interference, the administration shall immediately cease operation of the interim assignment.

17. Where an administration, having been informed of a complaint of harmful interference, does not cease transmission within a period of thirty days after the receipt of complaint, the Board shall apply the provisions of paragraph 13.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Addendum 2 to
Document DT/74-E
4 September 1985
Original: English

SUB-WORKING GROUP 6A2

FINAL ACTS

adopted by the First Session of the
World Administrative Radio Conference
on the Use of the Geostationary-Satellite Orbit and
the Planning of Space Services Utilizing It,
Geneva, 1985, (WARC ORB-85)¹

Preamble

1. The First Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (WARC ORB-85) was convened at Geneva on 8 August 1985 under Article 54 of the International Telecommunication Convention and in accordance with Resolutions 1 and 8 of the Plenipotentiary Conference, Nairobi, 1982, and Resolution 3 of the World Administrative Radio Conference, Geneva, 1979, as well as Resolution 895 of the Administrative Council.

2. The delegates of the following Members of the International Telecommunication Union:

[(List....in French alphabetical order)]

have formally adopted, subject to the approval of the competent authorities of their respective countries, a partial revision of the Radio Regulations, as contained in the Annex and outlined below:

- the provisions and associated Plan for the broadcasting-satellite service in the frequency band 12.2 - 12.7 GHz in Region 2, as incorporated by them into the Radio Regulations,
- the provisions and associated Plan for the feeder links for the broadcasting-satellite service (12.2 - 12.7 GHz) in Region 2 in the frequency band 17.3 - 17.8 GHz, as incorporated by them into the Radio Regulations;
- consequential modifications to certain Articles of the Radio Regulations and to Appendices 3 and 30 thereto,

¹ Called in short: Final Acts adopted by the First Session of WARC ORB, Geneva, 1985.

have also adopted, the interim procedure and instructions applicable on a world-wide basis, as contained in Resolution [COM6/2] and a procedure relating to interim systems for Region 2, as contained in Resolution [COM6/3], [as well as other resolution[s] related to the partial revision of the Radio Regulations].

have decided that the above-mentioned provisions and associated Plans and the revised provisions of the Radio Regulations shall form an integral part of the Radio Regulations which are annexed to the International Telecommunication Convention, and that said provisions and Plans shall enter into force on [.....], at 0001 hours UTC. The provisions of the Radio Regulations which are cancelled, superseded or modified by these revised provisions shall be abrogated on the date of entry into force of the revised provisions,

IN WITNESS WHEREOF, the delegates of the Members of the International Telecommunication Union mentioned below have, on behalf of their respective competent authorities, signed the present Final Acts in a single copy in the English, French, and Spanish languages, of which, in case of dispute, the French text shall prevail. This copy shall remain deposited in the archives of the Union. The Secretary-General shall forward one certified true copy to each Member of the International Telecommunication Union.

Done at Geneva, 13 August 1985

[List of delegates and administrations in French alphabetical order of administrations.]

ANNEX 1

**Limits for Determining Whether a Service of an
Administration is Affected by a Modification
to the Plans or When It Is Necessary
Under This Appendix to Seek the
Agreement of any other
Administration^{1, [2]}**

1. Limits to the change in the wanted-to-interfering signal ratio with respect to frequency assignments in conformity with the Regions 1 and 3 Plan

With respect to paragraph 4.3.1.1, an administration in Region 1 or 3 shall be considered as being affected if the effect of the proposed modification to the Regions 1 and 3 Plan would result in the wanted-to-interfering signal ratio at any point within the service area associated with any of its frequency assignments in that Plan falling below either 30 dB or the value resulting from the frequency assignments in that Plan at the date of entry into force of the Final Acts³, whichever is the lower.

Note: In performing the calculation, the effect at the receiver input of all the co-channel and adjacent-channel signals is expressed in terms of one equivalent co-channel interfering signal. This value is usually expressed in decibels.

¹ With respect to paragraphs [...] of this Annex, the limits relate to the power flux-density which would be obtained assuming free-space propagation conditions.

With respect to paragraphs [...] of this Annex, the limits relate to the power flux-density which would be obtained assuming clear sky propagation conditions.

[² See Resolution 9(Sat-R2).]

³ Final Acts of the 1977 Conference, which entered into force on 1 January 1979.

2. Limits to the change in the overall equivalent protection margin with respect to frequency assignments in conformity with the Region 2 Plan

With respect to paragraph [4.3.3.1], an administration in Region 2 shall be considered as being affected if the overall equivalent protection margin¹ corresponding to a test point of its entry in the Region 2 Plan, including the cumulative effect of any previous modification to that Plan or any previous agreement, falls more than 0.25 dB below 0 dB, or, if already negative, more than 0.25 dB below the value resulting from:

- the Region 2 Plan as established by the 1983 Conference; or
- a modification of the assignment in accordance with this Appendix; or
- a new entry in the Region 2 Plan under Article 4 of this Appendix; or
- any agreement reached in accordance with this Appendix.

¹ For the definition of the overall equivalent protection margin, see paragraph [...] of Annex [6] to this Appendix.

3. Limits to the change in the power flux-density to protect the broadcasting-satellite service in Regions 1 and 2 in the band 12.2 - 12.5 GHz and in Region 3 in the band 12.5 - 12.7 GHz

With respect to paragraph 4.3.1.2, an administration in Region 2 shall be considered as being affected if the proposed modification to the Regions 1 and 3 Plan would result in exceeding the power flux-densities given below, at any point in the service area affected.

With respect to paragraph [4.3.3.2], an administration in Region 1 or 3 shall be considered as being affected if the proposed modification to the Region 2 Plan would result in exceeding the power flux-densities given below, at any point in the service area affected.

-147 dB(W/m ² /27 MHz)	for $0^\circ \leq \theta < 0.44^\circ$
-138 + 25 log ₁₀ θ dB(W/m ² /27 MHz)	for $0.44^\circ \leq \theta < 19.1^\circ$
-106 dB(W/m ² /27 MHz)	for $\theta \geq 19.1^\circ$

where θ is:

- the difference in degrees between the longitudes of the broadcasting-satellite space station in Region 1 or 3 and the broadcasting-satellite space station affected in Region 2, or
- the difference in degrees between the longitudes of the broadcasting-satellite space station in Region 2 and the broadcasting-satellite space station affected in Region 1 or 3.

4. Limits to the change in the power flux-density to protect the terrestrial services of administrations in Region 2

With respect to paragraph [...], an administration in Region 2 shall be considered as being affected if the proposed modification to the Regions 1 and 3 Plan would result in exceeding a power flux-density, for any angle of arrival, at any point on its territories, of:

-125 dB(W/m ² /4 kHz)	when the broadcasting-satellite station uses circular polarization and,
-128 dB(W/m ² /4 kHz)	when the broadcasting-satellite station uses linear polarization.

5. Limits to the change in the power flux-density to protect the terrestrial services of administrations in Regions 1 and 3¹

With respect to paragraph [...], an administration in Region 1 or 3 shall be considered as being affected if the proposed modification to the Region 2 Plan would result in the following power flux-density limits being exceeded:

- a) for fixed services in the frequency band 12.2 - 12.7 GHz for all the territories of administrations in Regions 1² and 3 and for all arrival angles:

-125 dB(W/m ² /4 kHz)	for broadcasting-satellite space stations using circular polarization;
-128 dB(W/m ² /4 kHz)	for broadcasting-satellite space stations using linear polarization;
- b) for broadcasting services in the frequency band 12.2 - 12.5 GHz for territories of administrations in Region 3 and those in the western part of Region 1, West of longitude 30° E:

-132 dB(W/m ² /5 MHz)	for 0° ≤ γ < 10°;
-132 + 4.2(γ - 10) dB(W/m ² /5 MHz)	for 10° ≤ γ < 15°;
-111 dB(W/m ² /5 MHz)	for 15° ≤ γ < 90°;
- c) [for ... services] in the frequency band 12.2 - 12.7 GHz for territories of administrations in Region 1, east of longitude 30°E:

-134 dB (W/m ² /5 MHz)	for γ = 0°;
-134 + 4.6975 γ ² dB (W/m ² /5 MHz)	for 0° < γ ≤ 0.8°;
-128.5 + 25 log ₁₀ γ dB (W/m ² /5 MHz)	for γ > 0.8°;
- d) [for ... services] in the frequency band 12.5 - 12.7 GHz for all the territories of administrations of Regions 1² and 3:

-148 dB (W/m ² /4 kHz)	for γ = 0°;
-148 + 4.6975 γ ² dB (W/m ² /4 kHz)	for 0° < γ ≤ 0.8°;
-142.5 + 25 log ₁₀ γ dB (W/m ² /4 kHz)	for γ > 0.8°.

¹ See paragraph [3.18] of Annex [6].

² In the band 12.5 - 12.7 GHz in Region 1, these limits are applicable only to the territory of administrations mentioned in Nos. 848 and 850 of the Radio Regulations.

6. Limits to the change in the power flux-density of assignments in the Regions 1 and 3 Plan to protect the fixed-satellite service in the band 11.7 - 12.2 GHz in Region 2, and of assignments in the Region 2 Plan to protect the fixed-satellite service in the band 12.5 - 12.7 GHz in Region 1 and in the band 12.2 - 12.7 GHz in Region 3

With respect to paragraph 4.3.1.4, an administration in Region 2 shall be considered as being affected if the proposed modification to the Regions 1 and 3 Plan would result in an increase in the power flux-density on its territory of 0.25 dB or more above that resulting from the frequency assignments in the Regions 1 and 3 Plan at the time of entry into force of the Final Acts¹.

With respect to paragraph [4.3.3.4], an administration in Region 1 or 3 shall be considered as being affected if the proposed modification to the Region 2 Plan would result in an increase in the power flux-density on its territory of 0.25 dB or more above that resulting from the frequency assignments in the Region 2 Plan at the time of entry into force of the Final Acts².

However, where an assignment in the Regions 1 and 3 Plan or its subsequent modification gives a power flux-density of less than -138 dB(W/m²/27 MHz) anywhere in the territory of an administration of Region 2, that administration shall be considered as not affected; where an assignment in the Region 2 Plan or its subsequent modification gives a power flux-density of less than -160 dB(W/m²/4 kHz) anywhere in the territory of an administration of Region 1 or 3, that administration shall be considered as not affected.

¹ Final Acts of the 1977 Conference, which entered into force on 1 January 1979.

² Final Acts of the 1985 Conference.

7. Limits to the change in noise temperature to protect the fixed-satellite service (Earth to space) in Region 1 from modifications to the Region 2 Plan

With respect to paragraph [4.3.3.4], an administration of Region 1 shall be considered to be affected if the proposed modification to the Region 2 Plan would result in:

- the $\Delta T/T$ resulting from the proposed modification is greater than the $\Delta T/T$ resulting from the assignment in the Region 2 Plan as of the date of entry into force of the Region 2 Plan; and
- the $\Delta T/T$ resulting from the proposed modification exceeds 4%;

using the method of Appendix 29 (Case II).

8. Limits to the change in the power flux-density to protect the terrestrial services of other administrations

In Region 1 or 3:

With respect to paragraph 4.3.1.3, an administration in Region 1 or 3 shall be considered as being affected if the consequence of the proposed modification to the Regions 1 and 3 Plan is to increase the power flux-density arriving on any part of the territory of that administration by more than 0.25 dB over that resulting from that frequency assignment in the Regions 1 and 3 Plan at the time of entry into force of the Final Acts.¹

The same administration shall be considered as not being affected if the value of the power flux-density anywhere in its territory does not exceed the limits expressed in Section 5 of this Annex.

In Region 2:

With respect to paragraph [4.3.3.3], an administration in Region 2 shall be considered as being affected if the consequence of the proposed modification to the Region 2 Plan is to increase the power flux-density arriving on any part of the territory of that administration by more than 0.25 dB over that resulting from the frequency assignments in the Region 2 Plan at the time of entry into force of the Final Acts².

The same administration shall be considered as not being affected if the value of the power flux-density anywhere in its territory does not exceed the following limit: -115 dB(W/m²).

¹ Final Acts of the 1977 Conference, which entered into force on 1 January 1979.

² Final Acts of the 1985 Conference.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

Document DT/74-E
3 September 1985
Original: English

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

SUB-WORKING GROUP 6A2

Draft

Second Report of Sub-Working Group 6A2 to Working Group 6A

Sub-Working Group 6A2 held six further meetings during which it continued to consider the consolidated version of Appendix 30 to the Radio Regulations prepared by the General Secretariat in Document 16, together with the comments from administrations in Document DT/29. Agreement was reached on Articles 5, 7, 9, 10, 11, 12, 13, 14 and 15 (see Annex).

It should be borne in mind that the texts in the Annex have been adopted on the understanding that they are still subject to any decisions emanating from discussions in Working Group 6A and Committee 6.

J.F. BROERE
Chairman

Annex: 1

ARTICLE 5

**Notification, Examination and Recording in the Master
Register of Frequency Assignments to Space Stations
in the Broadcasting-Satellite Service****5.1 Notification**

5.1.1 Whenever an administration intends to bring into use a frequency assignment to a space station in the broadcasting satellite service, it shall notify this frequency assignment to the Board. For this purpose, the notifying administration shall apply the following provisions.

5.1.2 For any notification under 5.1.1, an individual notice for each frequency assignment shall be drawn up as prescribed in Annex [2], the various sections of which specify the basic characteristics to be provided as appropriate. It is recommended that the notifying administration should also supply any other data it may consider useful.

5.1.3 Each notice must reach the Board not earlier than three years before the date on which the frequency assignment is to be brought into use. In any case, the notice must reach the Board not later than three months before that date¹.

5.1.4 Any frequency assignment the notice of which reaches the Board after the applicable period specified in 5.1.3 shall, where it is to be recorded, bear a remark in the Master Register to indicate that it is not in conformity with 5.1.3.

5.1.5 Any notice made under 5.1.1 which does not contain the characteristics specified in Annex [2] shall be returned by the Board immediately by airmail to the notifying administration with the relevant reasons.

5.1.6 Upon receipt of a complete notice, the Board shall include its particulars, with the date of receipt, in its weekly circular which shall contain the particulars of all such notices received since the publication of the previous circular.

5.1.7 The circular shall constitute the acknowledgement to the notifying administration of the receipt of a complete notice.

5.1.8 Complete notices shall be considered by the Board in order of receipt. The Board shall not postpone its finding unless it lacks sufficient data to reach a decision; moreover, the Board shall not act upon any notice which has a technical bearing on an earlier notice still under consideration by the Board until it has reached a finding with respect to such earlier notice.

¹ Where appropriate, the notifying administration shall initiate the procedure for modifying the Plan concerned in sufficient time to ensure that this limit is observed. [For Region 2, see also Resolution 2(Sat-R2) and paragraph [...] of Annex [8].]

ORB-85/DT/74-E

5.2 Examination and recording

5.2.1 The Board shall examine each notice:

- a) with respect to its conformity with the Convention and the relevant provisions of the Radio Regulations (with the exception of those relating to b), c) and d) below);
- b) with respect to its conformity with the appropriate Regional Plan; or
- c) with respect to b) above if the Board finds characteristics differing from those in the appropriate Regional Plan in respect of one or more of the following:
 - use of a reduced e.i.r.p.,
 - use of a reduced coverage area entirely situated within the coverage area appearing in the appropriate Regional Plan,
 - use of other modulating signals in accordance with the provisions of paragraph [3.1.3] of Annex [6],
 - use of the assignment for transmission in the fixed-satellite service in accordance with No. 846 of the Radio Regulations,
 - use of an orbital position under the conditions specified in paragraph [...] of Annex [8]; [or]
- [d) with respect to its conformity with the provisions of Resolution 2(Sat-R2).]

5.2.2 Where the Board reaches a favourable finding with respect to 5.2.1 a) and 5.2.1 b), the frequency assignment of an administration shall be recorded in the Master Register. The date of receipt of the notice by the Board shall be entered in Column 2d. In relations between administrations all frequency assignments brought into use in conformity with the Region 2 Plan and recorded in the Master Register shall be considered to have the same status irrespective of the dates entered in Column 2d for such frequency assignments.

5.2.2.1 Where the Board reaches a favourable finding with respect to 5.2.1 a) and 5.2.1 c) the frequency assignment shall be recorded in the Master Register.

The date of receipt of the notice by the Board shall be entered in Column 2d. In relations between administrations, all frequency assignments brought into use in conformity with the Plan and recorded in the Master Register shall be considered to have the same status irrespective of the dates entered in Column 2d for such frequency assignments. When recording these assignments, the Board shall indicate by an appropriate symbol the characteristics having a value different from that appearing in the Plan.

5.2.2.2 Where the Board reaches a favourable finding with respect to 5.2.10a), but an unfavourable finding with respect to 5.2.10b), it shall examine the notice with respect to the successful application of the provisions of Resolution 2(Sat-R2). A frequency assignment which has successfully applied the provisions of Resolution 2(Sat-R2) shall be recorded in the Master Register with an appropriate symbol to indicate its interim status. The date of receipt of the notice by the Board shall be entered in Column 2d. In relations between administrations all frequency assignments brought into use following the successful application of the provisions of Resolution 2(Sat-R2) and recorded in the Master Register shall be considered to have the same status irrespective of the dates entered in Column 2d for such frequency assignments.

5.2.3 Whenever a frequency assignment is recorded in the Master Register, the finding reached by the Board shall be indicated by a symbol in Column 13a.

5.2.4 Where the Board reaches an unfavourable finding with respect to 5.2.1 a) and 5.2.1 b) or c), the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding and with such suggestions as the Board may be able to offer with a view to a satisfactory solution of the problem.

5.2.5 Where the notifying administration resubmits the notice and the finding of the Board becomes favourable with respect to the appropriate parts of 5.2.1, the notice shall be treated as in 5.2.2, 5.2.2.1 or 5.2.2.2, as appropriate.

5.2.6 If the notifying administration resubmits the notice without modification and insists on its reconsideration, and if the Board's finding with respect to 5.2.1 remains unfavourable, the notice is returned to the notifying administration in accordance with 5.2.4. In this case, the notifying administration undertakes not to bring into use the frequency assignment until the condition specified in 5.2.5 is fulfilled. For Regions 1 and 3, in the event that the Board has been informed of agreement to modification of the Plan for a specified period of time in accordance with Article 4, the frequency assignment shall be recorded in the Master Register with a note indicating that the frequency assignment is valid only for the period specified. The notifying administration using the frequency assignment over a specified period shall not subsequently invoke this fact to justify the continued use of the frequency beyond the period specified unless it obtains the agreement of the administration(s) concerned.

5.2.7 If a frequency assignment notified in advance of bringing into use in conformity with 5.1.3 has received a favourable finding by the Board with respect to the provisions of paragraph 5.2.1, it shall be entered provisionally in the Master Register with a special symbol in the Remarks Column indicating the provisional nature of that entry.

5.2.8 When the Board has received confirmation that the frequency assignment has been brought into use, the Board shall remove the symbol in the Master Register.

5.2.9 The date in Column 2c shall be the date of bringing into use notified by the administration concerned. It is given for information only.

ORB-85/DT/74-E

5.3 Cancellation of entries in the Master Register

5.3.1 If an administration has not confirmed the bringing into use of a frequency assignment under 5.2.8, the Board will make inquiries of the administration not earlier than six months after the expiry of the period specified in 5.1.3. On receipt of the relevant information, the Board will either modify the date of coming into use or cancel the entry.

5.3.2 If the use of any recorded frequency assignment is permanently discontinued, the notifying administration shall so inform the Board within three months, whereupon the entry shall be removed from the Master Register.

MOD

ARTICLE 7

Procedures for Coordination, Notification and Recording in the
Master International Frequency Register of Frequency
Assignments to Stations in the Fixed-Satellite Service in the
Frequency Bands 11.7 - 12.2 GHz (in Region 2),
12.2 - 12.7 GHz (in Region 3) and
12.5 - 12.7 GHz (in Region 1), When
Frequency Assignments to Broadcasting-Satellite
Stations in Conformity with the Regions 1 and 3 Plan,
or the Region 2 Plan, Respectively, Are Involved¹

Section I. Procedure for the Advance Publication of Information
on Planned Fixed-Satellite Systems

Publication of Information

7.1.1 An administration which intends to establish a fixed-satellite system shall, prior to the procedure described in paragraph 7.2.1, where applicable, send to the International Frequency Registration Board, not earlier than five years and preferably not later than two years before the date of bringing into service each satellite network of the planned system, the information listed in Appendix 4 to the Radio Regulations.

7.1.2 Any amendments to the information concerning a planned satellite system sent in accordance with paragraph 7.1.1 shall also be sent to the Board as soon as they become available.

7.1.3 The Board shall publish the information sent under paragraphs 7.1.1 and 7.1.2 in a special section of its weekly circular and shall also, when the weekly circular contains such information, so advise all administrations by circular telegram. The circular telegram shall include the frequency bands to be used and, in the case of a geostationary satellite, the orbital location of the space station.

7.1.3.1 If the information is found to be incomplete, the Board shall publish it under paragraph 7.1.3 and immediately seek, from the administration concerned, any clarification and information not provided. In such cases, the period of 3 months specified in paragraph 7.1.4 shall count from the date of publication, under paragraph 7.1.3, of the complete information.

¹ These provisions do not replace the procedures prescribed in Articles 11 and 13 of the Radio Regulations when stations other than those of the broadcasting-satellite service having frequency assignments in conformity with the appropriate Regional Plan are involved.

Comments on Published Information

7.1.4 If, after studying the information published under paragraph 7.1.3, any administration is of the opinion that interference which may be unacceptable may be caused to its frequency assignments in conformity with the appropriate Regional Plan, it shall, within three months after the date of the weekly circular publishing the information listed in Appendix 4 to the Radio Regulations, send its comments to the administration concerned. A copy of these comments shall also be sent to the Board. If no such comments are received from an administration within the period mentioned above, it may be assumed that that administration has no basic objections to the planned fixed-satellite network(s) of that system of which details have been published.

Resolution of Difficulties

7.1.5 An administration receiving comments sent in accordance with paragraph 7.1.4 shall endeavour to resolve any difficulties that may arise without considering the possibility of adjustment to broadcasting-satellite stations of other administrations. If no such means can be found, the administration concerned is then free to apply to other administrations concerned in order to solve these difficulties, provided that any modifications which may result to the appropriate Regional Plan are in accordance with Article 4.

7.1.6 In their attempts to resolve the difficulties mentioned above, administrations may seek the assistance of the Board.

Results of Advance Publication

7.1.7 An administration, on behalf of which details of planned satellite networks have been published in accordance with the provisions of paragraphs 7.1.1 and 7.1.2 shall, after the period of 3 months specified in paragraph 7.1.4, inform the Board whether or not comments provided for in paragraph 7.1.4 have been received and of the progress made in resolving any remaining difficulties. Additional information on the progress made in resolving any remaining difficulties shall be sent to the Board at intervals not exceeding six months prior to the commencement of coordination or the sending in of notices to the Board. The Board shall publish this information in a special section of its weekly circular and shall also, when the weekly circular contains such information, so inform all administrations by circular telegram.

Commencement of Coordination or Notification Procedure

7.1.8 In complying with the provisions of paragraphs 7.1.5 and 7.1.6, an administration responsible for a planned fixed-satellite system shall, if necessary, defer its commencement of the coordination procedure of paragraph 7.2.1 or, where this is not applicable, the sending of its notices to the Board until 5 months after the date of the weekly circular containing the information listed in Appendix 4 to the Radio Regulations on the relevant satellite network. However, in respect of those administrations with which difficulties have been resolved or which have responded favourably, the coordination procedure, where applicable, may be commenced prior to the expiry of the 5 months mentioned above.

Section II. Coordination Procedures to Be Applied in Appropriate Cases

7.2.1 Before an administration notifies to the Board or brings into use any frequency assignment to a space station in the fixed-satellite service, it shall seek the agreement of any other administration having a frequency assignment in conformity with the appropriate Regional Plan, if

- a) any portion of the necessary bandwidth proposed for the space station in the fixed-satellite service falls within the necessary bandwidth associated with the frequency assignment to the broadcasting-satellite station; and
- b) the power flux-density which would be produced by the proposed fixed-satellite assignment exceeds the value specified in Annex [4].

For this purpose, the administration seeking agreement shall send to any other such administration the information listed in Appendix 3 to the Radio Regulations.

7.2.2 No additional agreement is necessary when an administration proposes to change the characteristics of an existing assignment in such a way as will, in respect of the broadcasting-satellite service of another administration, meet the requirements of paragraph 7.2.1 above, or when this assignment has previously been the subject of an agreement and when the change will not cause any increase in the interference potential specified in that agreement.

7.2.3 An administration seeking coordination under paragraph 7.2.1 shall at the same time send to the Board a copy of the request for coordination together with the information listed in Appendix 3 to the Radio Regulations and the name(s) of the administration(s) whose agreement is sought. The Board shall determine on the basis of Annex [4] which frequency assignments in conformity with the appropriate Regional Plan are considered to be affected. The Board shall include the names of those administrations with the information received from the administration seeking coordination and shall publish this information in a special section of its weekly circular, together with a reference to the weekly circular in which details of the satellite system were published in accordance with Section I of this Article. When the weekly circular contains such information, the Board shall so inform all administrations by circular telegram.

7.2.4 An administration believing that it should have been included in the procedure under paragraph 7.2.1 shall have the right to request that it be brought into the procedure.

7.2.5 An administration whose agreement is sought under paragraph 7.2.1 shall acknowledge receipt of the coordination data immediately by telegram. If no acknowledgement is received within one month after the date of the weekly circular publishing the information under paragraph 7.2.3, the administration seeking coordination shall dispatch a telegram requesting acknowledgement, to which the receiving administration shall reply within a further period of 1 month. Upon receipt of the coordination data, an administration shall, having regard to the proposed date of bringing into use of the assignment for which agreement was requested, promptly examine the matter with regard to interference¹ which would be caused to the service rendered by its stations in respect of which agreement is sought under paragraph 7.2.1, and shall, within 3 months from the date of the relevant weekly circular, notify its agreement to the requesting administration. If the administration with which coordination is sought does not agree, it shall, within the same period, send to the administration seeking coordination the technical details upon which its disagreement is based, and make such suggestions as it may be able to offer with a view to a satisfactory solution of the problem. A copy of these comments shall also be sent to the Board.

7.2.6 An administration seeking coordination may request the Board to endeavour to effect coordination in those cases where:

- a) an administration whose agreement is sought under paragraph 7.2.1 fails to acknowledge receipt, under paragraph 7.2.5, within 2 months after the date of the weekly circular publishing the information relating to the request for coordination;
- b) an administration has acknowledged receipt under paragraph 7.2.5, but fails to give a decision within 3 months from the date of the relevant weekly circular;
- c) there is disagreement between the administration seeking coordination and an administration whose agreement is sought as to the acceptable level of interference;
- d) agreement between administrations is not possible for any other reason.

In so doing, it shall furnish the Board with the necessary information to enable it to endeavour to effect such coordination.

¹ The criteria to be employed in evaluating interference levels shall be based upon the technical information contained in this Appendix or upon relevant CCIR Recommendations and shall be agreed between the administrations concerned.

7.2.7 Either the administration seeking coordination or an administration whose agreement is sought, or the Board, may request additional information which they may require to assess the level of interference to the services concerned.

7.2.8 Where the Board receives a request under paragraph 7.2.6a), it shall forthwith send a telegram to the administration whose agreement is sought requesting immediate acknowledgement.

7.2.9 Where the Board receives an acknowledgement following its action under paragraph 7.2.8, or where the Board receives a request under paragraph 7.2.6b), it shall forthwith send a telegram to the administration whose agreement is sought requesting an early decision in the matter.

7.2.10 Where the Board receives a request under paragraph 7.2.6d), it shall endeavour to effect coordination in accordance with the provisions of paragraph 7.2.1. The Board shall also, where appropriate, act in accordance with paragraph 7.2.3. Where the Board receives no acknowledgement to its request for coordination within the periods specified in paragraph 7.2.5, it shall act in accordance with paragraph 7.2.8.

7.2.11 Where an administration fails to reply within one month of dispatch of the Board's telegram requesting an acknowledgement sent under paragraph 7.2.8, or fails to give a decision in the matter within one month of dispatch of the Board's telegram of request under paragraph 7.2.9, it shall be deemed that the administration whose agreement was sought has undertaken:

- a) that no complaint will be made in respect of any harmful interference which may be caused to the services rendered by its broadcasting-satellite stations by the use of the assignment for which coordination was requested;
- b) that its broadcasting-satellite stations will not cause harmful interference to the use of the assignment for which coordination was requested.

7.2.12 Where necessary, as part of the procedure under paragraph 7.2.6, the Board shall assess the level of interference. In any case, the Board shall inform the administrations concerned of the results obtained.

7.2.13 In the event of continuing disagreement between one administration seeking to effect coordination and one whose agreement has been sought, provided that the assistance of the Board has been requested, the administration seeking coordination may, after five months from the date of the request for coordination, taking into consideration the provisions of paragraph 7.3.4, send its notice concerning the proposed assignment to the Board. In those circumstances the notifying administration shall undertake not to bring the frequency assignment into use until the condition in paragraph 7.4.11.2 can be fulfilled. But the administrations concerned may explore the possibility of reaching an agreement on the use of the proposed frequency assignment for a specified period.

Section III. Notification of Frequency Assignments

7.3.1 Any frequency assignment to a space station in the fixed-satellite service shall be notified to the Board:

- a) if the use of the frequency concerned is capable of causing harmful interference to a frequency assignment of another administration which is in conformity with the appropriate Regional Plan¹; or
- b) if it is desired to obtain international recognition of the use of the frequency.

7.3.2 Similar notice shall be given for any frequency to be used for reception by an earth station where one or more of the conditions specified in paragraph 7.3.1 are applicable.

7.3.3 For any notification under paragraph 7.3.1 or 7.3.2, an individual notice for each frequency assignment shall be drawn up as prescribed in Appendix 3 to the Radio Regulations, the various Sections of which specify the basic characteristics to be furnished according to the case. The notifying administration shall furnish such further data as it considers appropriate.

7.3.4 Each notice must reach the Board not earlier than three years before the date on which the assignment is to be brought into use. The notice must reach the Board in any case not later than 3 months² before this date.

7.3.5 Any frequency assignment to an earth or space station, the notice of which reaches the Board after the applicable period specified in paragraph 7.3.4, shall, where it is to be recorded, bear a mark in the Master Register to indicate that it is not in conformity with paragraph 7.3.4.

¹ The attention of administrations is specifically drawn to the application of paragraph 7.2.1 above.

² The notifying administration shall take this limit into account when deciding, where appropriate, to initiate the coordination procedure(s).

**Section IV. Procedure for the Examination of Notices and the
Recording of Frequency Assignments in the Master Register**

7.4.1 Any notice which does not contain at least those basic characteristics specified in Appendix 3 to the Radio Regulations shall be returned by the Board immediately, by airmail, to the notifying administration with the reasons therefor.

7.4.2 Upon receipt of a complete notice, the Board shall include the particulars thereof, with the date of receipt, in its weekly circular which shall contain the particulars of all such notices received since the publication of the previous circular.

7.4.3 The circular shall constitute the acknowledgement to the notifying administration of the receipt of a complete notice.

7.4.4 Complete notices shall be considered by the Board in the order of their receipt. The Board shall not postpone the formulation of a finding unless it lacks sufficient data to render a decision in connection therewith; moreover, the Board shall not act upon any notice which has a technical bearing on an earlier notice still under consideration by the Board, until it has reached a finding with respect to such earlier notice.

7.4.5 The Board shall examine each notice:

7.4.5.1 with respect to its conformity with the Convention, the relevant provisions of the Radio Regulations and the provisions of this Appendix (with the exception of those relating to the coordination procedures and the probability of harmful interference);

7.4.5.2 where appropriate, with respect to its conformity with the provisions of paragraph 7.2.1, relating to the coordination of the use of the frequency assignment with the other administrations concerned having a frequency assignment in conformity with the appropriate Regional Plan;

7.4.5.3 where appropriate, with respect to the probability of harmful interference to the service rendered or to be rendered by a broadcasting-satellite station whose frequency assignment is in conformity with the appropriate Regional Plan.

7.4.6 Depending upon the findings of the Board subsequent to the examination prescribed in paragraphs 7.4.5.1, 7.4.5.2 and 7.4.5.3, as appropriate, further action shall be as follows:

7.4.7 Finding favourable with respect to paragraph 7.4.5.1 in cases where the provisions of paragraph 7.4.5.2 are not applicable

7.4.7.1 The assignment shall be recorded in the Master Register. The date of receipt by the Board of the notice shall be entered in Column 2d.

7.4.8 Finding unfavourable with respect to paragraph 7.4.5.1

7.4.8.1 Where the notice includes a specific reference to the fact that the station will be operated in accordance with the provisions of No. 342 of the Radio Regulations and the finding is favourable with respect to paragraphs 7.4.5.2 and 7.4.5.3, as appropriate, the assignment shall be recorded in the Master Register. The date of receipt of notice by the Board shall be entered in Column 2d.

7.4.8.2 Where the notice includes a specific reference to the fact that the station will be operated in accordance with the provisions of No. 342 of the Radio Regulations and the finding is unfavourable with respect to paragraph 7.4.5.2 or 7.4.5.3, as appropriate, the notice shall be returned immediately by airmail to the notifying administrations with the reasons of the Board for this finding. In those circumstances the notifying administration shall undertake not to bring into use the frequency assignment until the condition in paragraph 7.4.8.1 can be fulfilled. The agreement of the administrations affected can also be obtained in accordance with this Article for a specified period. In that event the Board shall be notified of the agreement and the frequency assignment shall be recorded in the Master Register with a note indicating that the frequency assignment is valid only for the period specified. The notifying administration using the frequency assignment over a specified period shall not subsequently use this circumstance to justify continued use of the frequency beyond the period specified if it does not obtain the agreement of the administration(s) concerned. The date of receipt by the Board of the original notice shall be entered in Column 2d.

7.4.8.3 Where the notice does not include a specific reference to the fact that the station will be operated in accordance with the provisions of No. 342 of the Radio Regulations, it shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding and with such suggestions as the Board may be able to offer with a view to the satisfactory solution of the problem.

7.4.8.4 If the notifying administration resubmits the notice unchanged, it shall be treated in accordance with the provisions of paragraph 7.4.8.3. If it is resubmitted with a specific reference to the fact that the station will be operated in accordance with the provisions of No. 342 of the Radio Regulations, it shall be treated in accordance with the provisions of paragraph 7.4.8.1 or 7.4.8.2, as appropriate. If it is resubmitted with modifications which, after re-examination, result in a favourable finding by the Board with respect to paragraph 7.4.5.1, it shall be treated as a new notice.

7.4.9 Finding favourable with respect to paragraph 7.4.5.1 in cases where the provisions of paragraph 7.4.5.2 are applicable

7.4.9.1 Where the Board finds that the coordination procedures mentioned in paragraph 7.4.5.2 have been successfully completed with all administrations whose frequency assignments in conformity with the appropriate Regional Plan may be affected, the frequency assignment shall be recorded in the Master Register. The date of receipt by the Board of the notice shall be entered in Column 2d.

7.4.9.2 Where the Board finds that the coordination procedure mentioned in paragraph 7.4.5.2 has not been applied, and the notifying administration requests the Board to effect the required coordination, the Board shall take appropriate action and shall inform the administrations concerned of the results obtained. If the Board's efforts are successful, the notice shall be treated in accordance with paragraph 7.4.9.1. If the Board's efforts are unsuccessful, the notice shall be examined by the Board with respect to the provisions of paragraph 7.4.5.3.

7.4.9.3 Where the Board finds that the coordination procedure mentioned in paragraph 7.4.5.2 has not been applied, and the notifying administration does not request the Board to effect the required coordination, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this action and with such suggestions as the Board may be able to offer with a view to the satisfactory solution of the problem.

7.4.9.4 Where the notifying administration resubmits the notice and the Board finds that the coordination procedure mentioned in paragraph 7.4.5.2 has been successfully completed with all administrations whose frequency assignments in conformity with the appropriate Regional Plan may be affected, the frequency assignment shall be recorded in the Master Register. The date of receipt of the original notice by the Board shall be entered in Column 2d. The date of receipt by the Board of the resubmitted notice shall be entered in the Remarks Column.

7.4.9.5 Where the notifying administration resubmits the notice with a request that the Board effect the required coordination under paragraph 7.2.1, it shall be treated in accordance with the provisions of paragraph 7.4.9.2. However, in any subsequent recording of the assignment, the date of receipt by the Board of the resubmitted notice shall be entered in the Remarks Column.

7.4.9.6 Where the notifying administration resubmits the notice and states it has been unsuccessful in effecting the coordination, the Board shall inform the administrations concerned thereof. The notice shall be examined by the Board with respect to the provisions of paragraph 7.4.5.3. However, in any subsequent recording of the assignment, the date of receipt by the Board of the resubmitted notice shall be entered in the Remarks Column.

7.4.10 Finding favourable with respect to paragraphs 7.4.5.1 and 7.4.5.3

7.4.10.1 The assignment shall be recorded in the Master Register. The date of receipt by the Board of the notice shall be entered in Column 2d.

7.4.11 Finding favourable with respect to paragraph 7.4.5.1, but unfavourable with respect to paragraph 7.4.5.3

7.4.11.1 The notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding and with such suggestions as the Board may be able to offer with a view to the satisfactory solution of the problem.

7.4.11.2 Should the notifying administration resubmit the notice with modifications which result, after re-examination, in a favourable finding by the Board with respect to paragraph 7.4.5.3, the assignment shall be recorded in the Master Register. The date of receipt by the Board of the original notice shall be entered in Column 2d. The date of receipt by the Board of the resubmitted notice shall be indicated in the Remarks Column.

7.4.11.3 Should the notifying administration resubmit the notice, either unchanged, or with modifications which decrease the probability of harmful interference, but not sufficiently to permit the provisions of paragraph 7.4.11.2 to be applied, and should that administration insist upon reconsideration of the notice, but should the Board's finding remain unchanged, the notification shall again be returned to the notifying administration in accordance with paragraph 7.4.11.1. In those circumstances, the notifying administration shall undertake not to bring into use the proposed frequency assignment until the condition in paragraph 7.4.11.2 can be fulfilled. The agreement of the administrations affected can also be obtained in accordance with this Article for a specified period. In that event the Board shall be notified of the agreement and the frequency assignment shall be recorded in the Master Register with a note in the Remarks Column indicating that the assignment is valid only for the specified period. The notifying administration using the frequency assignment over a specified period shall not subsequently use this circumstance to justify continued use of the frequency beyond the period specified if it does not obtain the agreement of the administration(s) concerned. The date of receipt by the Board of the original notice shall be entered in Column 2d.

7.4.12 Change in the basic characteristics of assignments already recorded in the Master Register

7.4.12.1 A notice of a change in the basic characteristics of an assignment in the fixed-satellite service already recorded, as specified in Appendix 3 to the Radio Regulations (except the name of the station or the name of the locality in which it is situated or the date of bringing into use), shall be examined by the Board according to paragraph 7.4.5.1 and, where appropriate, paragraphs 7.4.5.2 and 7.4.5.3, and the provisions of paragraphs 7.4.7 to 7.4.11.3 inclusive shall apply. Where the change should be recorded, the original assignment shall be amended accordingly.

7.4.12.2 However, in the case of a change in the characteristics of an assignment which is in conformity with paragraph 7.4.5.1, should the Board reach a favourable finding with respect to paragraphs 7.4.5.2 and 7.4.5.3, where appropriate, or find that the changes do not increase the probability of harmful interference to frequency assignments in conformity with the appropriate Regional Plan, the amended assignment shall retain the original date in Column 2d. The date of receipt of the notice by the Board relating to the change shall be entered in the Remarks Column.

7.4.12.3 The projected date of bringing into use of a frequency assignment may be extended by four months on request of the notifying administration. If the administration states that, due to exceptional circumstances, it needs a further extension of this period, such extension may be provided but it shall in no case exceed eighteen months from the original projected date of bringing into use.

7.4.12.4 In applying the provisions of this section, any resubmitted notice which is received by the Board more than two years after the date of its return by the Board shall be considered as a new notice.

7.4.13 Recording of frequency assignments in the fixed-satellite service notified before being brought into use

7.4.13.1 If a frequency assignment notified in advance of bringing into use has received a favourable finding by the Board with respect to paragraph 7.4.5.1 and, where appropriate, paragraphs 7.4.5.2 and 7.4.5.3, it shall be entered provisionally in the Master Register with a special symbol in the Remarks Column indicating the provisional nature of that entry.

7.4.13.2 Within one month after the date of bringing into use, either as originally notified or as modified in application of paragraph 7.4.12.3, the notifying administration shall confirm that the frequency assignment has been brought into use. When the Board is informed that the assignment has been brought into use, the special symbol shall be deleted from the Remarks Column.

7.4.13.3 If the Board does not receive this confirmation within the period referred to in paragraph 7.4.13.2, the entry concerned shall be cancelled. The Board shall advise the administration concerned before taking such action.

Section V. Recording of Findings in the Master Register

7.5 In any case where a frequency assignment is recorded in the Master Register, the finding reached by the Board shall be indicated by a symbol in Column 13a. In addition, a remark indicating the reasons for any unfavourable finding shall be inserted in the Remarks Column.

Section VI. Categories of Frequency Assignments

7.6.1 The date in Column 2c shall be the date of putting into use notified by the administration concerned. It is given for information only.

7.6.2 If harmful interference is actually caused to the reception of any broadcasting-satellite station whose frequency assignment is in conformity with the appropriate Regional Plan, by the use of a frequency assignment to a space radiocommunication station subsequently recorded in the Master Register in accordance with the provisions of paragraph 7.4.11.3, the station using the latter frequency assignment must, upon receipt of advice thereof, immediately eliminate this harmful interference.

7.6.3 If harmful interference to the reception of any broadcasting-satellite station whose frequency assignment is in conformity with the appropriate Regional Plan, is actually caused by the use of a frequency assignment which is not in conformity with paragraph 7.4.5.1, the station using the latter frequency assignment must, upon receipt of advice thereof, immediately eliminate this harmful interference.

Section VII. Review of Findings

7.7.1 The review of a finding by the Board may be undertaken:

- a) at the request of the notifying administration;
- b) at the request of any other administration interested in the question, but only on the grounds of actual harmful interference;
- c) on the initiative of the Board itself when it considers this is justified.

7.7.2 The Board, in the light of all the data at its disposal, shall review the matter, taking into account paragraph 7.4.5.1 and, where appropriate, paragraphs 7.4.5.2 and 7.4.5.3, and shall render an appropriate finding, informing the notifying administration prior either to the promulgation of its finding or to any recording action.

7.7.3 If the finding of the Board is then favourable it shall enter in the Master Register the changes that are required so that the entry shall appear in the future as if the original finding had been favourable.

7.7.4 If the finding with regard to the probability of harmful interference remains unfavourable, no change shall be made in the original entry.

**Section VIII. Modification, Cancellation and Review of Entries
in the Master Register**

7.8 The Board shall at intervals not exceeding two years request confirmation from the notifying administration that its assignment has been and will continue to be in regular use in accordance with its recorded characteristics.

7.8.1 Where the use of a recorded assignment to a station in the fixed-satellite service is suspended for a period of eighteen months, the notifying administration shall, within this eighteen-month period, inform the Board of the date on which such use was suspended and of the date on which the assignment is to be brought back into regular use.

7.8.2 Whenever it appears to the Board, whether or not as a result of action under paragraph 7.8.1, that a recorded assignment to a space station in the fixed-satellite service has not been in regular use for more than eighteen months, the Board shall inquire of the notifying administration as to when the assignment is to be brought back into regular use.

7.8.3 If no reply is received within six months of action by the Board under paragraph 7.8.2, or if the reply does not confirm that the assignment to a space station in the fixed-satellite service is to be brought back into regular use within this six-month limit, a mark should be entered against the entry in the Master Register.

7.8.4 In case of permanent discontinuance of the use of any recorded frequency assignment, the notifying administration shall inform the Board within three months of such discontinuance, whereupon the entry shall be removed from the Master Register.

7.8.5 Whenever it appears to the Board from the information available that a recorded assignment has not been brought into regular operation in accordance with the notified basic characteristics, or is not being used in accordance with those basic characteristics, the Board shall consult the notifying administration and, subject to its agreement, shall either cancel or suitably modify or retain the basic characteristics of the entry.

7.8.6 If, in connection with an inquiry by the Board under paragraph 7.8.5 the notifying administration has failed to supply the Board within three months with the necessary or pertinent information, the Board shall make suitable entries in the Remarks Column of the Master Register to indicate the situation.

NOC

ARTICLE 9

**Power Flux-Density Limits Between 11.7 GHz and 12.2 GHz
to Protect Terrestrial Services in Regions 1 and 3
from Interference from Region 2
Broadcasting-Satellite Space Stations**

9.1 The power flux-density at the Earth's surface in Regions 1 and 3, produced by emissions from a space station in the broadcasting-satellite service in Region 2 for all conditions and for all methods of modulation shall not exceed the values given in Annex [5] on the territory of any country unless the administration of that country so agrees.

MOD

ARTICLE 10

**Power Flux-Density Limits Between 11.7 GHz and 12.2 GHz to Protect
the Fixed-Satellite Service in Region 2 from Interference
from Broadcasting-Satellite Space Stations of
Regions 1 and 3, and Power Flux-Density
Limits Between 12.2 GHz and 12.7 GHz
to Protect Space Services in Region 3 and
Between 12.5 GHz and 12.7 GHz to Protect the
Fixed-Satellite Service in Region 1 from Interference
from Broadcasting-Satellite Space Stations of Region 2**

10.1 Broadcasting-satellite space stations of Regions 1 and 3 shall employ transmitting antennas whose side-lobe characteristics fall within the reference antenna pattern given in Figure [9] of Annex [6]. Therefore, the power flux-density falling on the territory of any administration of Region 2 in the band 11.7 - 12.2 GHz prior to any modifications to the Regions 1 and 3 Plan shall not exceed, under all conditions and methods of modulation, the values produced by broadcasting-satellite stations operating in accordance with the Regions 1 and 3 Plan on the date of its entry into force and using the technical characteristics specified in that Plan. The power flux-density values shall be calculated using the method described in Annex [...].

10.2 Broadcasting-satellite space stations of Region 2 shall employ transmitting antennas whose side-lobe characteristics fall within the reference antenna pattern given in Figure [10] of Annex [6]. Therefore, before making any modifications to the Region 2 Plan, administrations shall ensure that the power flux-density falling on the territory of any administration of Region 1 in the band 12.5 - 12.7 GHz and of Region 3 in the band 12.2 - 12.7 GHz does not exceed, under all conditions and methods of modulation, the values produced by broadcasting-satellite space stations operating in conformity with the Region 2 Plan on the date of its entry into force and using the technical characteristics specified in that Plan. The power flux-density values shall be calculated using the method described in Annex [...].

NOC

ARTICLE 11

**The Plan for the Broadcasting-Satellite Service in
the Frequency Bands 11.7 - 12.2 GHz in Region 3
and 11.7 - 12.5 GHz in Region 1**

(This Article is not reproduced in this document)

1 (MOD) See Annex [8], paragraph [3.2.3].

MCS

ARTICLE 10 12

The Plan for the Broadcasting-Satellite Service in
the Frequency Band 12.2 - 12.7 GHz in Region 2

12.4
10.4

COLUMN HEADINGS OF THE PLAN

- Col. 1. *Beam identification* (Column 1 contains the symbol designating the country or the geographical area taken from Table No. 1 of the Preface to the International Frequency List followed by the symbol designating the service area).
- Col. 2. *Nominal orbital position*, in degrees and hundredths of a degree.
- Col. 3. *Channel number* (see Table showing channel numbers and corresponding assigned frequencies).
- Col. 4. *Boresight* geographical coordinates, in degrees and hundredths of a degree.
- Col. 5. *Antenna beamwidth*. This column contains two figures corresponding to the major axis and the minor axis respectively of the elliptical cross-section half-power beam, in degrees and hundredths of a degree.
- Col. 6. *Orientation of the ellipse* determined as follows: in a plane normal to the beam axis, the direction of a major axis of the ellipse is specified as the angle measured anti-clockwise from a line parallel to the equatorial plane to the major axis of the ellipse to the nearest degree.
- Col. 7. *Polarization* (1 = direct, 2 = indirect)¹.
- Col. 8. *E.i.r.p.* in the direction of maximum radiation, in dBW.
- Col. 9. *Remarks*.

12.2
10.2

TEXT FOR SYMBOLS IN REMARKS COLUMN OF THE PLAN

1. Fast roll-off space station transmitting antenna as defined in Annex [5] (item 3.13.3) ~~to this Part.~~
2. Television standard with 625 lines using greater video bandwidth and necessary bandwidth of 27 MHz.
3. ~~This assignment will be implemented only if it does not hinder the development and subsequent introduction of a feeder-link Plan for Region 1.~~ Not used.
4. This assignment may be utilized in the geographical area of Anguilla (AIA) (which is in the beam area).
5. Feeder-link earth stations for this assignment may also be located in the territories of Puerto Rico and the United States Virgin Islands. Such operation shall not cause more interference nor require more protection than the assignment under the Plan.
6. Feeder-link earth stations for this assignment may also be located in the States of Alaska and Hawaii. Such operation shall not cause more interference nor require more protection than the assignment under the Plan.
7. The feeder-link earth station for this assignment may also be located at the point with geographical coordinates 3°31' West, 48°46' North. Such operation shall not cause more interference nor require more protection than the assignment under the Plan.

¹ See Annex [5] to this Part, paragraph 3.2.

8. Feeder-link earth stations for this assignment may also be located at the points with the following geographical coordinates:

47°55' West	15°47' South	34°53' West	08°04' South
43°13' West	22°55' South	60°02' West	03°06' South
46°38' West	23°33' South	38°31' West	12°56' South
51°13' West	30°02' South	49°15' West	16°40' South

Such operation shall not cause more interference nor require more protection than the assignment under the Plan.

9/GR....: This assignment is part of a group, the number of which follows the symbol. The group consists of the beams and has the number of channels assigned to it as indicated in the Table below. The overall equivalent protection margin to be used for the new application of Article 4 and Annex 1 and Resolution No. 2 shall be calculated on the following basis: (Sat-82)

- for assignments that are part of a group, only the interference contributions from assignments that are not part of the same group are to be included; and
- from assignments belonging to a group to assignments that are not part of that same group, only the worst interference contribution from that group shall be used on a test point to test point basis."

[40]
[41]
[42]

Group	Beams in the group	Number of channels assigned to the group
GR1	ALS00002 HWA00002 USAPSA02	32 channels
GR2	ALS00003 HWA00003 USAPSA03	32 channels
GR3	ARGINSU4 ARGSUR04	16 channels
GR4	ARGINSU5 ARGSUR05	12 channels
GR5	BOLAND01 CLMAND01 EQACAND1 EQAGAND1 PRUAND02 VENAND03	16 channels
GR6	B SU111 B SU211	32 channels
GR7	B CE311 B CE411 B CE511	32 channels
GR8	B NO611 B NO711 B NO811	32 channels
GR9	B SU112 B SU212 B CE312 B CE412	32 channels
GR10	CAN01101 CAN01201	32 channels
GR12	CAN01203 CAN01303 CAN01403	32 channels
GR13	CAN01304 CAN01404 CAN01504	32 channels
GR14	CAN01405 CAN01505 CAN01605	32 channels
GR16	CHLCONT4 CHLCONT6	16 channels
GR17	CHLCONT5 PAQPAC01 CHLPAC02	16 channels
GR18	CRBBER01 CRBBLZ01 CRBJMC01 CRBBAH01 CRBECO01	16 channels
GR19	EQACOO01 EQAGOO01	16 channels
GR20	PTRVIR01 USAEHO02	32 channels
GR21	PTRVIR02 USAEHO03	32 channels
GR22	VEN02VEN VEN11VEN	4 channels

Country symbols

1. For the explanation of symbols designating countries or geographical areas in Region 2, see the Preface to the International Frequency List.
2. One additional symbol, CRB, has been created for the purposes of the ¹⁴⁸³~~present~~ Conference only, to designate a geographical area in the Caribbean Area. The five Caribbean beams are identified as follows:

CRBBAH01, CRBBER01, CRBBLZ01, CRBEC001 and CRBJMC01

and are intended collectively to provide coverage for the following countries or geographical areas: AIA, ATG, BAH, BER, BLZ, BRB, CYM, DMA, GRD, GUY, JMC, LCA, MSR, SCN, SUR, TCA, TRD, VCT and VRG to be so used if approved by them.

TABLE SHOWING CORRESPONDENCE BETWEEN CHANNEL NUMBERS
AND ASSIGNED FREQUENCIES

Channel No.	Assigned frequency (MHz)	Channel No.	Assigned frequency (MHz)
1	12224.00	17	12457.28
2	12238.58	18	12471.86
3	12253.16	19	12486.44
4	12267.74	20	12501.02
5	12282.32	21	12515.60
6	12296.90	22	12530.18
7	12311.48	23	12544.76
8	12326.06	24	12559.34
9	12340.64	25	12573.92
10	12355.22	26	12588.50
11	12369.80	27	12603.08
12	12384.38	28	12617.66
13	12398.96	29	12632.24
14	12413.54	30	12646.82
15	12428.12	31	12661.40
16	12442.70	32	12675.98

(The Plan is not reproduced in this Document)

ORB-85/DT/74-E

MOD

ARTICLE 13

Relationship to Resolution 507

13.1 The provisions and associated Plans for the broadcasting-satellite service in Regions 1 and 3, and in Region 2 of this Appendix shall be regarded as including a world agreement and associated Plans for Regions 1, 2 and 3 in accordance with resolves 1 of Resolution 507, which requires the stations in the broadcasting-satellite service to be established and operated in accordance with such agreements and associated plans.

MOD

ARTICLE 14

Interference

14.1 The Members of the Union shall endeavour to agree on the action required to reduce harmful interference which might be caused by the application of these provisions and the associated Plans.

MOD

ARTICLE 15

Period of Validity of the Provisions and Associated Plans

15.1 For Regions 1 and 3, the provisions and associated Plan have been prepared in order to meet the requirements of the broadcasting-satellite service in the bands concerned for a period of at least fifteen years from 1 January 1979.

15.2 For Region 2, the provisions and associated Plan have been prepared in order to meet the requirements of the broadcasting-satellite service in the bands concerned for a period extending until at least 1 January 1994¹.

15.3 In any event, the provisions and associated Plans shall remain in force until their revision by a competent administrative radio conference convened in accordance with the relevant provisions of the Convention in force.

¹ [See also Resolution 1(Sat-R2)].

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/75-E
3 September 1985
Original: English

Source: Document 199 (section 4)

COMMITTEE 4

ELEMENT FOR INCLUSION IN CHAPTER 3 (SECTION 3.4)

INTER-SERVICE SHARING CONSIDERATIONS

The following text is based on section 4 of Document 199 as approved in Committee 4. The material has been reformatted into a form closer to that required for the report of this session. This material will probably be addressed to section 3.4 of Chapter 3 once the decisions of Committee 5 are known.

Sections 1 to 3 (inclusive) of Document 199 will be included in a separate DT document.

R.G. AMERO
Chairman of Committee 4

Annex: 1

ANNEX

Element for Chapter 3 (section 3.4)

Inter-service sharing

Y. Agenda item 2.2, sharing criteria for bands and services to be planned.

In view of the decision of this session to select only the FSS, and the bands 4 and 6 GHz, 11 - 12 and 14 GHz, for planning at the second session, the following information is provided, both to guide the studies to be conducted during the intersessional period, and to facilitate the work of the second session.

Y.1 Existing sharing criteria for the FSS in the 4 and 6 GHz bands include the p.f.d. limits set forth in Radio Regulations 2565-2568, the restrictions on the pointing of antennas in the fixed service at or near the orbit contained in Radio Regulations 2502-2547, and certain other provisions of the Regulations.

These criteria, which have enabled extensive sharing between the fixed, mobile (except aeronautical mobile) and fixed-satellite services for many years, are deemed adequate to permit the continuation of sharing in the 4 and 6 GHz bands (3 700 - 4 200 MHz (space-to-Earth) and 5 925 - 6 425 MHz (Earth-to-space)). Based on more limited experience, the present criteria are also deemed adequate for the bands (3 400 - 3 700 MHz (space-to-Earth), 4 500 - 4 800 MHz (space-to-Earth) and 6 425 - 7 025 MHz (Earth-to-space)). These conclusions are valid regardless of which of the possible planning methods is employed, unless the planning method violates the principle of [paragraphs 2.2 and 2.3 of Chapter] by specifying nominal earth station locations.

Y.2 The sharing criteria for the 11 - 12 and 14 GHz bands include the p.f.d. limits set forth in Radio Regulations 2572-2576, and the restrictions on the pointing of antennas in the fixed service at or near the orbit contained in Radio Regulations 2502-2547, and certain other provisions of the Regulations.

These criteria, which have enabled sharing between the fixed, mobile (except aeronautical mobile) and fixed-satellite services to develop in recent years, are deemed adequate to permit the continuation of sharing in these bands. This conclusion is valid, regardless of which of the possible planning methods is employed, unless the planning method violates the principle of [paragraphs 2.2 and 2.3 of Chapter] by specifying nominal earth station locations.

Y.3 It should be noted that sharing criteria for bands below 15 GHz are generally derived from analogue-modulated terrestrial systems, and parameters for digital systems need to be developed.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/76-E
3 September 1985
Original: English

Source: Document 199 (sections 1 to 3)

COMMITTEE 4

ELEMENT FOR INCLUSION IN CHAPTER 5

INTER-SERVICE SHARING CONSIDERATIONS

The following text is based on sections 1 to 3 inclusive of Document 199 as approved in Committee 4. The material has been reformatted into a form closer to that required for the report of this session. This material may have to be reviewed further once the decisions of Committee 5 are known.

Section 4 of Document 199 will be included in a separate DT document.

R.G. AMERO
Chairman of Committee 4

Annex: 1

ELEMENT FOR CHAPTER 5

INTERSERVICE SHARING

X.1 Introduction

In the CPM Report, Chapters 8 and 10 and all of Annex 5 and section 6.1.3.4 of Annex 6 treat sharing principles, performance requirements, interference criteria and the available criteria for sharing between services.

Both down-link and feeder-link sharing situations have been considered. This material and the conclusions set forth in those sections are endorsed and are incorporated by reference in this report for the information and guidance they offer, particularly with regard to the bands and services to be planned, planning principles and criteria.

X.2 Principles and conclusions

Among the principles and conclusions of particular importance in the CPM Report are those discussed below. Where there are additional views on interservice sharing situations, based on information included in the report of the IFRB to this session, and on contributions of administrations, they have been included.

X.2.1 Interference and sharing criteria are necessary to permit the equitable sharing of a band by services having primary allocations in that band. Such criteria have been developed for many bands and services, and are responsible for the successful and intensive use now being made of shared bands.

X.2.2 Services, whether space or terrestrial, having primary allocations in a particular band, have equal rights with respect to the use of the spectrum. The requirements of both services must be taken into account while planning a space service, without changing their existing sharing status, regardless of the planning method or approach employed, taking into account, in specific bands, Article 8 of the Radio Regulations.

X.2.3 In order for the development of terrestrial services in shared bands to continue, as a corollary or consequence of the principle set forth immediately above, earth station locations should not be included in the planning of bands shared on a primary basis with terrestrial services.

X.2.4 Techniques that may be necessary or desirable to facilitate sharing, also bring about the more efficient use of the spectrum by all services.

X.2.5 The planning of bands shared by space services operating in different directions of transmission (i.e. "reverse band working") could well impose additional constraints on both services, particularly when a terrestrial fixed service is also a primary service in those bands.

It may be possible in some operational environments to increase the overall use of some FSS/FS shared bands through reverse band working (RBW), without significantly affecting terrestrial services or significantly reducing the capacity in the forward-band working, if the initial indications can be confirmed that the favourable geometry associated with the high elevation angles (above 40° was proposed by one administration) significantly ameliorates the constraints outlined above. It is recommended that such studies be conducted

during the intersessional period. It would, however, be necessary, while considering RBW at 4 and 6 GHz in particular, to restrict satellite pfd and require adequate satellite antenna discrimination towards the limb of the Earth, taking into account existing terrestrial stations (whether they employ analogue or digital techniques) and where the main beam of the satellite antenna is directed within two degrees of the Earth's limb. The limits on pfd and the required satellite antenna discrimination should also be determined during the intersessional period.

X.2.6 Further study may be needed for a number of combinations of services, listed below, which may share a band or bands. Certain of these sharing situations are more likely to occur, and more problematic than others. In view of the limited time and resources to be available during the intersessional period, attention should be focussed on those situations identified in Chapter 8 as critical to the requirements of the second session.

- a) BSS/FSS at 2.5 GHz;
- b) BSS/FSS at 12 GHz - Interregional;
- c) FSS/EESS (passive) at 18.6 - 18.8 GHz;
- d) FSS/MetSS at around 7/8 GHz and at 18 GHz;
- e) ISS/BSS at 22.5 - 23 GHz;
- f) FSS/FS in bidirectional bands;
- g) MSS/FS at 1.6/1.5 GHz;
- h) BSS/FS at 22.5 - 23 GHz;
- i) FSS/EES at 8 GHz.

X.2.7 Interference limits and sharing criteria must permit a continuation of at least the same level of sharing between services in a particular band. However, certain planning methods could adversely affect the ability of these sharing criteria to ensure the same level of sharing.

X.2.8 WARC-79 by Recommendation No. 66, recommended that the CCIR study (as a matter of urgency) the question of spurious emissions from space stations. It is important that intersessional studies provide the second session of the Conference with information to be able to take appropriate action at that time.

X.2.9 Once ORB-85 has identified bands and services to be planned, new sharing criteria must be developed for situations where no criteria exist, and existing criteria should be reviewed for their adequacy in light of the particular planning method to be employed. It is contemplated that those criteria requiring further study should be identified for consideration during the intersessional period.

X.2.10 The CCIR can provide a knowledgeable and efficient forum for the development of new criteria and the examination of existing ones; however, special arrangements may be necessary to enable the CCIR to provide the information required within the limited available time.

X.2.11 In situations where interference and sharing criteria had not been incorporated in the Radio Regulations, the IFRB, acting in accordance with the Regulations, developed and applied such criteria to Article 14 procedures to space services on a provisional basis. These sharing criteria should be reviewed during the intersessional period, and appropriate Recommendations should be made to the second session of WARC-ORB.

There are several services and bands in which sharing could take place under current footnote allocations, employing the provisions of Article 14, which are not included in Table I of Appendix 28. These instances are summarized in Table [A] here, which also gives the number of such cases that have been received by the IFRB during the period 1 January 1982 to 31 July 1985.

Furthermore, the first three columns of Table II of Appendix 28 do not contain values of certain interference parameters and criteria ($p_o\%$, n , $J(\text{dB})$, $M_o(P_o)$, W , B or $P_r(p)$). Other columns should be added to Table II of Appendix 28 for the bands and services marked in Table [B] with a plus sign (+).

X.2.12 With regard to Appendix 29, note that the value of 4% triggering the requirement for coordination between space systems was adopted some years ago for the FSS, taking into account the sharing situations that could arise at the time, and assuming technical characteristics of FSS then envisaged.

This level of 4% may not be appropriate for space services other than the FSS, and may even be in need of revision for application to the FSS (many, or even most, FSS systems whose system temperature is increased by 4% may still not experience unacceptable interference). Study of this matter should be undertaken by the CCIR during the intersessional period and the results made available to the second session.

X.2.13 The sharing situations which are the subject of many such communications to the IFRB as shown in Tables [A and B] would appear to be in greatest need of having sharing criteria studied by the CCIR during the intersessional period, for consideration by the second session, but other bands may have equal or greater need, because of the narrower bandwidth available, or the technical characteristics of systems likely to be employed.

The IFRB is invited to identify early in the intersessional period, those services which, in its opinion, are in greatest need of formally adopted sharing criteria, or of review and revision of existing criteria.

X.2.14 It should be borne in mind during the intersessional period, when considering changes to the technical provisions of coordination (such as those set forth in Appendix 28), that Resolution No. 703 offers a possible means for those administrations wishing to amend these provisions within their particular geographic area, without imposing these amendments on other administrations, and without causing unacceptable interference to any administration.

TABLE A(Rev.)

Services and frequency bands subject to the procedure of Article 14
and not included in Table I of Appendix 28 (between 1 and 40 GHz)

Frequency bands	Ref. No.	Services concerned	Status of services	Direction of links	Number of cases received by the IFRB during the period 1.1.82 to 31.7.85
1 610 - 1 626.5 MHz	732	Radionavigation-satellite	Not mentioned	Not mentioned	
1 610 - 1 626.5 MHz	733	Aeronautical mobile-satellite (R)	Not mentioned	Not mentioned	3
1 750 - 1 850 MHz	745	Space operation	Not mentioned	Up-link	5
1 750 - 1 850 MHz	745	Space research	Not mentioned	Up-link	
1 770 - 1 790 MHz	746	Meteorological-satellite	Primary	Not mentioned	
2 025 - 2 110 MHz	747	Space research	Not mentioned	Up-link and intersatellite	54
2 025 - 2 110 MHz	747	Space operation	Not mentioned	Up-link and intersatellite	
2 025 - 2 110 MHz	747	Earth exploration-satellite	Not mentioned	Up-link and intersatellite	
2 110 - 2 120 MHz	748/749	Space research	Not mentioned	Up-link	5
2 110 - 2 120 MHz	749	Space operation	Not mentioned	Up-link	
2 655 - 2 690 MHz	761	Fixed-satellite	Primary	Up-link, down-link	2
5 000 - 5 250 MHz	797	Fixed-satellite	Not mentioned	Not mentioned	
5 000 - 5 250 MHz	797	Intersatellite	Not mentioned	Intersatellite	
7 125 - 7 155 MHz	810	Space operation	Not mentioned	Up-link	
7 145 - 7 235 MHz	811	Space research	Not mentioned	Up-link	
7 900 - 8 025 MHz	812	Mobile-satellite	Not mentioned	Up-link	8
13.25 - 13.4 GHz	852	Space research	Secondary*	Up-link	
15.4 - 15.7 GHz	797	Fixed-satellite	Not mentioned	Not mentioned	
15.4 - 15.7 GHz	797	Intersatellite	Not mentioned	Intersatellite	
37 - 39 GHz	899	Fixed-satellite	Not mentioned	Up-link	

* Because of its secondary status, [Committee 4] does not propose inclusion of the space research service in this band in Table I of Appendix 28.

TABLE B

Services and frequency bands subject to Article 14
procedure not included in Section IV of Article 28 (between 1 and 40 GHz)

Frequency bands	Ref. No.	Services concerned	Status of services	Direction of links	Number of cases received by the IFRB during the period 1.1.82 to 31.7.85
1 610 - 1 626.5 MHz ⁺	732	Radionavigation-satellite	Not mentioned	Not mentioned	
1 610 - 1 626.5 MHz ⁺	733	Aeronautical mobile-satellite (R)	Not mentioned	Not mentioned	3
1 770 - 1 790 MHz	746	Meteorological-satellite	Primary	Not mentioned	
2 025 - 2 110 MHz*	747	Space research	Not mentioned	Up-link and intersatellite	54
2 025 - 2 110 MHz*	747	Space operation	Not mentioned	Up-link and intersatellite	
2 025 - 2 110 MHz*	747	Earth exploration-satellite	Not mentioned	Up-link and intersatellite	
2 200 - 2 290 MHz**	750	Space research	Not mentioned	Down-link and intersatellite	62
2 200 - 2 290 MHz**	750	Space operation	Not mentioned	Down-link and intersatellite	
2 200 - 2 290 MHz**	750	Earth-exploration satellite	Not mentioned	Down-link and intersatellite	
2 500 - 2 535 MHz ⁺	754	Mobile-satellite	Not mentioned	Down-link	
5 000 - 5 250 MHz ⁺	797	Fixed-satellite	Not mentioned	Not mentioned	
5 000 - 5 250 MHz ⁺	797	Intersatellite	Not mentioned	Intersatellite	
8 025 - 8 400 MHz*	815	Earth exploration-satellite	Primary	Down-link	4
11.7 - 12.7 GHz ⁺	839	Broadcasting-satellite	Primary	Down-link	34
11.7 - 12.7 GHz	839	Fixed-satellite	Primary	Down-link	
22.5 - 23 GHz ⁺	877	Broadcasting-satellite	Primary	Down-link	
31.8 - 33.8 GHz	892	Fixed-satellite	Not mentioned	Down-link	

Note 1 - In bands marked with an asterisk (*) Table references specify that the service concerned is subject to power flux-density limits under Article 28, Section IV.

Note 2 - Bands and services marked with a plus (+) sign are also missing in Table II of Appendix 28.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/77-E
4 September 1985
Original: English

SUB-WORKING GROUP 6A2

NOTE BY THE CHAIRMAN OF SUB-WORKING GROUP 6A2

Enclosed at Annex 1 is a draft of Resolution No. COM6/4 relating to the sharing of the band 17.7 - 17.8 GHz between the space and terrestrial services in Region 2.

Annex 2 contains a draft Recommendation No. COM6/A relating to the recording in the MIFR of the assignments for Region 2 contained in Appendix 30 and Appendix 30A.

J.F. BROERE
Chairman

Annexes: 2

ANNEX 1

Draft

RESOLUTION No. COM6/4

**Relating to the Sharing of the Band 17.7 - 17.8 GHz
Between the Space and Terrestrial Services in Region 2**

The World Administrative Radio Conference on the Use of the
Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It,
Geneva, 1985

considering

- a) that the 17.3 - 17.8 GHz band is allocated to the fixed-satellite service (Earth-to-space) for the exclusive use of feeder links to the broadcasting-satellite service;
- b) that it adopted a feeder-link Plan in the band 17.3 - 17.8 GHz based on the recording in the Plan of the area in which the feeder-link earth stations may be located;
- c) that the 17.7 - 17.8 GHz is also allocated on a primary basis to the fixed-satellite service (space-to-Earth) and to the terrestrial services;
- d) that the equality of rights among services sharing the band 17.7 - 17.8 GHz should be reflected in the procedures adopted by this Conference;
- e) that it was not possible to base the feeder-link Plan in the band 17.7 - 17.8 GHz on the exact locations of the feeder-link earth stations using characteristics given in [Appendix 30A];
- f) that administrations planning to use the terrestrial stations or the earth stations in the fixed-satellite service (space-to-Earth) should have the means to evaluate the interference that might be caused to their planned stations;

resolves to request the IFRB

- 1. to invite administrations in Region 2, which have not already done so, to communicate the geographical coordinates of their planned feeder-link earth stations and any other technical characteristics that they may consider appropriate in the band 17.7 - 17.8 GHz;
- 2. to add the information submitted by administrations under Resolves 1 to Col. 9 of the Plan of [Appendix 30A].

ANNEX 2

Draft

RECOMMENDATION No. COM6/A

**Relating to the Recording in the Master International
Frequency Register the assignments for Region 2
contained in Appendix 30 and Appendix 30A**

The World Administrative Radio Conference on the Use of the
Geostationary-Satellite Orbit and the Planning of the Space Services Utilizing
It, First Session, Geneva, 1985,

considering

a) that the provisions and associated Plans prepared by the present
Conference for Region 2 adopted by the RARC-Sat-2 have been incorporated in the
Radio Regulations in Appendix 30 and Appendix 30A;

recommends

that the IFRB record in the Master International Frequency Register
the assignments appearing in the two Region 2 Plans.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

Document DT/78-E
5 September 1985
Original: English

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

WORKING GROUP 5B

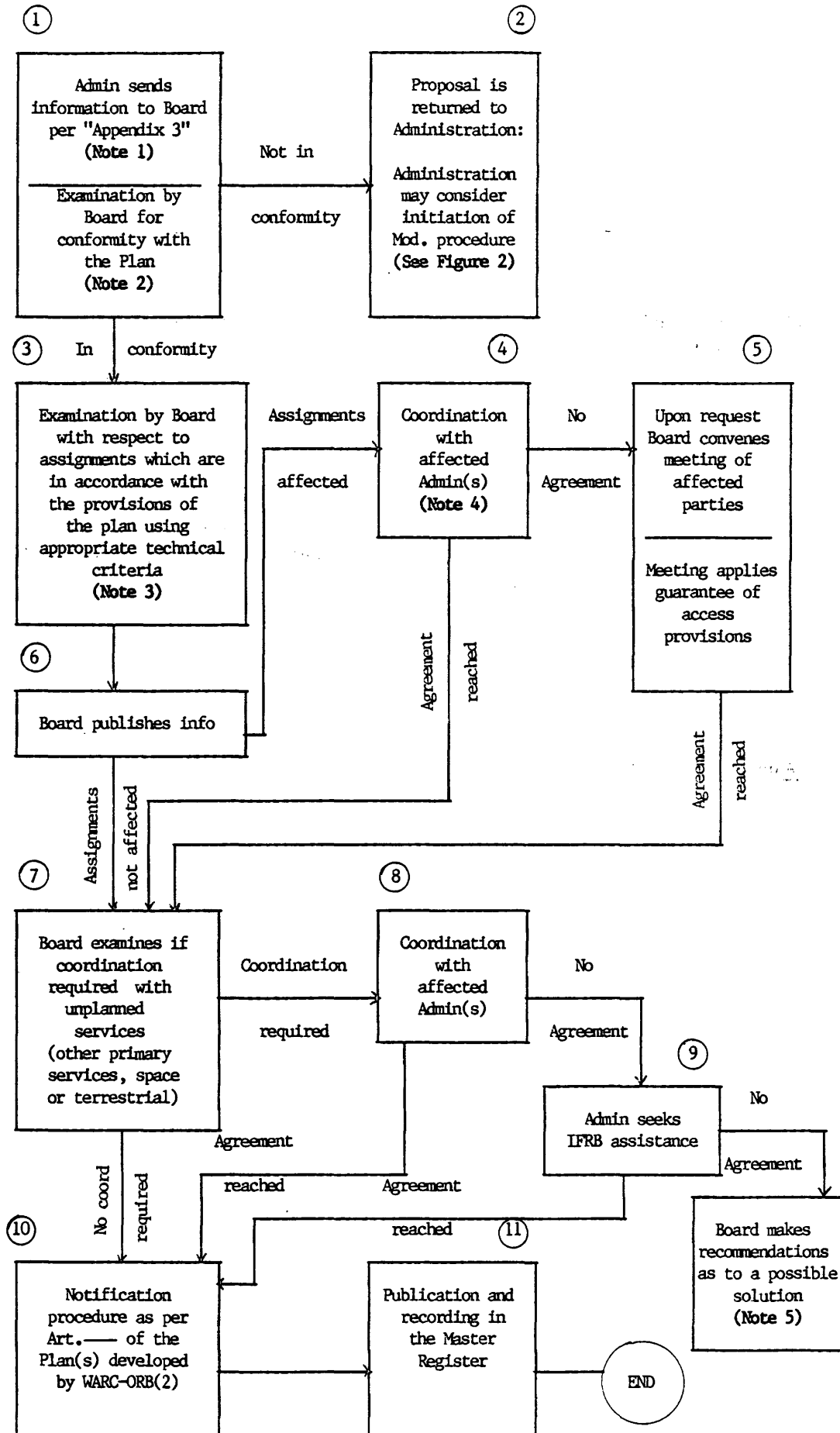
The annexed flowcharts and the associated notes reflect the opinion of the Chairman of Working Group 5B in respect of procedures applicable to an allotment plan in the event that such a plan is adopted.

S.M. CHALLO
Chairman of Working Group 5B

Annex

FIGURE 1-

SYSTEM IMPLEMENTATION PROCEDURE

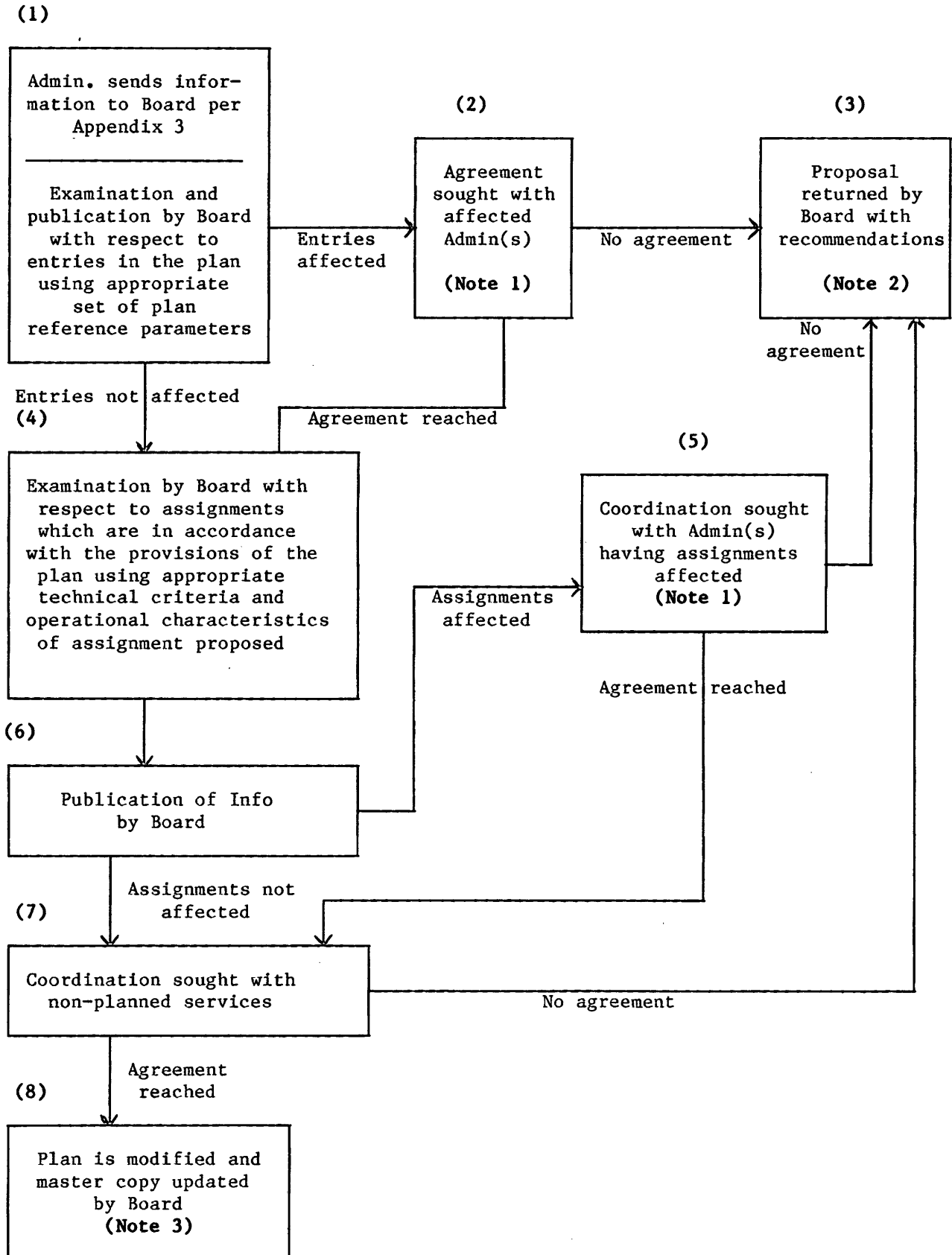


NOTES TO FIGURE 1

- Note 1: Submission of this information shall be made within (a period yet to be determined) before the date on which assignment is to be brought into use.
- Note 2: The examination for conformity with the plan mentioned in box 1 should be in respect of allotments, and covers:
- orbital position in a predetermined arc (paragraphs 3 and 4 of Annex 1 to DT/70);
 - service area (paragraph 1 of Annex 1 to DT/70);
 - the minimum bandwidth within the band (yet to be defined) (paragraph 3 of Annex 1 to DT/70).
- Note 3: The examination mentioned in box 3 should be in respect of assignments for which full information has been received, and covers existing systems. The status of existing systems will be determined later (paragraph 8 of Annex 1 to DT/70).
- Note 4: The agreement required could be reached through bilateral discussions or at a multilateral planning meeting, as appropriate.
- Note 5: The IFRB will offer assistance in the application of the modification procedure, if necessary.

Figure 2

PROCEDURE FOR MODIFICATIONS TO THE PLAN



NOTES TO FIGURE 2

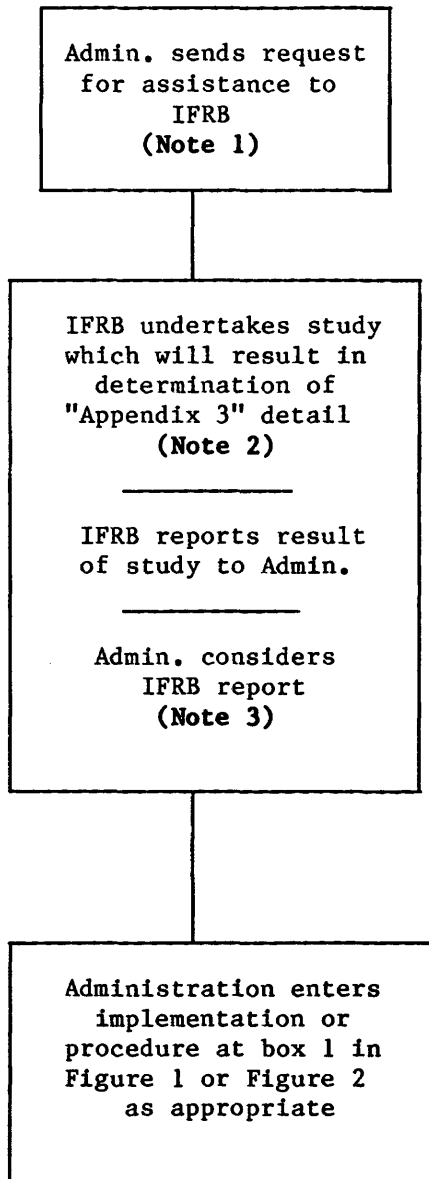
Note 1: The agreement required could be reached through bilateral discussions or at a multilateral planning meeting, as appropriate.

Note 2: If the requirement is for a new Member of the ITU for which there is no allotment in the plan a special effort shall be made to guarantee access for this requirement.

Note 3: When a system for which the modification procedure has been applied is to be implemented, the implementation procedure starts at box 1 in Figure 1.

Figure 3

Requests for special assistance*



Notes to Figure 3:

Note 1: The administration should state its communication requirements in accordance with Appendix N (to be developed) which should contain sufficient detail to permit a proper assessment by the Board

Note 2: The study will take existing systems into account.

Note 3: Consultation between the IFRB and the requesting administration will take place as and when appropriate.

* This procedure may be applied on behalf of two or more administrations wishing to establish a sub-regional system.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

Document DT/79
5 September 1985
Original: English

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

SUB-WORKING GROUP PL-A-2

Report of Sub-Group PL-A-2/1

(High Definition Television)

The Sub-Group Pl-A-2/1, having considered proposals HOL/23/4, S/33/10, E/34/7 and D/175/26, has prepared the text of a draft Recommendation from this session on the basis of which the subject might be considered at the second session. The text is given in the Annex.

The delegation of France has expressed a reservation on the draft Recommendation.

M.J. BATES

Chairman of Sub-Group PL-A-2/1

Annex: 1

ANNEX

DRAFT RECOMMENDATION PLEN/

Relating to high definition television (HDTV)
in the broadcasting-satellite service

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (First Session - Geneva, 1985),

considering

- a) that the development of techniques for high definition television broadcasting is rapidly progressing;
- b) that the frequency bands presently allocated to the broadcasting-satellite service do not at present provide a world-wide allocation suitable for the implementation of a unique world-wide standard for high definition television transmission via satellites;
- c) that the band 22.5 - 23 GHz has already been allocated to the broadcasting-satellite service in Regions 2 and 3 on the basis of procedures as defined by Article 14 of the Radio Regulations;
- d) that several Region 1 administrations have submitted proposals concerning frequency band allocations to the BSS for HDTV in the band 21.2 - 23.6 GHz;
- e) that a world-wide allocation to the broadcasting-satellite service suitable for high definition television transmissions would be [highly] desirable;
- f) that the CCIR has already carried out a number of studies concerning the broadcasting of HDTV signals (see Report of the CPM, 1984, chapter 3.2.3 and Annexes 3.2.3.2 and 4.6.2.5.3);

recommends that the Administrative Council

place on the agenda of the second session of the Conference consideration of the question of a suitable frequency band for the broadcasting-satellite service, [possibly] [preferably] on a world-wide basis, to accommodate HDTV, including possible action as appropriate on the necessary changes to Article 8 at a competent conference [not excluding the second session of the Conference];

further recommends

that the CCIR study in time for the second session of the Conference:

- the development of technical parameters for HDTV transmissions by satellite;
 - which frequency bands would be possible and appropriate from the point of view of propagation; and
 - inter- and intra-service sharing aspects.
-

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Corrigendum 1 to
Document DT/80(Rev.1)-E
7 September 1985
Original: English

SUB-WORKING GROUP PL-A-2

As the text of paragraph 4 appearing in Document DT/80(Rev.1) had not been agreed to, the following text should be used as a basis for discussion:

"4. in accordance with [Resolution/Recommendation No. [COM4/1]] of this session, to consider the results of the various up-to-date studies and, in reviewing the situation prevailing at that time, take appropriate decisions concerning the various aspects of this system in agreement with [the intention] of Resolution No. 505;"

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

Document DT/80(Rev.1)-E

6 September 1985

Original: English

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

SUB-WORKING GROUP PL/A-2

Note by the Chairman of Sub-Working Group PL/A-2

A draft Recommendation (PLEN/A), embodying a proposed draft agenda for the Second Session, has been prepared on the basis of proposals from administrations, discussion at the last meeting of Sub-Working Group PL/A-2, and documents directed from Committees to the Ad Hoc Working Group of Plenary. The text is at Annex 1.

Annex 2 contains a draft Resolution (PLEN/1) relating to the Report of the First Session.

M.J. BATES
Chairman of PL/A-2

Annexes: 2

ANNEX 1

DRAFT RECOMMENDATION [PLEN/A]

Draft Agenda for the Second Session of the Conference

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, (First Session - Geneva, 1985),

considering

- a) Resolution 1 of the Plenipotentiary Conference, Nairobi, 1982, relating to future conferences of the Union;
- b) that Resolution 3 of WARC-79 relating to the use of the geostationary-satellite orbit and the planning of space services utilizing it invited the Administrative Council to take the necessary steps to convene a WARC consisting of two sessions for the use of the geostationary-satellite orbit and the planning of the frequency bands utilizing it;
- c) that Resolution 895 of the Administrative Council, 1983, includes in the agenda of the First Session the recommendation of a draft agenda for the Second Session of the Conference for consideration by the Administrative Council;
- d) the Report of the First Session of the Conference to the Second Session;
- e) that the Second Session will need to consider the report from the IFRB on the work to be carried out during the intersessional period;
- f) that the Second Session will need to consider submissions from administrations, preparatory work carried out as part of the intersessional activities identified by the First Session, and relevant reports from the CCIR;

recognizing

that some of the bands are allocated on a shared basis with equal rights to more than one space service and that most of them are also allocated with equal rights to terrestrial services, and that these rights must be taken into account;

recommends to the Administrative Council

the following draft agenda for the Second Session:

- 1. on the basis of the material identified in considering d), e) and f):

1.1 to carry out the planning for the fixed-satellite service in the bands [.....], according to the principles and the methods established at the First Session;

- 1.2 to establish associated regulatory procedures pertaining to the frequency bands specified in item 1.1;

1.3 to adopt appropriate technical standards, parameters and criteria, pertaining to the fixed-satellite service in the frequency bands specified in item 1.1;

2. to review and revise, as necessary, the regulatory procedures and appropriate technical standards, parameters and criteria pertaining to space services and frequency bands not to be subject to planning;

2bis. to review and revise, as necessary, the definitions relating to space services;

3.1 to consider whether a feeder-link plan for Region 3 should be developed at the Second Session of the Conference, or whether a later competent administrative radio conference should be empowered to develop such a plan;

3.2 to establish the provisions and associated plan for feeder links in the bands [.....] to stations in the broadcasting-satellite service [in Regions 1 and 3] [in Region 1 and, if necessary, in the light of the decision on item 3.1, in Region 3], operating in accordance with Appendix 30 to the Radio Regulations, on the basis of the [technical standards, parameters and criteria recommended in the Report of the First Session;] [material identified in considering d), e) and f);]

3.3 to amend, as appropriate, the relevant articles and appendices of the Radio Regulations, as well as related Resolutions and Recommendations, pertaining to feeder links to broadcasting satellites, taking into account the bands being planned for that purpose;

4. to consider the results of the various studies and take appropriate decisions in agreement with Resolution 505;

5.1 in accordance with [Recommendation PLEN/A] of this Session, to consider the question of a suitable frequency band for the broadcasting-satellite service to accommodate high-definition television (HDTV);

5.2 to consider the need at a future conference in the mid-1990's to plan the band 22.5 - 23 GHz in Regions 2 and 3, allocated to the broadcasting-satellite service, for HDTV;

6. to evaluate the financial impact of its decisions upon the budget of the Union in accordance with No. 627 and other pertinent provisions of the Nairobi Convention;

7. to make such consequential amendments in the Radio Regulations as may be necessitated by other decisions of the Conference;

8. to consider, revise as necessary, and take other appropriate action upon the relevant Resolutions and Recommendations, as follows:

Resolutions [....];

Recommendations [....].

ANNEX 2

DRAFT RESOLUTION [PLEN/1]

Relating to the Report of the First Session

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, (First Session - Geneva, 1985),

considering

the mandate entrusted to it by Resolution 895 of the Administrative Council and its agenda contained in "decides", paragraph 5.3 thereof;

resolves

to approve the Report of the First Session of the Conference;

instructs

1. the Chairman of the First Session of the Conference to transmit under his signature the Report of the First Session to the Second Session of the Conference;
 2. the Secretary-General to transmit the Report of the First Session to all Members of the Union and to the organizations which have participated in the First Session of the Conference.
-

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/80-E
5 September 1985
Original: English

SUB-WORKING GROUP PL/A-2

Note by the Chairman of Sub-Working Group PL/A-2

A draft Recommendation (PLEN/A), embodying a proposed draft agenda for the Second Session, has been prepared on the basis of proposals from administrations, discussion at the last meeting of Sub-Working Group PL/A-2, and documents directed from Committees to the Ad Hoc Working Group of Plenary. The text is at Annex 1.

Annex 2 contains a draft Resolution (PLEN/1) relating to the Report of the First Session.

M.J. BATES
Chairman of PL/A-2

Annexes: 2

ANNEX 1

DRAFT RECOMMENDATION [PLEN/A]

Draft Agenda for the Second Session of the Conference

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (First Session, Geneva, 1985),

considering

- a) Resolution 1 of the Plenipotentiary Conference, Nairobi, 1982, relating to future conferences of the Union;
- b) that Resolution 3 of WARC-79 relating to the use of the geostationary-satellite orbit and the planning of space services utilizing it invited the Administrative Council to take the necessary steps to convene a WARC consisting of two sessions for the use of the geostationary-satellite orbit and the planning of the frequency bands utilizing it;
- c) that Resolution 895 of the Administrative Council, 1983, includes in the agenda of the First Session the recommendation of a draft agenda for the Second Session of the Conference for consideration by the Administrative Council;
- d) the Report of the First Session of the Conference to the Second Session;
- e) that the Second Session will need to consider the report from the IFRB on the work to be carried out during the intersessional period;
- f) that the Second Session will need to consider the report from the CCIR;

recommends to the Administrative Council

- 1. the following draft agenda for the Second Session:

on the basis of the Report of the First Session and the proposals from administrations, and taking into account the reports on the intersessional work carried out by the IFRB [(see Resolution [...])] and the CCIR [(see Recommendation [...])]:

- 1.1 to carry out the planning for the fixed-satellite service in the bands [.....], according to the principles and the method established at the First Session;

1.2 to establish procedures for regulating the use of the bands specified in item 1.1;

1.3 to adopt appropriate technical standards, parameters and criteria, based on the recommendations in the Report of the First Session;

2. to review and revise, as necessary, the regulatory procedures, technical parameters and related definitions pertaining to space services and frequency bands not to be subject to planning;

3.1 to establish a plan for feeder links in the bands [.....] to stations in the broadcasting-satellite service in Regions 1 [and 3], operating in accordance with Appendix 30 to the Radio Regulations, on the basis of the technical standards, parameters and criteria recommended in the Report of the First Session;

3.2 to amend, as appropriate, the relevant articles and Resolutions of the Radio Regulations pertaining to feeder links to broadcasting satellites, taking into account the bands being planned for that purpose;

[3.3 to study the question of empowering a later competent administrative radio conference to develop a feeder-link plan for Region 3;]

4. in accordance with [Resolution/Recommendation [COM4/1]] of this Session, to consider the results of the various up-to-date studies and, in reviewing the situation prevailing at that time, take appropriate decisions concerning the various aspects of this system in agreement with [the intention] of Resolution 505;

5.1 in accordance with [Recommendation PLEN/A] of this Session, to consider the question of a suitable frequency band for the broadcasting-satellite service to accommodate high-definition television (HDTV);

5.2 to consider the need at a future conference in the mid-1990's to plan the band 22.5 - 23 GHz in Regions 2 and 3, allocated to the broadcasting-satellite service, for HDTV;

6. to evaluate the financial impact of its decisions upon the budget of the Union in accordance with No. 627 and other pertinent provisions of the Nairobi Convention;

ANNEX 2

DRAFT RESOLUTION [PLEN/1]

Relating to the Report of the First Session

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, First Session, Geneva, 1985,

considering

the mandate entrusted to it by Resolution 895 of the Administrative Council and its agenda contained in "decides", paragraph 5.3 thereof;

resolves

to approve the Report of the First Session of the Conference;

instructs

1. the Chairman of the First Session of the Conference to transmit under his signature the Report of the First Session to the Second Session of the Conference;
2. the Secretary-General to transmit the Report of the First Session to the administrations of all Members of the Union and to the organizations which have participated in the First Session of the Conference.

DRAFT

REPORT OF COMMITTEE 2 TO THE PLENARY MEETING
(CREDENTIALS)

1. Terms of reference of the Committee

The terms of reference of the Committee are set out in Document 79.

2. Meetings

The Committee met twice, on 14 August and 9 September 1985.

At its first meeting, it set up a Working Group consisting of the Chairman and Vice-Chairman of the Committee and one delegate from the Federal Republic of Germany, from Bulgaria and from Thailand to verify delegations' credentials in accordance with Article 67 of the International Telecommunication Convention, Nairobi (1982).

3. Conclusions

The conclusions reached by the Committee are reproduced in the Annex attached hereto and submitted to the Plenary Meeting for approval.

4. Final remark

The Committee recommends that the Plenary Meeting authorize the Chairman and the other members of the Working Group to verify the credentials received after the date of the present Report and to submit their conclusions to the Plenary Meeting on the matter.

S. SISSOKO

Chairman of Committee 2

Annex : 1

ANNEX

1. Credentials found to be in order, deposited by the delegations of countries having the right to vote

(In French alphabetical order)

Algeria (People's Democratic Republic of)
Germany (Federal Republic of)
Angola (People's Republic of)
Saudi Arabia (Kingdom of)
Argentine Republic
Australia
Austria
Bahrain (State of)
Belgium
Byelorussian Soviet Socialist Republic
Brazil (Federative Republic of)
Brunei Darussalam
Bulgaria (People's Republic of)
Cameroon (Republic of)
Canada
Chile
China (People's Republic of)
Vatican City State
Colombia (Republic of)
Korea (Republic of)
Costa Rica
Ivory Coast (Republic of the)
Cuba
Denmark
Egypt (Arab Republic of)
Ecuador
Spain
United States of America
Ethiopia
Finland
France
Gabonese Republic
Ghana
Greece
Hungarian People's Republic
India (Republic of)
Indonesia (Republic of)
Iran (Islamic Republic of)
Iraq (Republic of)
Ireland
Israel (State of)
Italy
Japan
Jordan (Hashemite Kingdom of)
Kenya (Republic of)
Kuwait (State of)
Libya (Socialist People's Libyan Arab Jamahiriya)

Luxembourg
Madagascar (Democratic Republic of)
Malaysia
Malawi
Mali (Republic of)
Malta (Republic of)
Morocco (Kingdom of)
Mexico
Monaco
Mongolian People's Republic
Nigeria (Federal Republic of)
Norway
New Zealand
Oman (Sultanate of)
Pakistan (Islamic Republic of)
Papua New Guinea
Paraguay (Republic of)
Netherlands (Kingdom of the)
Poland (People's Republic of)
Portugal
Qatar (State of)
Syrian Arab Republic
German Democratic Republic
Democratic People's Republic of Korea
Ukrainian Soviet Socialist Republic
Romania (Socialist Republic of)
United Kingdom of Great Britain and Northern Ireland
San Marino (Republic of)
Senegal (Republic of)
Singapore (Republic of)
Somali Democratic Republic
Sri Lanka (Democratic Socialist Republic of)
Sweden
Switzerland (Confederation of)
Suriname (Republic of)
Tanzania (United Republic of)
Czechoslovak Socialist Republic
Thailand
Togolese Republic
Tonga (Kingdom of)
Trinidad and Tobago
Tunisia
Turkey
Union of Soviet Socialist Republics
Uruguay (Eastern Republic of)
Venezuela (Republic of)
Yemen (People's Democratic Republic of)
Yugoslavia (Socialist Federal Republic of)

Conclusion : The delegations of these countries are entitled to vote and to sign the Final Acts.

2. Provisional credentials found to be in order, deposited by the delegations of countries having the right to vote (see No. 383 of the Convention)

Philippines (Republic of the)

Conclusion : The delegation of this country is entitled to vote but is entitled to sign only if the credentials are confirmed by one of the authorities mentioned in No. 361, prior to signature of the Final Acts.

3. Credentials found to be in order, deposited by the delegations of countries which do not have the right to vote (see Document 45 + Rev.)

Djibouti (Republic of)
Guatemala (Republic of)
Honduras (Republic of)
Liberia (Republic of)
Chad (Republic of)

Conclusion : The delegations of these countries are not entitled to vote, but may sign the Final Acts.

4. Delegations attending the Conference which have not deposited credentials

Bolivia (Republic of)
Burkina Faso
Congo (People's Republic of the)
United Arab Emirates
Jamaica
Panama (Republic of)
Peru
Rwandese Republic

Conclusion : The delegations of these countries are neither entitled to vote nor to sign the Final Acts

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

**WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT**

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/82-E
6 September 1985
Original: English

COMMITTEE 4

REPORT ON THE INTERSESSIONAL STUDIES PROPOSED FOR BSS (SOUND)

RESOLUTION No. 505 AND FOR INTER-SERVICE SHARING

This document summarizes, in point form where possible, the proposals for intersessional work contained in Documents DT/75, DT/76 and 237. Where a short title does not easily reflect the material of the referenced section, the title has been supplemented with the text of that section.

Once approved these items will be combined with those of Document 258 and transmitted to the ad hoc Working Group of the Plenary.

R.G. AMERO
Chairman of Committee 4

Annex: 1

ANNEX

Intersessional studies proposed for the interservice sharing

1. Reverse band working (Document DT/76, § X.2.5)

The planning of bands shared by space services operating in different directions of transmission (i.e. "reverse band working") could well impose additional constraints on both services, particularly when a terrestrial fixed service is also a primary service in those bands.

It may be possible in some operational environments to increase the overall use of some FSS/FS shared bands through reverse band working (RBW), without significantly affecting terrestrial services or significantly reducing the capacity in the forward-band working, if the initial indications can be confirmed that the favourable geometry associated with the high elevation angles (above 40° was proposed by one administration) significantly ameliorates the constraints outlined above. It is recommended that such studies be conducted during the intersessional period. It would, however, be necessary, while considering RBW at 4 and 6 GHz in particular, to restrict satellite pfd and require adequate satellite antenna discrimination towards the limb of the Earth, taking into account existing terrestrial stations (whether they employ analogue or digital techniques) and where the main beam of the satellite antenna is directed within two degrees of the Earth's limb. The limits on pfd and the required satellite antenna discrimination should also be determined during the intersessional period.

2. Further studies for different combinations of services
(Document DT/76 § X.2.6)

Further study may be needed for a number of combinations of services, listed below, which may share a band or bands. Certain of these sharing situations are more likely to occur, and more problematic than others. In view of the limited time and resources to be available during the intersessional period, attention should be focussed on those situations identified in Chapter 8 as critical to the requirements of the second session.

- a) BSS/FSS at 2.5 GHz;
- b) BSS/FSS at 12 GHz - InterRegional;
- c) FSS/EESS (passive) at 18.6 - 18.8 GHz;
- d) FSS/MetSS at around 7/8 GHz and at 18 GHz;
- e) ISS/BSS at 22.5 - 23 GHz;
- f) FSS/FS in bidirectional bands;
- g) MSS/FS at 1.6/1.5 GHz;
- h) BSS/FS at 22.5 - 23 GHz;
- i) FSS/EES at 8 GHz.

3. Spurious emissions from space stations (Document DT/76, § X.2.8)
 4. Sharing criteria for the bands and services identified by ORB-85 to be planned
(Document DT/76, § X.2.9)
 5. Sharing situations subject to Article 14 of the Radio Regulations
(Document DT/76, § X.2.13)
 6. Sharing criteria for digital systems for bands below 15 GHz
(Document DT/75, § Y.3)
 7. Satellite sound broadcasting systems for individual reception by portable and automobile receivers
(Document 237, § 7.2.4.1 Quality of service
§ 7.2.4.2 Frequency of operation
§ 7.2.4.3 Modulation type
§ 7.2.4.4, § 7.2.3.2 Bandwidth required
§ 7.2.4.5 Receivers
§ 7.2.4.6 Antenna design
§ 7.2.4.7 Feeder links
§ 7.2.4.8, § 7.2.3.3 Appropriate sharing criteria (including
those applicable to geographical separation)
§ 7.2.4.9, § 7.2.2 Cost considerations
§ 7.2.4.10 Ability of technology to enable compliance with
Provision 2674
§ 7.2.4.11 Multiple user satellite).
-

WORKING GROUP 5B

NOTE BY THE CHAIRMAN

1. During discussion of Document DT/78 in Working Group 5B at the tenth meeting on 6 September 1985, the representative of the IFRB (Mr. A. Berrada) reminded the meeting that an allotment plan for the fixed-satellite service (FSS) might lead to three categories of bands:

B1: bands covered by the allotment plan;

B2: parts of the planned bands not covered by the allotment plan, such as 4/6 GHz;

B3: other bands allocated to space services.

Reference to paragraph 7 of Annex 1 to Document DT/70 indicates that bands B1 will be occupied by allotments covered by the plan and assignments derived from them as well as by other users of the FSS after the application of a procedure to be defined.

2. For the FSS the procedures concerned might consist of:

P1: procedures for modification of the plan;

P2: procedures for the implementation of the plan - i.e. conversion of allotments into assignments;

P3: procedures applicable to additional FSS users in bands B1. (Additional users being defined as users of the FSS in the planned bands for purposes other than those of the plan - e.g. multi-administration networks);

P4: improved procedures applicable in bands B2;

P5: modified/improved Articles 11 and 13 procedures applicable in bands B3.

3. The above considerations give rise to three Questions which merit discussion in Working Group 5B, namely:

Q1: Should the allotments appearing in the plan be recorded in the Master Register and hence be protected in the same way as any other space service assignment?

Q2: Should Working Group 5B work on the assumption that bands B1 may be utilized for additional FSS use?

Q3: If additional users are permitted in bands B1, should preferential protection be given to allotments in the plan and to the assignments derived from them?

4. Depending on the answers to these Questions, the flowchart in Figure 1 of Document DT/84 may require deletion of boxes 8, 10 and 12-15, and a direct route from box 7 (the "yes" option) to box 11.

S.M. CHALLO
Chairman of Working Group 5B

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

Document DT/84(Rev.1)-E

8 September 1985

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Original: English

Source: Documents DT/70(Rev.1), 214

WORKING GROUP 5B

NOTE BY THE CHAIRMAN

Discussion of Document DT/78 at the tenth meeting of Working Group 5B on 6 September 1985 and discussion and decisions taken in Committee 5 on 8 September have indicated that further consideration of the procedures relevant to an allotment plan was necessary.

The annexed revised flowchart and notes are now presented for consideration, and completely replace proposals of Document DT/78.

S.M. CHALLO

Chairman of Working Group 5B

Factors to be taken into account

1. Service area

The allotment plan shall be limited to national systems providing domestic services. The procedures associated to this plan should contain provisions permitting administrations with adjacent territories to combine all or part of their allotments with the view to ensure a sub-regional service.

2. Modifications to the plan

The procedures for modification of the plan shall include:

- the procedures to be applied by administrations wishing to modify their allotments appearing in the plan; and
- the procedures to be applied in order to ensure that new Members of the ITU shall obtain an allotment in the plan.

3. Additional FSS requirements

An additional requirement in a band covered by the allotment Plan shall be accommodated to the extent that it will not introduce limitations to the bringing into use of an allotment in the plan except if agreed by the administrations concerned. It shall not cause interference unacceptable to assignments in use which are in conformity with the Plan.

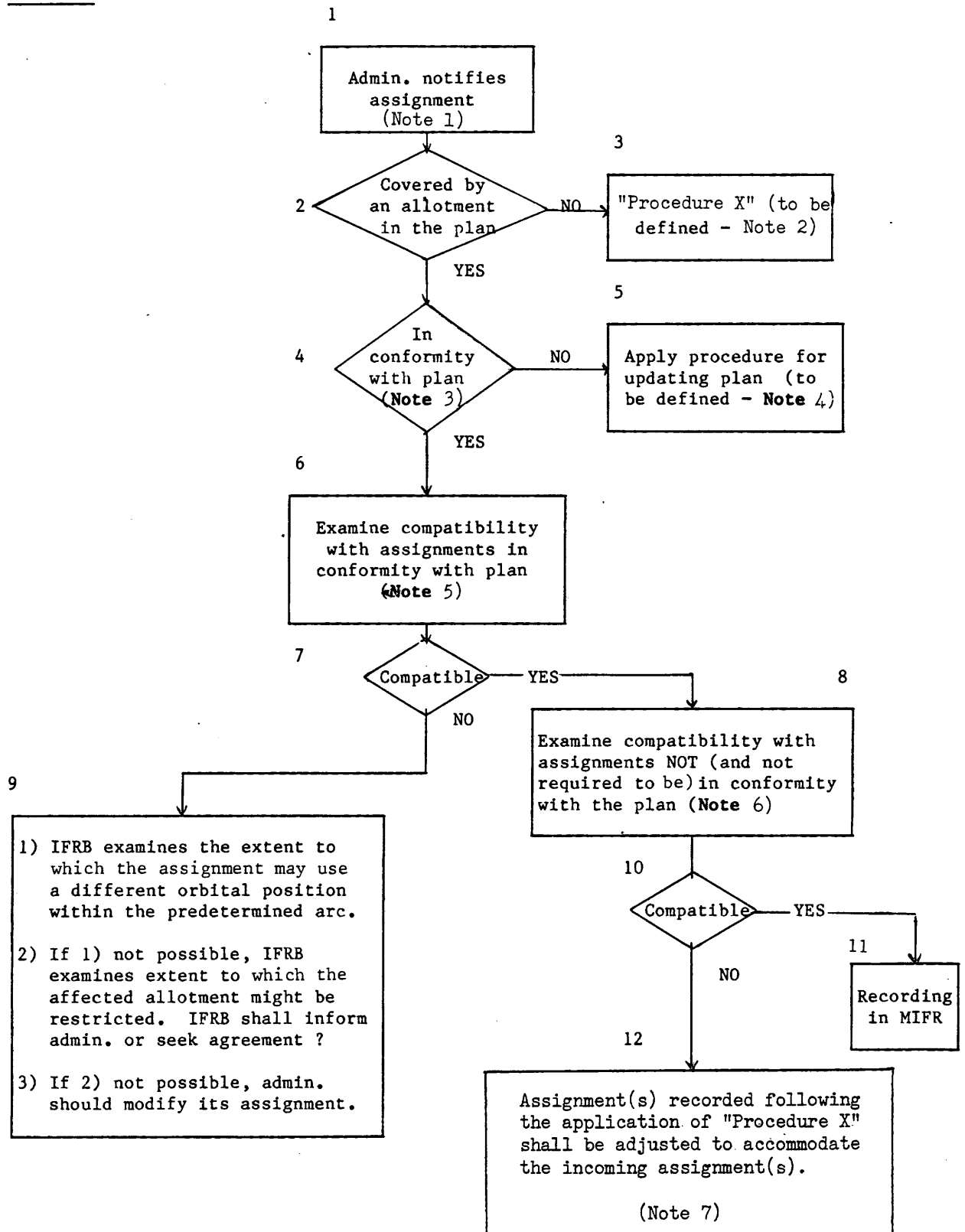
4. Sharing with other services

The allotment plan must preserve the rights of other services having equal primary status in the bands to which this approach is to be applied. This will necessitate the adoption and application of appropriate sharing criteria.

5. Flexibility

Any planning method should provide means to accommodate unforeseen requirements and modification of requirements of administrations. It should also be capable of accommodating advances in technology and do not prevent the use of technologies which are well proven and widely available.

FIGURE 1



Notes to Figure 1

Note 1 - Submission of this information shall be made within (a period to be determined by the second session) before the date on which the assignment is to be brought into use.

Note 2 - This procedure applies to assignments with no corresponding allotment in the plan. Such assignments are referred to as "additional assignments".

Note 3 - It is to be noted that the plan will probably conform to the power flux-density limits existing in the Radio Regulations, and hence give appropriate protection to terrestrial services against transmissions from space stations. The relationship between earth stations and terrestrial stations is a matter that may be treated through the present coordination procedures contained in Sections III and IV of Article 11 when an allotment is to be implemented.

Note 4 - This procedure applies to assignments with characteristics exceeding those of the relevant allotment in the plan. Successful application of this procedure results in equal status with those in the plan.

Note 5 - This examination is with respect to:

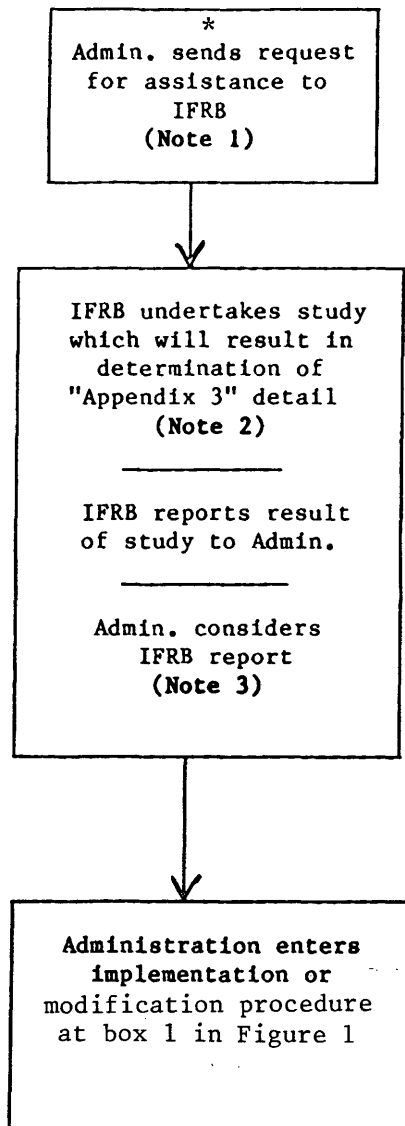
- any operational assignments in accordance with the plan, and
- any assignment, the characteristics of which are in accordance with the plan and have been notified to the IFRB.

Note 6 - This examination is with respect to the probability of the assignments referred to as "additional assignments" (see Note 1) causing interference to the new assignment.

Note 7 - This implies that assignments notified in conformity with the Plan shall have preferential protection with respect to "additional assignments". The protection of "additional assignments" vis-à-vis each other shall be determined by their respective dates of receipt or if applicable, by the date of their recording in the MIFR.

FIGURE 2

Requests for special assistance



Notes to Figure 2:

Note 1: The administration should state its communication requirements in accordance with Appendix N (to be developed) which should contain sufficient detail to permit a proper assessment by the Board

Note 2: The study will take existing systems into account.

Note 3: Consultation between the IFRB and the requesting administration will take place as and when appropriate.

* This procedure may also be applied on behalf of two or more administrations wishing to establish a subregional system not in the allotment plan.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/84-E
6 September 1985
Original: English

WORKING GROUP 5B

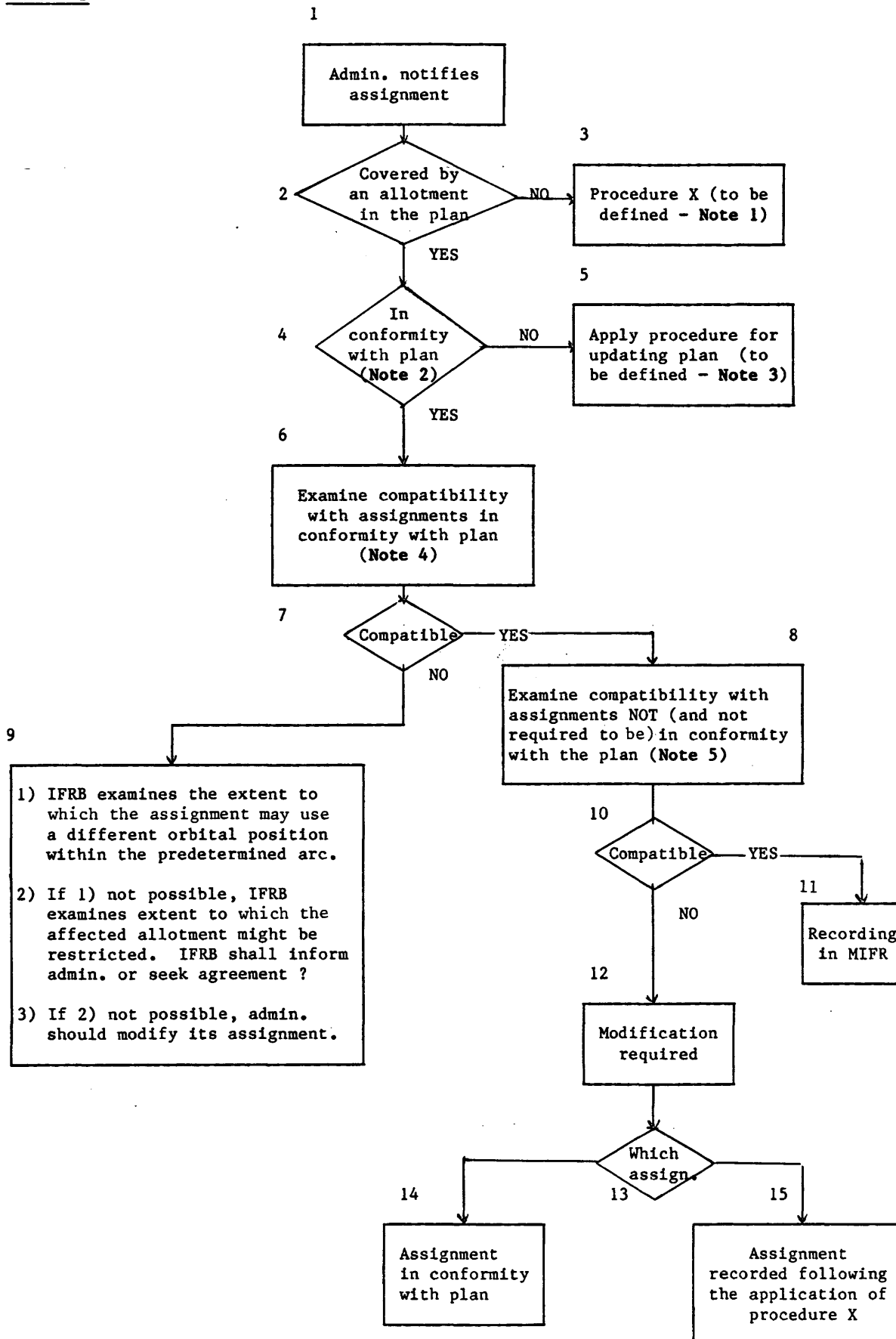
NOTE BY THE CHAIRMAN

Discussion of Document DT/78 at the tenth meeting of Working Group 5B on 6 September 1985 indicated that an alternative approach to the procedures relevant to an allotment plan was necessary.

The annexed flowchart and notes are now presented for consideration, and completely replace proposals of Document DT/78.

S.M. CHALLO
Chairman of Working Group 5B

FIGURE 1



Notes to Figure 1

Note 1 - This procedure applies to assignments with no corresponding allotment in the plan. Such assignments are referred to as "additional assignments".

Note 2 - It is to be noted that the plan will probably conform to the power flux-density limits existing in the Radio Regulations, and hence give appropriate protection to terrestrial services against transmissions from space stations. The relationship between earth stations and terrestrial stations is a matter that may be treated through the present coordination procedures contained in Sections III and IV of Article 11 when an allotment is to be implemented.

Note 3 - This procedure applies to assignments with characteristics exceeding those of the relevant allotment in the plan. Successful application of this procedure results in equal status with those in the plan.

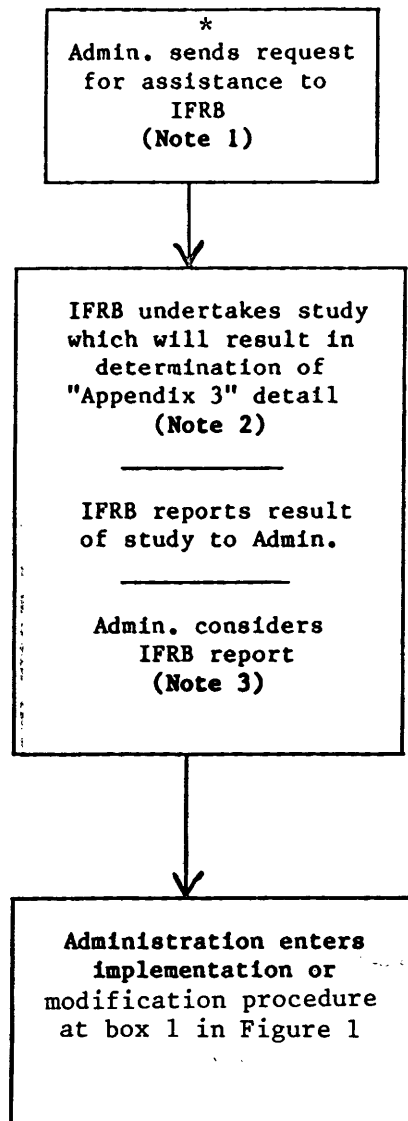
Note 4 - This examination is with respect to:

- any operational assignments in accordance with the plan, and
- any assignment, the characteristics of which are in accordance with the plan and have been notified to the IFRB.

Note 5 - This examination is with respect to the probability of the assignments referred to as "additional assignments" (see Note 1) causing interference to the new assignment.

Figure 2

Requests for special assistance



Notes to Figure 2:

Note 1: The administration should state its communication requirements in accordance with Appendix N (to be developed) which should contain sufficient detail to permit a proper assessment by the Board

Note 2: The study will take existing systems into account.

Note 3: Consultation between the IFRB and the requesting administration will take place as and when appropriate.

* This procedure may also be applied on behalf of two or more administrations wishing to establish a subregional system not in the allotment plan.

SCENARIO FOR CCIR INTERSESSIONAL ACTIVITIES

The ad hoc Group undertook a review of the schedule of ITU activities (Annex 1) between ORB-1 and ORB-2 to determine whether the CCIR-related elements of that schedule could meet the requirements of ORB-2. A number of possibilities were identified for adapting the schedule to the needs of ORB-2, including the following:

- a) the Study Group meetings scheduled for November-December 1987 occur about seven months ahead of ORB-2. If this grouping were to include the Study Groups more closely related to ORB-2 matters (i.e. Study Groups 4, 5, 9, 10 and 11), the Conference would benefit from the latest available technical advice from the CCIR;
- b) however, the seven-month separation is less than the usual ten-month advance mailing to administrations associated with preparatory material for conferences. However, since the technical information would be required for the second session of a two-session conference, and which is, therefore, dealing with the implementation of decisions taken at the first session, a waiver of the ten-month rule might be considered acceptable in this particular circumstance;
- c) the scope of the waiver required might be reduced by interchanging ORB-2 (July 1988) with BC-R2(2) (September 1988). This would require a decision by the Administrative Council;
- d) the meeting of Study Groups in November-December 1988 would have to be authorized by the CCIR Plenary Assembly (May 1986), at the request of this Conference, to transmit its recommendations directly to administrations and the ORB-2;
- e) the possible need for two special International Working Parties (IWPs) meetings, constituted by the Study Groups involved in this work should be anticipated. Assuming that the forthcoming Study Group meetings (mid-September to mid-November 1985) would set the necessary studies into motion, a first IWP meeting towards the end of 1986 would review the progress made and serve to align and/or merge related studies. A final IWP meeting at the time of the Study Group meetings in November-December 1987, would finalize the Report to administrations and ORB-2.

The ad hoc Group might wish to examine other possible scenarios. However, it is suggested that the above represents a least-cost scenario which is responsive to known budgetary constraints. If a scenario such as the above, after full consultation with the Director of the CCIR and review of the questions (yet to be finalized) to be referred to the CCIR, the ad hoc may wish to recommend such a scenario, along with its associated budgetary (cost of two IWPs) implications and target dates (late 1986 progress review; late 1987 submissions of final recommendations).

R. MARCHAND

Chairman of Working Group PL-A-1

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

Document DT/86-E

9 September 1985

Original: English

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Sources: 232(Rev.1), 234(Rev.1), 237,
238(Rev.1), 282, 294

SUB-WORKING GROUP PLA/1

BACKGROUND INFORMATION ON INTERSESSIONAL WORK

Further to the informal request from the Chairman of Sub-Working Group PLA/1, the attached table has been prepared by the IFRB Secretariat and the CCIR to indicate where, in the CCIR texts, some information can be found. This table supplements the items formally referred to the Working Group by Document 294. Unfortunately, it has not been possible to give a subjective assessment of the extent of information available and therefore what might be required to complete the study.

R.G. AMERO
Chairman of Committee 4

	ORB(1) Agenda item	Study area identified	Section in ORB Report	CCIR Reference	Conference documents	Remarks
1	2	3	4	5	6	7
1.	5.2	<p><u>Frequency band pairing</u></p> <p>To determine the potential value of frequency band pairings in the work of the Conference.</p> <p>To provide, if necessary and if possible, a specific list of FSS frequency band pairings which may be used as a guide for administrations to follow to the extent possible. When designing and implementing future satellite systems.</p>	8.1	Rep. 453-3 (MOD I), § 5 CPM Rep. (Annex 4, § 4.6.1.2)	234(Rev.1), § 3.4.1	
2.	5.2	<p><u>Amelioration of constraints</u></p> <p>The demand for satellite networks will vary between different frequency band pairs and, in a given frequency band pair, in different arcs of the geostationary satellite orbit. Thus, where constraints are applied to satellite network characteristics, it may be feasible to set mild constraints for some frequency bands and orbital arcs, where the demand is low, even though more stringent constraints may have to be applied where the demand is high. Intersessional study is required to determine how this might be achieved, to give relief in particular to networks of low capacity and complexity.</p>	8.1	-	234(Rev.1), 1.4 c)	
3.	5.2	<p><u>Orbit sectorization</u></p> <p>To study the potential benefits and potential disadvantages of orbit sectorization, for example:</p> <ul style="list-style-type: none"> - reduction of inhomogeneity; - constraints on choice of orbit location; - impact on efficiency of use of orbit/spectrum, in particular the need for guard arcs between sectors. 	8.1	Rep. 453-3 (MOD I), § 4.4.3 CPM Rep. (Annex 4, § 4.4.9.1)	234(Rev.1), § 4.5	

1	2	3	4	5	6	7
4.	5.2	<p><u>Interference and harmonization</u></p> <p>a) To consider the role of the "single entry of permissible interference" in an interference-limited situation and to determine the value of a single entry allowance in FDM/FM systems which is appropriate to a total interference entry of 2500 pWop. The possible need to revise the $\Delta T/T = 4\%$ threshold in Appendix 29 of the Radio Regulations in the light of any proposed change in the single entry value which may be found desirable during the intersessional studies should also be considered. Considerations should also be given to the possible need to revise permissible interference levels for digital systems and also to the compatibility of these new values for FDM-FM telephony with the corresponding levels for analogue FM television given in CCIR Recommendation 483.</p> <p>b) To identify the potential benefit of spectrum segmentation and the way in which they may best be achieved.</p> <p>c) To study the concept of burden-sharing including equitable interference and relocation to determine the extent of parameter adjustments practicable over a period of time.</p> <p>d) To evaluate the benefits and the technical, operational and economic problems arising from a requirement for flexibility of orbital position and to consider what regulatory action might be appropriate. These studies should consider two situations, firstly where the relative order of satellites in orbit remains unchanged but their respective angular separation is changed, and secondly where the order is changed.</p>	8.1	<p>Reps. 454-3, 455-3, 866 Recs. 466-3, 483-1, 523-1 CPM Rep. (Annex 4, § 4.6.1.6.2)</p> <p>Rep. 453-3 (MOD I), CPM Rep. (Annex 4, §§ 4.4.9.3, 4.4.9.4)</p> <p>CPM Rep. (Annex 4, § 4.4.9.4)</p> <p>Rep. AD/4 CPM Rep. (Annex 4, §§ 4.6.1.3.2, 4.4.9.4)</p>	<p>238(Rev.1), § 2.8</p> <p>238(Rev.1), § 4.4.7</p> <p>238(Rev.1), § 5.3</p> <p>238(Rev.1), § 4.2.6</p>	
5.	5.2	<p><u>Generalized parameters</u></p> <p>To identify and evaluate various sets of generalized parameters for planning and coordination.</p> <p>In this evaluation, study should include consideration of the feasibility of using earth station antennas which do not meet CCIR Recommendation 580 in plans which are based on generalized parameters which assume conformity with that Recommendation, that is in frequency bands and orbital arcs where the special needs of developing countries have not been identified.</p>	8.1	<p>CPM Rep. (Annex 4, § 4.4.9.5)</p>	<p>232(Rev.1), §§ 2.3, 3</p>	

1	2	3	4	5	6	7
6.	5.2	<u>Earth station antennas</u> <p>To determine an appropriate side-lobe reference radiation pattern for earth station antennas for which D/λ is less than 150, to be assumed in determining generalized performance criteria for use in the first planning period in those frequency bands and orbital arcs where the special needs of developing countries have not been identified.</p>	8.1	Recs. 465-1, 580 Reps. 390-4, 391-4 CPM Rep. (Annex 4, § 4.2.4)	232(Rev.1), § 3	
7.	5.2	<u>Physical interference in orbit</u> <p>For the CCIR to develop in the intersessional period a better understanding of the physical interference process leading to:</p> <ul style="list-style-type: none"> - an identification of the relevant factors of what is thought at present to be a theoretical problem; - an evaluation of the risks that this phenomenon could present in the future, and; - a recommendation for a solution to the problem should the study results justify further action. 	8.1	Question AG/4 CPM Rep. (Annex 4, § 4.6.1.3.3)	234(Rev.1), § 11	
8.	5.2	<u>Reverse band working</u> <p>These studies should be focussed primarily on national or regional systems. Consideration should be given to:</p> <ul style="list-style-type: none"> a) - problems that may arise from inter-Regional differences of frequency allocations; - the possible need for coordination modes not covered in Appendices 28 and 29; - the extent to which the introduction of RBW would increase the orbit/spectrum resources available to the FSS; - the impact of the introduction of RBW on freedom to locate earth stations within a service area and ability to reposition satellites; - sub-division of permissible interference budgets between interference from FSS networks operating in the same frequency band mode and interference from FSS networks in the opposite mode; 	8.1			

1	2	3	4	5	6	7
		<ul style="list-style-type: none"> - the most appropriate means of facilitating sharing between RBW satellite networks and terrestrial services; - the most economically advantageous way of implementing RBW. <p>It would be valuable to confirm the outcome of these studies by experimentation.</p> <p>b) whether the introduction of reverse band working will require limits to be applied to satellite antenna side-lobe gain in the direction of neighbouring satellites in frequency bands used in both directions of transmission;</p> <p>c) whether regulatory constraints would need to be applied to orbital ellipticity in frequency bands where reverse band working is implemented;</p> <p>d) planning of bands using reverse band working could well impose additional constraints on other space and terrestrial services, particularly when a terrestrial fixed service is also primary service in the same band. As a first step, studies must be carried out to ensure that the introduction of reverse band working will not restrict existing operational terrestrial networks and their system parameters.</p>		<p>Reps. 577-1, 561-2, 455-3 CPM Rep. (Annex 4, § 4.2.10)</p> <p>-</p> <p>Rep. 556-2</p> <p>8.1 Rep. 557-1</p>	<p>234(Rev.1), § 6.5</p> <p>232(Rev.1), § 4</p> <p>232(Rev.1), § 1</p> <p>282, (Annex 2, § X.25)</p>	
9.	5.2	<p><u>Polarization discrimination between networks</u></p> <p>Intersessional studies should be carried out to ascertain how much benefit could be obtained:</p> <p>a) from polarization discrimination between nominally co-located single-polarization satellites serving different coverage areas;</p> <p>b) between adjacent satellites, perhaps serving the same coverage area, both also having single-polarization.</p>	8.1	<p>Reps. 555-2, 453-3 (MOD I) CPM Rep. (Annex 4, § 4.2.6)</p>	<p>234(Rev.1), § 7.5</p>	
10.	5.2	<p><u>Criteria for satellite beams</u></p> <p>To determine the necessary criteria for satellite beams, including:</p> <p>i) reference radiation patterns for elliptical and shaped beams;</p> <p>ii) an appropriate minimum required beam size, as a function of frequency;</p>	8.1	<p>Rep. 558-2 CPM Rep. (Annex 4, § 4.2.5)</p>	<p>232(Rev.1), § 4</p>	

1	2	3	4	5	6	7
		and to study whether				
		iii) beam pointing constraints more stringent than those in Article 29 of the Radio Regulations are desirable.				
11.	5.2	<u>Determination of the need to coordinate satellite networks</u> To consider the revision of the technical content of Appendix 29 of the Radio Regulations in order to: i) increase the accuracy with which the need to coordinate is determined, reducing the likelihood of unjustified affirmative results without introducing a significant risk of failing to detect a real need to coordinate; ii) simplify the application of the process.	8.1	Reps. 454-3, 870, AE/4	238(Rev.1), § 3	
12.	5.2	<u>Review of technical aspects of Appendices 3 and 4 of the Radio Regulations</u> To examine the technical information called for by Appendices 3 and 4 and to ascertain whether any parts of it have no significant value for the purposes of Articles 11 and 13 as they now stand. / Note that Committee 5 is reviewing the administrative aspects of Articles 11 and 13 which may, in turn, have an impact on these Appendices. 7	8.1	-	294	
13.	5.2	<u>Further studies for different combinations of services</u> Further study may be needed for a number of combinations of services, listed below, which may share a band or bands. Certain of these sharing situations are more likely to occur, and more problematic than others. In view of the limited time and resources to be available during the intersessional period, attention should be focussed on those situations identified in Chapter 8 as critical to the requirements of the second session. a) BSS/FSS at 2.5 GHz; b) BSS/FSS at 12 GHz - Inter-Regional; c) FSS/EESS (passive) at 18.6 - 18.8 GHz; d) FSS/MetSS at around 7/8 GHz and at 18 GHz; e) ISS/BSS at 22.5 - 23 GHz;	8.1	Rep. 873 (MOD I) Rep. 874 Rep. 557-1 Rep. 850 Rep. 540-1 Rep. 694-1 Rep. 631-2 Rep. 540-1 Rep. 692-1	282, § X.2.6	

1	2	3	4	5	6	7
		<p>f) FSS/FS in bidirectional bands;</p> <p>g) MSS/FS at 1.6/1.5 GHz;</p> <p>h) BSS/FS at 22.5 - 23 GHz;</p> <p>i) FSS/EES at 8 GHz.</p>				
14.	5.2	<p><u>Spurious emissions from space stations</u></p> <p>WARC-79 by Recommendation No. 66, recommended that the CCIR study (as a matter of urgency) the question of spurious emissions from space stations. It is important that intersessional studies provide the second session of the Conference with information to be able to take appropriate action at that time.</p>	8.1	-	282, § X.2.8	
15.	2.6	<p><u>Sharing criteria for the bands and services identified by ORB-85 to be planned</u></p> <p>Once ORB-85 has identified bands and services to be planned, new sharing criteria must be developed for situations where no criteria exist, and existing criteria should be reviewed for their adequacy in light of the particular planning method to be employed. It is contemplated that those criteria requiring further study should be identified for consideration during the intersessional period.</p>	5. 8.1	-	X.2.9	
16.	5.2	<p><u>Sharing situations subject to Article 14 of the Radio Regulations</u></p> <p>The sharing situations which are the subject of many such communications to the IFRB as shown in Tables [A and B] would appear to be in greatest need of having sharing criteria studied by the CCIR during the intersessional period, for consideration by the second session, but other bands may have equal or greater need, because of the narrower bandwidth available, or the technical characteristics of systems likely to be employed.</p> <p>The IFRB is invited to identify early in the intersessional period, those services which, in its opinion, are in greatest need of formally adopted sharing criteria, or of review and revision of existing criteria.</p>	8.1	-	282, § X.2.13	
17.	5.2	<p><u>Sharing criteria for digital systems for bands below 15 GHz</u></p> <p>It should be noted that sharing criteria for bands below 15 GHz are generally derived from analogue-modulated terrestrial systems, and parameters for digital systems need to be developed.</p>	8.1	<p>Rec. 558-1 (MOD I)</p> <p>Rep. 793 (MOD I)</p> <p>Rec. AA/4-9</p> <p>Rep. 877 (MOD I)</p>	282, § Y.3	

1	2	3	4	5	6	7
18.	5.2	<p><u>Satellite sound broadcasting systems for individual reception by portable and automobile receivers</u></p> <p>It is necessary to investigate further the sharing possibilities between BSS (sound) and other services. Further work is also required to fully define practical system parameters that would more readily permit the implementation of such a service. The following study areas have been identified.</p> <p><u>Quality of service</u></p> <p>The quality of service impacts upon overall system characteristics and sharing with other services. Different administrations may desire different quality levels. It is suggested that at least medium and high quality systems be studied, with high quality possibly being attained by the use of permanently installed receivers.</p> <p><u>Frequency of operation</u></p> <p>A number of administrations indicated that they would be unable to accommodate the BSS (sound) in the band 0.5 - 2.0 GHz on an exclusive allocation basis. However, two administrations indicated that they may be able to accommodate, on a national basis, BSS (sound) in this band on an exclusive basis. Additional study is desirable to identify possible frequencies where the BSS (sound) might be implemented within the band 0.5 - 2.0 GHz, using the technical parameters identified for further study. [In addition, studies are requested for frequencies outside but near the 0.5 - 2.0 GHz range where the possibilities for sharing or other accommodations may be greater.]</p> <p><u>Modulation type</u></p> <p>Changes in modulation format may reduce the power required for BSS (sound) transmitters and may enhance the possibilities for sharing with other services. In this respect the technical characteristics of practicable digital systems need further determination.</p> <p><u>Bandwidth required</u></p> <p>The change in modulation type or the use of other digital systems may alter the bandwidth required from the values given in the example systems discussed in this report.</p>	8.2	Rep. 955 (MOD I)	237, 7.2.4	
					237, 7.2.4.1	
					237, 7.2.4.2	
					237, 7.2.4.3	
					237, 7.2.4.4	

1	2	3	4	5	6	7
		<p>The bandwidth required for a UHF satellite sound broadcasting service depends on the modulation method and on the extent of coverage overlap. As discussed in the CPM Report, studies performed for almost the whole of Africa and Europe, and in Region 2, arrive at a required bandwidth of 9 to 11 MHz for providing one national sound broadcast programme per country when this is transmitted by frequency modulation. Digital modulation tends to require a somewhat larger bandwidth. The study for Region 2 countries concluded that some 13 MHz are needed for one monophonic programme per country. These results are believed to be representative for national services.</p> <p><u>Receivers</u></p> <p>Signal processing techniques, the possible use of existing receivers, and the possible development of similar receiver designs were identified as areas of study.</p> <p><u>Antenna design</u></p> <p>To improve sharing possibilities, it is necessary to study spacecraft antennas with improved side-lobes and multiple spot beams, and the gain and directivity characteristics of ground receiving antennas.</p> <p><u>Feeder links</u></p> <p>Technical characteristics of required feeder links need to be identified.</p> <p><u>Appropriate sharing criteria (including those applicable to geographical separation)</u></p> <p>Sharing criteria are needed to determine possibilities for sharing with all services using frequency bands in which the BSS (sound) might operate. In particular, studies need to be directed towards sharing on a geographical basis, that is, among and within regions or among groups of administrations.</p> <p>Primary users of the 0.5 - 2.0 GHz band include broadcasting, mobile and fixed services. Additionally there are substantial allocations for the aeronautical radionavigation and radiolocation services.</p>			<p>237, 7.2.3.2</p> <p>237, 7.2.4.5</p> <p>237, 7.2.4.6</p> <p>237, 7.2.4.7</p> <p>237, 7.2.4.8</p> <p>7.2.3.3</p>	

1	2	3	4	5	6	7
		<p>Sharing studies have been conducted for frequency modulation and digital modulation techniques. Frequency modulation allows very limited energy dispersal while digital modulation techniques offer a significant energy dispersal advantage. However, even the most optimistic studies for the latter modulation demonstrate that the obtainable power flux-density levels are still too high to allow frequency sharing with the broadcasting, fixed or mobile services within the service area and in large areas around it.</p> <p><u>Cost considerations</u></p> <p>Several input studies were available to determine space segment costs, total sound BSS system costs and costs of alternative coverage by terrestrial sound broadcast systems. Additional study is needed to identify more precisely these costs for practicable systems.</p> <p>The attention of administrations is drawn to the technical factors having a bearing on costs involved in the implementation of a satellite sound broadcasting system. Examples of space-segment cost estimates can be found in the annex to Chapter 7. Technical and economic studies in one country have been reported since the CPM 1984 and have indicated that a satellite system could be several times more expensive than an equivalent terrestrial system. In other cases, particularly in mountainous areas, the satellite system could be less expensive as indicated in a study by another administration based upon the cost of terrestrial television systems. The relative cost depends on the geographical location of the service area, the shape and size of the territory, the number of programmes, technological solutions chosen and other factors. Further studies by the CCIR into those technical factors which have a bearing on costs, are required.</p> <p><u>Ability of present and future technology to comply with RR 2674</u></p> <p>This area must also be studied.</p> <p><u>Multiple user satellite</u></p> <p>Investigation is required into the technical implications of use of the same satellite by more than one administration to satisfy their individual requirements.</p>			<p>237, 7.2.4.9</p> <p>7.2.2</p> <p>237, 7.2.4.10</p> <p>237, 7.2.4.11</p>	

DRAFT ELEMENT OF A REPORT TO THE
AD HOC WORKING GROUP OF THE CONFERENCE ON
THE SOFTWARE REQUIRED FOR THE PLANNING OF
FEEDER-LINKS IN REGIONS 1 AND 3

1. A "Software Advisory Group" was established to evaluate the software requirements and associated tasks of the various planning exercises decided upon by WARC-ORB(1) and required by WARC-ORB(2). This Group consisted of representatives with experience in software development and related management aspects from B, CAN, CHN, USA, IND, IRN, J, G, YUG and from the IFRB.
2. The first task of this Group was to evaluate the proposal made by the IFRB (Document 256 and Add.1), in respect of the intersessional activities deemed necessary for the planning of the feeder-links for the BSS in Regions 1 and 3. In this particular matter, the Software Advisory Group arrived at the following conclusions:
 - a) the general breakdown of the various tasks and the related estimates of the manpower required to perform them are considered reasonable, taking into account the software currently available to the IFRB and the changes and associated testing necessary to meet the requirements stated by Committee 6 (Documents 209(Rev.2) and 235, para. 6.2.2.21);
 - b) the choice of an engineer/analyst at the P4 level, assisted by a computer programmer at the P3 level, is considered to be appropriate for the tasks envisaged;
 - c) the two Tasks, XI and XV, briefly described in the Annex are intended to provide administrations with tools which can quickly evaluate various alternatives (e.g. changes in parameters) and identify optimal situations. Each one addresses a different need. Task XI expands the basic capability of the feeder-link planning process to cope with the heavy demand for analyses anticipated during the Conference, and can only be executed on the ITU computer. Task XV provides limited analysis capabilities with the added feature of portability, in that administrations could utilize it on a micro-computer before, during and after the Conference.

J.R. MARCHAND
Chairman of Sub-Working Group PLA/1

Annex: 1

ANNEX

Details of Tasks XI and XV

Task XI (Feeder-link synthesis program)

1. The program will provide the following:
 - i) C/N values at the satellite receiver for all feeder-link test points;
 - ii) feeder-link single entry C/I values at the satellite receiver under worst case conditions;
 - iii) equivalent feeder-link protection margins for a given feeder-link channel;
 - iv) overall equivalent protection margin at each down-link test point.
2. This program is capable of providing the above results almost instantaneously as part of an analysis for a single orbital position analysis with interactive changes of polarization, translation frequency, orbital position and earth-stations e.i.r.p.
3. The program can also perform a full plan analysis with the same input files.

Task XV

1. The program will provide the following:
 - i) the C/N value at the satellite receiver for all feeder-link test points;
 - ii) feeder-link single-entry C/I matrix for the administrations concerned, under worst case conditions;
 - iii) the equivalent feeder-link protection margin for a given feeder-link channel (see Document 280, Annex, section 1);
 - iv) the overall equivalent protection margin or the complete BSS system, including the feeder-link and the downlink. This calculation would be based upon a file of pre-calculated downlink C/I values for each downlink test point, provided by the IFRB.
2. The programs will be implemented using FORTRAN 77 to ensure portability.
3. The programs would be useful for administrations to coordinate their requirements with those of other administrations, to facilitate the submission of adjusted requirements to the IFRB, etc.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/88-E
9 September 1985
Original: English

WORKING GROUP 5B

NOTE BY THE CHAIRMAN OF WORKING GROUP 5B

The Chairman of Working Group 5B understands that Annex 2 to DT/70(Rev.1) was agreed during the Committee 5 meeting on 9 September 1985 to be as annexed.

S.M. CHALLO
Chairman of Working Group 5C

Annex: 1

ANNEX

Improved procedures for application to planned FSS bands which
are not covered by the allotment plan

1. The guidelines for improved procedures for application to the planned FSS bands which are not covered by the allotment plan.
 2. The overall aim of these improved procedures shall be to guarantee in practice for all countries equitable access to the orbit/spectrum resources in the relevant bands.
 3. These guidelines for procedures shall combine the best features of the proposals made by administrations and the views expressed by administrations. Some of the possible features of these procedures include:
 - a) simplification of the advance publication procedure of Article 11;
 - b) consideration of periodical multilateral planning meetings;
 - c) "burden-sharing" for possible use in assistance in ensuring access to the orbit/spectrum resources when appropriate;
 - d) the use of further technical measures in resolving problems of space station coordination;
 - e) consideration of existing systems in these bands.
 4. The stage of development of these improved procedures shall be sufficient to enable administrations in their intersessional work to develop detailed proposals for the second session of the WARC-ORB.
-

COMMITTEE 5

NOTE BY THE CHAIRMAN OF COMMITTEE 5

3.2 Planning principles

(See Document 214.)

3.3 Planning methods

3.3.1 The planning of the bands 4/6 GHz and 11-12/14 GHz is based on the following two methods:

a) an allotment plan in the bands:

- 4 500 - 4 800 MHz and 300 MHz to be selected in the band
6 425 - 7 075 MHz; and
- 10.70 - 10.95 GHz, 11.20 - 11.45 GHz and 12.75 - 13.25 GHz,

which will enable each administration to satisfy national requirements providing national services;

b) planning by improved procedures in the bands:

- 3 700 - 4 200 MHz,
5 850 - 6 425 MHz and
- 10.95 - 11.20 GHz,
11.45 - 11.70 GHz,
12.50 - 12.75 GHz,
14.00 - 14.50 GHz.

The overall aim of these improved procedures shall be to guarantee in practice for all countries equitable access to the orbit/spectrum resources in the relevant bands.

3.3.2 Both the planning methods will need to conform to the planning principles set out in section 3.2.

3.3.3 Both planning methods must preserve the rights of the other services to which the above-mentioned bands are allocated with equal rights, applying the criteria and procedures given in the Radio Regulations.

3.3.4 Allotment plan

3.3.4.1 Service area

The allotment plan shall be limited to national systems providing domestic services. The service area intended to cover the territory of a country may be provided by means of one or more beams from the same or different orbital positions. The elements making up the service areas shall be determined on the basis of section (3.1 of Document DT/...).

The procedures associated with this plan should contain provisions permitting administrations with adjacent territories to combine all or part of their allotments with a view to ensuring a subregional service.

3.3.4.2 Standardized parameters

The plan shall be prepared on the basis of generalized and standardized parameters applicable to all allotments (see section 2 of Document 232(Rev.1)).

3.3.4.3 Guarantee of access

All ITU Members shall have at least one allotment in the plan. Each allotment shall consist of:

- an orbital position in a predetermined arc;
- a minimum bandwidth within the band(s) defined in section 3.3.1;
- a service area (see 3.3.4.1).

In order to make the plan more flexible, the associated procedures should make it possible to modify an orbital position within the limits of the predetermined arc and to define the conditions for such modifications.

3.3.4.4 Bandwidth

The bandwidth associated with each allotment shall be ≥ 800 MHz.

3.3.4.5 Predetermined arc

This allotment plan refers to "a predetermined arc" as a means of increasing the flexibility of the plan. The size and position of the arc will necessitate intersessional studies.

3.3.4.6 Duration of the plan

The allotment plan must be established for a period of at least ten years. The second session of the Conference shall decide on its exact duration. It shall form an integral part of the Radio Regulations and, as such, may be revised, if necessary, in accordance with the relevant provisions of the Convention.

The WARC-ORB(2) should adopt pertinent provisions to assure that during the lifetime of the plan, any allotment to satisfy national requirements shall not be deleted without the agreement of the administration(s) concerned. Future radio conferences may however modify any allotment.

The Administrative Council should also be asked to keep this principle in mind in formulating the agenda for any future conference.

3.3.4.7 Modifications to the plan

The procedures for modification of the plan shall include:

- the procedures to be applied by administrations wishing to modify their allotments appearing in the plan;
- the procedures to be applied for converting an allotment into an assignment;
- the procedures to be applied in order to ensure that new Members of the ITU obtain an allotment in the plan.

3.3.4.8 Additional requirements

An additional requirement in the frequency bands covered by the allotment plan may be accommodated to the extent that it will not introduce limitations to the bringing into use of an allotment in the plan except if agreed by the administrations concerned. It shall not cause interference unacceptable to assignments in use which are in conformity with the plan.

3.3.4.9 Existing systems

In considering the establishment of an allotment plan, existing systems are those:

- a) recorded in the Master International Frequency Register;
- b) for which the coordination procedure has been initiated; and
- c) for which the information relating to advance publication was received by the Board before 8 August 1985.

either / Existing systems in the bands mentioned in section 3.3.1 a) shall be included in the plan on an equal basis with planned allotment and may be subject to some adjustments. The degree of adjustment to which an existing system would be subjected would depend upon the stage of its development. The adjustment criteria shall be drawn up at the second session of the Conference. 7

or / a) If an existing system meets the plan criteria, it shall be included in the plan as an allotment and taken into account as such.

b) If an existing system does not meet the plan criteria, the planning exercise shall endeavour to afford it the same degree of protection as the allotments to be included in the plan. Subsequently, such a system shall be treated in accordance with section 7. If, during the preparation of the plan, consideration of an existing system

gives rise to difficulty, adjustments will have to be made to that system. The degree of adjustment to which a system would be subjected would depend upon the stage of its development. 7

3.3.5 Planning by improved procedures

3.3.5.1 Guarantee of access

The overall aim of these improved procedures shall be to guarantee in practice for all countries equitable access to the orbit/spectrum resources in the relevant bands.

3.3.5.2 Planning method

7 The principal characteristic of this method is the convening of periodic multilateral planning meetings.

The multilateral planning meeting shall be the normal process for gaining access to the GSO/spectrum resources.

Additionally, in cases where administrations have an urgent need between multilateral planning meetings, simple matters of access or modifications could be dealt with between administrations. These cases shall be formalized at the next multilateral planning meeting.

The multilateral planning meeting approach should be a new and separate procedure to be added to the Radio Regulations. 7

Details of this procedure are found in section 3.5

Le DT/90 n'a pas été publié
has not been published

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

**WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT**

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/91-E
10 September 1985
Original: French

BUDGET CONTROL COMMITTEE

Note by the Secretary-General

WORK TO BE DONE BETWEEN THE FIRST AND SECOND SESSIONS OF WARC-ORB

At its third meeting, the Budget Control Committee considered the following documents in particular:

- Document 307 - SCENARIO FOR CCIR INTERSESSIONAL ACTIVITIES
- Document 308 - DRAFT ELEMENT OF A REPORT TO THE AD HOC WORKING GROUP OF THE
CONFERENCE ON THE SOFTWARE REQUIRED FOR THE PLANNING OF
FEEDER LINKS IN REGIONS 1 AND 3
- Document 304
(Rev.1) - COMPUTER SYSTEM REQUIREMENTS FOR PLANNING

which had been submitted to it and contained data that could be used for evaluating the cost of intersessional work to be provided for until the beginning of the second session.

IT SHOULD BE NOTED THAT THE COMMITTEE DID NOT CONSIDER COSTS RELATING TO THE ESTABLISHMENT OF AN ALLOTMENT PLAN FOR THE FIXED-SATELLITE SERVICE.

In the course of the discussion, many questions were raised concerning the exact cost to be expected and the distribution of expenditure over the period 1986 to 1988.

The following information should enable the Budget Control Committee to assess the financial implications of the Conference's decisions pursuant to No. 627 of the Nairobi Convention, as well as to decide on the amounts to be entered in the 1986 budget for intersessional work.

	1986	1987	1988 6 months
<hr/>			
- <u>Swiss francs</u> -			
<hr/>			
A. <u>CCIR intersessional activities</u> (Document 307)			
Meeting of a Joint Interim Working Party (JIWP)			
- 1986 - 5 day meeting	298,000		
- 1987 - 12 day meeting		413,000	
B. <u>IFRB supernumerary staff in accordance with Administrative Council Resolution No. 889</u>			
1 P.4/P.5 from 1 April 1984 until the end of the second session of the Conference, for intersessional work arising from Committee 5 decisions	180,000	180,000	180,000
C. <u>Software required for planning feeder links in Regions 1 and 3</u> (Documents 256(Add.1) and 308)			
IFRB supernumerary staff (1 P.4 and 1 P.3).			
- 1986 - 12 months			
Recurrent expenditure	265,000		
Non-recurrent expenditure	67,000		
Premises	20,000		
- 1987 - 10 months			
Recurrent expenditure		221,000	
Non-recurrent expenditure		75,000	
Premises		17,000	
D. <u>Software required for fixed-satellite service</u>			
IFRB supernumerary staff	?	?	
E. <u>Computer system requirements for planning</u> (Document 304(Rev.1))			
1) Requirements for planning feeder links in Regions 1 and 3	40,000	40,000	
2) Requirements entailed by the planning of other fixed-satellite services	?	?	
	<hr/>		
	870,000	946,000	180,000
i.e. for the three years,			
value 1.1.1985		1,996,000	
value 1.9.1982		1,800,000	
	<hr/>		

Note:

Annex 2 to the draft report of Committee 3 shows, with regard to sums available within the limits set on expenditure for intersessional work:

1986	800,000
1987	800,000
1988	400,000
	<hr/>
	2,000,000
Excess	186,000
	<hr/>
Amount therefore available	1,814,000
	=====

.....

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/92-E
10 September 1985
Original: French

BUDGET CONTROL COMMITTEE

DRAFT REPORT

OF THE BUDGET CONTROL COMMITTEE TO THE PLENARY MEETING

The Budget Control Committee held four meetings during the Conference and examined the questions arising from its terms of reference.

Under Nos. 475 to 479 of the International Telecommunication Convention (Nairobi, 1982), the Committee's terms of reference are :

- a) to determine the organization and the facilities available to delegates;
- b) to examine and approve the accounts for expenditure incurred throughout the duration of the Conference;
- c) to estimate the costs that may be entailed by the execution of the decisions taken by the Conference.

In addition, the Administrative Council, at its 40th Session, 1985, invited the WARC-ORB 85 through its Budget Control Committee to examine the requests for intersessional work during 1986.

1. Determination of the organization and facilities available to delegates

The Committee took note of the fact that no delegation had made any comments on the subject of the organization and facilities or the administrative arrangements made by the Secretary-General.

2. Conference budget

The Budget Control Committee examined the Conference budget, amounting to 2,265,000 Swiss francs, including IFRB preparatory work for 1985, which was approved by the Administrative Council at its 39th Session (1984).

The Committee noted that the budget did not include expenditure incurred for the Conference by the Union's Common Services, which was included in a special section of the Union's ordinary budget. This expenditure was estimated at 840,000 Swiss francs and remains within the protocol limits.

The Committee also noted that the Conference budget had been adjusted to take into account changes in the common system of the United Nations and the specialized agencies with regard to the salaries and allowances of short-term supernumerary staff and fluctuations in the rate of exchange between the US dollar and the Swiss franc, as required by Administrative Council Resolution No. 647. These adjustments raised the Conference budget to 2,331,800 Swiss francs, i.e. an increase of 66,800 Swiss francs.

3. Final Acts

Under the terms of Administrative Council Resolution No. 83 (amended) :

... if a conference prints, for its own use, documents of which the typographical composition can subsequently be used, in whole or in part, for the printing of the Final Acts, it must bear a percentage of the composition costs and the whole of the printing costs of the said document;

... the percentage of the composition cost ... shall be decided by the Plenary Meeting of the conference.

On the basis of the decisions of previous conferences, it is proposed to distribute these costs as follows :

- 1/3 to be charged to the Conference budget;
- 2/3 to be charged to the supplementary publications budget.

4. Situation of Conference expenditure

Under No. 478 of the Convention, the Budget Control Committee has to submit a report to the Plenary Meeting showing, as accurately as possible, the estimated total expenditure of the Conference.

Accordingly, Annex 1 contains a statement showing the Conference budget, as approved by the Administrative Council and adjusted under Resolution 647, together with a breakdown of credits among the budget subheads and items, as well as the actual expenditure incurred as at 6 September 85. There is also an indication of the expenditure committed up to that date and an estimate of expenditure up to the closure of the Conference's work.

The above statement shows that the total amount to be charged to the ordinary budget for the WARC-ORB 85 is estimated at 2,299,000 Swiss francs, i.e. 33,000 Swiss francs less than the amount allocated by the Administrative Council and adjusted under Resolution 647.

Annexes 2.1 and 2.2 to this document show, for the Plenary Meeting's information, the situation of expenditure on preparatory work for the WARC-ORB 85 in the years 1983 and 1984.

5. Expenditure limit fixed by Additional Protocol I of the Convention (Nairobi, 1982)

Committee 3 considered the situation of Conference expenditure, including expenditure on preparatory and intersessional work, in relation to the expenditure limit fixed for the WARC-ORB by the Plenipotentiary Conference.

The Committee found that the credits available for intersessional work were limited, as can be seen from the table attached in Annex 3. It is to be noted that this situation does not include any provision for data-processing facilities.

6. Recognized private operating agencies and international organizations taking part in the Conference

Under Article 16 of the Union's Financial Regulations, the report of the Budget Control Committee must include a list of the recognized private operating agencies and international organizations which contribute to the expenses of the Conference. To this shall be added a list of the international organizations which have been exempted from payment in accordance with Resolution 925 of the Administrative Council.

The list is to be found in Annex 4 to this document.

7. Additional expenditure to be envisaged for implementation of the decisions of the Conference

No. 478 of the International Telecommunication Convention (Nairobi, 1982) provides that the Budget Control Committee's report to the Plenary Meeting must show, as accurately as possible, the costs that may be entailed by the execution of the decisions taken by the Conference. Article 80 of the Convention, concerning the financial responsibilities of administrative conferences, specifies that before adopting proposals with financial implications, conferences must take account of all the Union's budgetary provisions with a view to ensuring that those proposals will not result in expenses beyond the credits which the Administrative Council is empowered to authorize.

Furthermore, Resolution No. 48 of the Plenipotentiary Conference, (Nairobi, 1982), provides :

"that before adopting resolutions and recommendations or taking decisions which are likely to result in additional and unforeseen demands upon the budgets of the Union, administrative conferences having regard to the need for economy, shall :

- 1.1 prepare and take into account estimates of the additional demands made on the budgets of the Union;
- 1.2 where two or more proposals are involved, arrange them in an order of priority;

- 1.3 prepare and submit to the Administrative Council a statement of the estimated budgetary impact, together with a summary of the significance and benefit to the Union of financing the implementation of those decisions, and an indication of priorities where appropriate."

The Budget Control Committee ...

8. Credit transfer in the Union's ordinary budget for 1986

In Resolution 931, adopted at its 40th Session (1985), the Administrative Council invited the WARC-ORB through its Budget Control Committee to examine the requests for intersessional work during 1986 and resolved that the amounts considered to be acceptable by the Committee should be entered in the Conference's budget, up to a maximum fixed by the Administrative Council at 900,000 Swiss francs.

In accordance with the provisions of section 7 above, the cost of intersessional work for the year 1986 is estimated at _____ Swiss francs.

In pursuance of the Administrative Council's decision in Resolution 931 and with Article 11, paragraph 2, of the Union's Financial Regulations, the Budget Control Committee has therefore decided to authorize a credit transfer in the Union's budget for 1986 of _____ Swiss francs

- from Section 19 - Payment into the ITU Reserve Account

- to Section 11.5 - WARC-ORB

for intersessional work so as to enable the IFRB, the CCIR and the Common Services of the Secretariat to carry out the work referred to in section 7 above.

*

*

*

In accordance with No. 479 of the Convention, this report will be transmitted together with any comments by the Plenary Meeting to the Secretary-General for reference to the Administrative Council at its next session.

The Plenary Meeting is requested to approve this report.

R.G. DEODHAR

Chairman of the Budget Control Committee

Annex 1

Position of WARC-ORB 1985 accounts at 6 September 1985

Annex 2.1

Preparatory work in 1983 for the
World Administrative Radio Conference ORB-85

Items		1983 Budget	1983 Accounts
<u>Subhead 1</u> <u>Preparatory work</u>			
11.511	CCIR preparatory work	150,000.-	44,485.05
<u>Section 17</u> <u>Common Services (share)</u>		110,000.-	5,000.--
		260,000.-	49,485.05
Total, value on 01.09.1982 (expenditure ceiling)		262,000.-	49,000.--

Annex 2.2

Preparatory work in 1984 for the
World Administrative Radio Conference ORB-85

Items	1984 Budget	1984 Accounts
<u>CPM CCIR meeting / IFRB preparatory work</u>		
<u>Subhead 1 - Staff expenditure</u>		
11.501 Salaries and related expenses	669,000.-	818,126.05
11.502 Travel (recruitment)	108,000.-	26,541.--
11.503 Insurance	13,000.-	23,063.10
	790,000.-	867,730.15
<u>Subhead 2 - Premises and equipment</u>		
11.504 Premises, furniture, machines	10,000.-	21,972.80
11.505 Document production	38,000.-	68,272.60
11.506 Office supplies and overheads	16,000.-	15,551.35
11.507 Postage, telephone calls, telegrams	40,000.-	1,835.75
11.508 Renting of electronic equipment	-	55,000.--
11.509 Sundry and unforeseen	10,000.-	7,399.15
	114,000.-	170,031.65
<u>Subhead 3 - Other expenses</u>		
11.511 IFRB preparatory work	117,600.-	153,968.15
11.519 Additional credit	250,000.-	-
Total expenditure under Section 11.5	1,271,600.-	1,191,729.95
Section 17 - Common Services (share)	299,000.-	443,000.-
	1,570,600.-	1,634,729.95
Total, value on 01.09.1985 (expenditure ceiling)	1,483,000.-	1,532,000.--

Annex 3

Limit on expenditure set for WARC-ORB 85-88

(Value 1.9.1982)

		Conference	Preparatory work		Total
			IFRB	CCIR	
- in thousands of Swiss francs -					
<u>Limit</u>	1983	-	-	300	300
	1984	-	405	1,445	1,850
	1985	3,835	365	-	4,200
	1986	-	450	-	450
	1987	-	300	-	300
	1988	3,720*	280	-	4,000
		7,555	1,800	1,745	11,100
		3,545			
=====					
<u>Expenditure</u>					
Actual 1983	-	-	49	49	
Actual 1984	-	185	1,347	1,532	
Approved Budget 1985	2,757	150	-	2,907	
1986 Budget	-		800**	800	
Budget forecast 1987	-		800**	800	
Budget forecast 1988	3,720*		400**	4,120	
	6,477	3,731		10,208	
=====					
Margin/(Excess) 1983/88		(186)			

* Including work immediately following the Conference

** Including an average of 180,000 Swiss francs per year for 1 P.4/P.5 engineer/analyst post authorized until the end of the second session of the 1988 Space Conference under Resolution No. 889.

Annex 4

List of recognized private operating agencies and
international organizations contributing to the expenses
of the Conference

	<u>Number of contributory units</u>
I. <u>Recognized private operating agencies</u>	
None	
II. <u>International organizations</u>	
II.1 <u>United Nations</u>	*)
II.2 <u>Specialized agencies</u>	
International Civil Aviation Organization (ICAO)	*)
International Maritime Organization (IMO)	*)
World Meteorological Organization (WMO)	*)
II.3 <u>Regional telecommunication organizations</u>	
Conference of Posts and Telecommunication Administrations of Central Africa (CAPTAC)	*)
Arab Telecommunication Union (ATU)	*)
Panafrican Telecommunication Union (PATU)	*)
II.4 <u>Other international organizations</u>	
Agency for the Safety of Air Navigation in Africa and Madagascar (ASECNA)	*)
European Space Agency (ESA)	1/2 unit
International Catholic Association for Radio, Television and Audiovisuals	1/2 unit
International Association of Broadcasting (IAB)	*)
International Maritime Radio Committee (CIRM)	*)
International Electrotechnical Commission (IEC)	*)
Inter-Union Commission on Frequency Allocations for Radioastronomy and Space Science (IUCAF- URSI, IAU, COSPAR)	*)
North American National Broadcasters Association (NANBA)	*)
Arab Satellite Communications Organization (ARABSAT)	1/2 unit
Interim European Telecommunications Satellite Organization (EUTELSAT)	1/2 unit
International Radio and Television Organization (OIRT)	*)
International Maritime Satellite Organization (INMARSAT)	1/2 unit
International Telecommunications Satellite Organization (INTELSAT)	1/2 unit
International Space Telecommunication Organization (INTERSPUTNIK)	1/2 unit

Asia-Pacific Broadcasting Union (ABU)	*)
Arab States Broadcasting Union (ASBU)	*)
The Procedural Aspects of International Law Institute	1/2 unit
European Broadcasting Union (EBU)	*)
International Amateur Radio Union (IARU)	*)

*) Exempt from contribution under Administration Council
Resolution No. 925.

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

Document DT/93-E
11 September 1985
Original: French

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

BUDGET CONTROL COMMITTEE

DRAFT REPORT

OF THE BUDGET CONTROL COMMITTEE TO THE PLENARY MEETING

The Budget Control Committee held five meetings during the Conference and examined the questions arising from its terms of reference.

Under Nos. 475 to 479 of the International Telecommunication Convention (Nairobi, 1982), the Committee's terms of reference are :

- a) to determine the organization and the facilities available to delegates;
- b) to examine and approve the accounts for expenditure incurred throughout the duration of the Conference;
- c) to estimate the costs that may be entailed by the execution of the decisions taken by the Conference.

In addition, the Administrative Council at its 40th session (1985), by Resolution No. 931, invited WARC-ORB 85 through its Budget Control Committee to examine the requests for intersessional work during 1986.

1. Determination of the organization and facilities available to delegates

The Committee took note of the fact that no delegation had made any comments on the subject of the organization and facilities or the administrative arrangements made by the Secretary-General. It expressed the view that the organization and the arrangements made by the Secretary-General were entirely satisfactory.

2. Conference budget

The Budget Control Committee examined the Conference budget, amounting to 2,265,000 Swiss francs, including IFRB preparatory work for 1985, which was approved by the Administrative Council at its 39th session (1984).

The Committee noted that the budget did not include expenditure incurred for the Conference in respect of additional staff for the common services of the ITU General Secretariat, which was included in a special section of the Union's ordinary budget. This expenditure was estimated at 840,000 Swiss francs and remains within the limits of Additional Protocol I.

The Committee also noted that the Conference budget had been adjusted to take into account changes in the common system of the United Nations and the specialized agencies with regard to the salaries and allowances of short-term supernumerary staff and fluctuations in the rate of exchange between the US dollar and the Swiss franc, as required by Administrative Council Resolution No. 647. These adjustments raised the Conference budget to 2,331,800 Swiss francs, i.e. an increase of 66,800 Swiss francs.

3. Final Acts

Under the terms of Administrative Council Resolution No. 83 (amended) :

"... if a conference or meeting prints, for its own use, documents of which the typographical composition can subsequently be used, in whole or in part, for the printing of the final acts, it must bear a percentage of the composition costs and the whole of the printing costs of the said document;"

"... the percentage of the composition cost ... shall be decided by the plenary meeting of the conference or meeting."

On the basis of the decisions of previous conferences, it is proposed to distribute these costs as follows :

- 1/3 to be charged to the Conference budget;
- 2/3 to be charged to the supplementary publications budget.

4. Situation of Conference expenditure

Under No. 478 of the Convention, the Budget Control Committee has to submit a report to the Plenary Meeting showing, as accurately as possible, the estimated total expenditure of the Conference.

Accordingly, Annex 1 contains a statement showing the Conference budget, as approved by the Administrative Council and adjusted under Resolution No. 647, together with a breakdown of credits among the budget subheads and items, as well as the actual expenditure incurred as at 6 September 85. There is also an indication of the expenditure committed up to that date and an estimate of expenditure up to the closure of the Conference's work.

The above statement shows that the total amount to be charged to the ordinary budget for WARC-ORB 85 is estimated at 2,299,000 Swiss francs, i.e. 33,000 Swiss francs less than the amount allocated by the Administrative Council and adjusted under Resolution No. 647.

Annexes 2.1 and 2.2 to this document show, for the Plenary Meeting's information, the situation of expenditure on preparatory work for WARC-ORB 85 in the years 1983 and 1984.

5. Expenditure limit fixed by Additional Protocol I to the Convention (Nairobi, 1982)

Committee 3 considered the situation of Conference expenditure, including expenditure on preparatory and intersessional work, in relation to the expenditure limit fixed for WARC-ORB by the Plenipotentiary Conference (see Annex 3 to this document).

6. Recognized private operating agencies and international organizations taking part in the Conference

Under Article 16 of the Union's Financial Regulations, the report of the Budget Control Committee must include a list of the recognized private operating agencies and international organizations which contribute to the expenses of the Conference. To this shall be added a list of the international organizations which have been exempted from payment in accordance with Resolution No. 925 of the Administrative Council.

The list is found in Annex 4 to this document.

7. Additional expenditure to be envisaged for implementation of the decisions of the Conference

No. 478 of the International Telecommunication Convention (Nairobi, 1982) provides that the Budget Control Committee's report to the Plenary Meeting must show, as accurately as possible, the costs that may be entailed by the execution of the decisions taken by the Conference. Article 80 of the Convention, concerning the financial responsibilities of administrative conferences, specifies that before adopting proposals with financial implications, conferences must take account of all the Union's budgetary provisions with a view to ensuring that those proposals will not result in expenses beyond the credits which the Administrative Council is empowered to authorize.

Furthermore, Resolution No. 48 of the Plenipotentiary Conference, (Nairobi, 1982), provides :

"that before adopting resolutions and recommendations or taking decisions which are likely to result in additional and unforeseen demands upon the budgets of the Union, administrative conferences having regard to the need for economy, shall :

- 1.1 prepare and take into account estimates of the additional demands made on the budgets of the Union;
- 1.2 where two or more proposals are involved, arrange them in an order of priority;

- 1.3 prepare and submit to the Administrative Council a statement of the estimated budgetary impact, together with a summary of the significance and benefit to the Union of financing the implementation of those decisions, and an indication of priorities where appropriate."

Pursuant to these provisions, the Budget Control Committee gave thorough consideration to the following conference documents:

- Document 307 - Scenario for CCIR intersessional activities
- Document 308 - Software required for the planning of feeder links in Regions 1 and 3
- Document 304 - Computer system requirements for planning
- Document 320 - Intersessional work on FSS planning all of which were concerned with work to be assigned to the Union's permanent organs.

Annex 5 to this report sets out the estimated cost of this intersessional work, which may be summed up as follows:

A.	CCIR intersessional activities	711,000 Swiss francs
B.	IFRB supernumerary staff in accordance with Administrative Council Resolution No. 889	540,000 Swiss francs
C.	Software required for planning feeder links in Regions 1 and 3	745,000 Swiss francs
D.	Software required for the fixed-satellite service	not yet calculated
E.	Computer system requirements for planning	80,000 Swiss francs

The total cost of this work may be estimated at 2,076,000 Swiss francs, value 1 January 1985, or 1,870,000 Swiss francs, value 1 September 1982 (ceiling value), excluding the costs listed under D. above.

Committee 3 concluded that, in the absence of guidelines from the Plenary Meeting, it could not put forward any reasonable proposals. Nevertheless, it draws the attention of the Plenary Meeting and all administrations to the large amounts involved.

8. Credit transfer in the Union's ordinary budget for 1986

In Resolution No. 931, adopted at its 40th session (1985), the Administrative Council invited the WARC-ORB through its Budget Control Committee to examine the requests for intersessional work during 1986 and resolved that the amounts considered to be acceptable by the Committee should be entered in the Conference's budget, up to a maximum fixed by the Administrative Council at 900,000 Swiss francs.

In accordance with the provisions of section 7 above, the cost of intersessional work is estimated at 2,076,000 Swiss francs, including 950,000 Swiss francs for 1986, without allowing for the cost of software for the fixed-satellite service.

In pursuance of the Administrative Council's decision in Resolution No. 931 and Article 11, paragraph 2, of the Union's Financial Regulations, the Budget Control Committee therefore proposes to authorize a credit transfer in the Union's budget for 1986 of 900,000 Swiss francs

- from section 19 - Payment into the ITU Reserve Account
- to section 11.5 - WARC-ORB

for intersessional work so as to enable the IFRB, the CCIR and the common services of the Secretariat to carry out the work referred to in section 7 above.

* * *

In accordance with No. 479 of the Convention, this report will be transmitted together with any comments by the Plenary Meeting to the Secretary-General for reference to the Administrative Council at its next session.

The Plenary Meeting is requested to approve this report.

R.G. DEODHAR
Chairman of the Budget Control Committee

Annexes: 5

ANNEX 1

Position of WARC-ORB 1985 accounts at 6 September 1985

Items	Heading	Budget approved by AC	Budget adjusted at 01.09 1)	Expenditure at 06.9.1985		
				actual	estimated or committed	total
<u>Subhead I - Preparatory work</u>		- in thousands of Swiss francs -				
11.521	IFRB preparatory work 2)	152	162	135	60	195
<u>Subhead II - Staff expenditure</u>						
11.531	Salaries and related expenses	1,500	1,557	17	1,521	1,538
11.532	Travel	107	107	13	95	108
11.533	Insurance	41	41	0	34	34
		1,648	1,705	30	1,650	1,680
<u>Subhead III - Premises and equipment</u>						
11.541	Premises, furniture, machines	90	90	9	81	90
11.542	Document production	120	120	51	100	151
11.543	Office supplies and overheads	40	40	27	20	47
11.544	PTT	165	165	18	70	88
11.545	Technical installations	20	20	0	18	18
11.546	Sundry and unforeseen	10	10	3	7	10
		445	445	108	296	404
<u>Subhead IV - Other expenses</u>						
11.551	Report to the second session	20	20	0	20	20
Total, Section 11.5/1985		2,265	2,332	273	2,026	2,299
Unused credits						33

- 1) Budget, including additional credits to take account of changes in the common system of the United Nations and the specialized agencies.
- 2) Credit intended mainly to meet expenditure relating to the creation of a P.4/P.5 post from 1 April 1984 until the end of the second session in 1988.

ANNEX 2.1

Preparatory work in 1983 for the
World Administrative Radio Conference ORB-85

Items		1983 Budget	1983 Accounts
<u>Subhead 1</u>	<u>Preparatory work</u>		
11.511	CCIR preparatory work	150,000.-	44,485.05
<u>Section 17</u>	<u>Common Services (share)</u>	110,000.-	5,000.--
		260,000.-	49,485.05
Total, value on 01.09.1982 (expenditure ceiling)		262,000.-	49,000.--

ANNEX 2.2

Preparatory work in 1984 for the
World Administrative Radio Conference ORB-85

Items	1984 Budget	1984 Accounts
<u>CPM CCIR meeting / IFRB preparatory work</u>		
<u>Subhead 1 - Staff expenditure</u>		
11.501 Salaries and related expenses	669,000.-	818,126.05
11.502 Travel (recruitment)	108,000.-	26,541.--
11.503 Insurance	13,000.-	23,063.10
	790,000.-	867,730.15
<u>Subhead 2 - Premises and equipment</u>		
11.504 Premises, furniture, machines	10,000.-	21,972.80
11.505 Document production	38,000.-	68,272.60
11.506 Office supplies and overheads	16,000.-	15,551.35
11.507 Postage, telephone calls, telegrams	40,000.-	1,835.75
11.508 Renting of electronic equipment	-	55,000.--
11.509 Sundry and unforeseen	10,000.-	7,399.15
	114,000.-	170,031.65
<u>Subhead 3 - Other expenses</u>		
11.511 IFRB preparatory work	117,600.-	153,968.15
11.519 Additional credit	250,000.-	-
Total expenditure under Section 11.5	1,271,600.-	1,191,729.95
<u>Section 17 - Common Services (share)</u>		
	299,000.-	443,000.-
	1,570,600.-	1,634,729.95
Total, value on 01.09.1985 (expenditure ceiling)	1,483,000.-	1,532,000.--

ANNEX 3

Limit on expenditure set for WARC-ORB 85-88

(Value 1.9.1982)

		Conference	Preparatory work		Total
			IFRB	CCIR	
- in thousands of Swiss francs -					
<u>Limit</u>	1983	-	-	300	300
	1984	-	405	1,445	1,850
	1985	3,835	365	-	4,200
	1986	-	450	-	450
	1987	-	300	-	300
	1988	3,720*	280	-	4,000
		7,555	1,800	1,745	11,100
		3,545			
=====					
<u>Expenditure</u>					
	Actual 1983	-	-	49	49
	Actual 1984	-	185	1,347	1,532
	Approved Budget 1985	2,757	150	-	2,907
	1986 Budget	-		800**	800
	Budget forecast 1987	-		800**	800
	Budget forecast 1988	3,720*		400**	4,120
	6,477	3,731		10,208	
=====					
Margin/(Excess) 1983/88			(186)		

* Including work immediately following the Conference

** Including an average of 180,000 Swiss francs per year for 1 P.4/P.5 engineer/analyst post authorized until the end of the second session of the 1988 Space Conference under Resolution No. 889.

ANNEX 4

List of recognized private operating agencies and
international organizations contributing to the expenses
of the Conference

		Number of contributory units
I.	<u>Recognized private operating agencies</u>	
	None	
II.	<u>International organizations</u>	
II.1	<u>United Nations</u>	*)
II.2	<u>Specialized agencies</u>	
	International Civil Aviation Organization (ICAO)	*)
	International Maritime Organization (IMO)	*)
	World Meteorological Organization (WMO)	*)
II.3	<u>Regional telecommunication organizations</u>	
	Conference of Posts and Telecommunication Administrations of Central Africa (CAPTAC)	*)
	Arab Telecommunication Union (ATU)	*)
	Panafrican Telecommunication Union (PATU)	*)
II.4	<u>Other international organizations</u>	
	Agency for the Safety of Air Navigation in Africa and Madagascar (ASECNA)	*)
	European Space Agency (ESA)	1/2 unit
	International Catholic Association for Radio, Television and Audiovisuals	1/2 unit
	International Association of Broadcasting (IAB)	*)
	International Maritime Radio Committee (CIRM)	*)
	International Electrotechnical Commission (IEC)	*)
	Inter-Union Commission on Frequency Allocations for Radioastronomy and Space Science (IUCAF- URSI, IAU, COSPAR)	*)
	North American National Broadcasters Association (NANBA)	*)
	Arab Satellite Communications Organization (ARABSAT)	1/2 unit
	Interim European Telecommunications Satellite Organization (EUTELSAT)	1/2 unit
	International Radio and Television Organization (OIRT)	*)
	International Maritime Satellite Organization (INMARSAT)	1/2 unit
	International Telecommunications Satellite Organization (INTELSAT)	1/2 unit
	International Space Telecommunication Organization (INTERSPUTNIK)	1/2 unit

Asia-Pacific Broadcasting Union (ABU)	*)
Arab States Broadcasting Union (ASBU)	*)
The Procedural Aspects of International Law Institute	1/2 unit
European Broadcasting Union (EBU)	*)
International Amateur Radio Union (IARU)	*)

*) Exempt from contribution under Administration Council
Resolution No. 925.

ANNEX 5

Work to be done between the first and second sessions of WARC-ORB

Estimated financial implications

	Cost per year			Total
	1986	1987	1988	cost
<hr/>				
- Swiss francs -				
<hr/>				
A. <u>CCIR intersessional activities (Document 307)</u>				
Meeting of a Joint Interim Working Party (JIWP)				
- 1986: 5-day meeting	298,000			
- 1987: 12-day meeting		413,000		711,000
 B. <u>IFRB supernumerary staff in accordance with</u>				
<u>Administrative Council Resolution No. 889</u>				
1 P.4/P.5 from 1 April 1984 until the end of the				
second session of the Conference, for interses-				
sional work arising from Committee 5 decisions				
	180,000	180,000	180,000	540,000
 C. <u>Software required for planning feeder links</u>				
<u>in Regions 1 and 3 (Documents 256 and 308)</u>				
IFRB supernumerary staff				
- 1986: 1 P.4 for 6 months	80,000			
- 1986: 1 P.4 and 1 P.3 for 12 months				
Recurrent expenditure	265,000			
Non-recurrent expenditure	67,000			
Premises	20,000			
- 1987: 1 P.4 and 1 P.3 for 10 months				
Recurrent expenditure		221,000		
Non-recurrent expenditure		75,000		
Premises		17,000		745,000
 D. <u>Software required for fixed-satellite</u>				
<u>service (Document 320)</u>				
	not yet calculated			
 E. <u>Computer system requirements for planning</u>				
1) Requirements for planning feeder links				
in Regions 1 and 3 (Document 304(Rev.1))	40,000	40,000		80,000
2) Requirements entailed by the planning of				
other fixed-satellite services	?	?		?
<hr/>				
Total, value 01.01.1985	950,000	946,000	180,000	2,076,000
value 01.09.1982	850,000	850,000	160,000	1,860,000
<hr/>				

Draft element for the report
of the first session to the second session

CHAPTER 8: PREPARATORY ACTIONS FOR THE SECOND SESSION

8.1 Intersessional activities

8.1.1 Introduction

The topics which are to be the object of intersessional activity include the following:

- Planning for the Regions 1 and 3 BSS feeder links
- Planning for the bands selected for allotment planning
- Planning for the bands in which multilateral coordination procedures will apply
- Improved regulations in the unplanned bands
- Matters relating to BSS (sound)
- Matters relating to High Definition Television (HDTV)

The activities related to the topics will have to be carried out, as the case may be, either by administrations, the IFRB, the CCIR or on a joint basis. To facilitate the identification of the intersessional activities required by each of the above three groupings, the following sections are presented accordingly, followed by a summary of the total progress of work.

8.1.2 CCIR activities

8.1.2.1 Related to the Regions 1 and 3 BSS feeder-link plan

Since the first session has agreed upon the technical parameters and to their values, which are to be used in developing the feeder-link plan, the only question remaining to be studied by the CCIR in this area, as given in Document [260], relates to the appropriate threshold value to trigger coordination between BSS feeder links operating in the different regions intended to operate in the band 17.3 - 17.8 GHz, as part of the modification procedures.

Specifically, studies are needed to determine the appropriate threshold value or values, whether it would be preferable to express the threshold for BSS feeder links in terms of $\Delta T/T$ or C/I, and whether it would be desirable to establish a common value between the regions.

8.1.2.2 Related to planning for the FSS

The specific studies to be undertaken by the CCIR in relation to allotment planning for the FSS include items 1 to 8, 10 to 15 and 17 listed in Annex [8/1].

Those to be undertaken in relation to the multilateral coordination procedures include items 1 to 15 and 17 listed in Annex [8/1].

8.1.2.3 Related to improved procedures for the unplanned bands

The specific studies required in relation to the improved procedures for the unplanned bands include items 7, 16 and 18, 12 to 14 listed in Annex [8/1].

8.1.2.4 Other relevant studies

Other studies which are to be undertaken by the CCIR for the second session include items 12 and 14.

8.1.2.5 Related to BSS (sound)

The questions to be studied by the CCIR in relation to the BSS (sound) are listed in item 18 of Annex [8/1].

8.1.2.6 Related to high definition television

The questions to be studied by the CCIR in relation to HDTV are listed in item 19 of Annex [8/1].

8.1.2.7 CCIR work plan

The most feasible CCIR work plan, which would strike a reasonable balance between the need for economy and effectiveness, would be along the lines given in Annex [8/2].

The cost of the Joint Interim Working Party meetings organized to coordinate and consolidate the CCIR's intersessional activities are estimated at [SF 298,000] for a five-day meeting in 1986, and at [SF 413,000] for a 12-day meeting in 1987.

8.1.3 IFRB activities

8.1.3.1 Related to the Regions 1 and 3 BSS feeder link plan

The activities related to the development of the Regions 1 and 3 BSS feeder-link plans are expected to commence as soon as possible after the first session and will continue for some time beyond the second session. The annual cost associated with this activity are estimated at [SF 392,000] for 1986 and [SF 352,000] for 1987.

The technical parameters to be used by the IFRB for the development and application of the computer software associated with this activity are given in Table 1 of Document [280]. The IFRB shall be guided by the conclusions, Recommendations and other technical information contained in Document [280] as well as those contained in Document [309]. A description of the tasks involved in developing the associated software is given in Document [256].

The IFRB shall also proceed with the adaptation onto a micro-computer of a single orbit position planning tool developed by an administration and with the programming assistance provided by that administration at a cost of /SF ? / during /198?/. This activity is further described in Document /256/.

8.1.3.2 Related to allotment planning

The technical parameters to be used by the IFRB in developing and application of the software needed for allotment planning are listed in Annex /8/3/.

The tasks, manpower and schedule related to the software development and its application are given in Annex /8/4/.

The budgetary requirements for the overall allotment planning activity by the IFRB are /SF ? / for 1986, /SF ? / for 1987 and /SF ? / for 1988.

8.1.3.3 Related to multilateral planning (MPM)

The IFRB shall identify the computer facilitates (hardware and software) needed to implement the MPM process, taking into account existing software and software developments available within administrations and the economies that might possibly result from judicious adaptations thereof.

8.1.4 Activities by administrations

8.1.4.1 Related to the feeder-link plan

Administrations should ensure that their participation in the feeder link process is carried out in a timely manner, in accordance with the tasks and schedules set forth in Document /280/.

8.1.4.2 Related to the planned and unplanned bands

Administrations and multi-administration organizations, are urged to participate in the studies of the CCIR listed in Annex /8/1/, taking into account the relatively short period of time available prior to the second session. They are also urged to participate in the development of the allotment plans, in accordance with the needs of the planning process described in Annex /8/4/.

Administrations are also urged to identify and develop regulatory procedures required:

- for the implementation of the allotment planning process;
- for the implementation of the MPM process;
- to improve the existing regulatory provisions governing the use of the unplanned bands.

Proposals related to the above shall be submitted to the Secretary-General by 1 November 1987.

8.1.5 The overall programme

The CCIR intersessional work plan shall begin as soon as possible after the first session and culminate in a report to the second session which will be sent to the Secretary General and administrations in February 1988. Related costs are [SF 298,000] for 1986 and [SF 413,000] for 1987.

The development work by the IFRB on the Regions 1 and 3 BSS feeder-link plan shall begin as soon as possible after the first session and is expected to be completed during the second session. Related costs are [SF 392,000] for 1986, [SF 352,000] for 1987 and [SF ?] for 1988.

The development work by the IFRB related to the FSS allotment planning activity shall commence in [] and be completed during the second session. Related costs are [SF ?] for 1986, [SF ?] for 1987 and [SF ?] for 1988.

J.L. MARCHAND
Chairman of Sub-Working Group PL-A-1

Annexes: 2

ANNEX [8/1]

CCIR intersessional studies

1. Frequency band pairing (Document 234(Rev.1), § 3.4.1)

- a) To determine the potential value of frequency band pairings in the work of the Conference.
- b) To provide, if necessary and if possible, a specific list of FSS frequency band pairings which may be used as a guide for administrations to follow to the extent possible, when designing and implementing future satellite systems.

2. Amelioration of constraints (Document 234(Rev.1), § 1.4 c))

The demand for satellite networks will vary between different frequency band pairs and, in a given frequency band pair, in different arcs of the geostationary-satellite orbit. Thus, where constraints are applied to satellite network characteristics, it may be feasible to set mild constraints for some frequency bands and orbital arcs, where the demand is low, even though more stringent constraints may have to be applied where the demand is high. Intersessional study is required to determine how this might be achieved, to give relief in particular to networks of low capacity and complexity.

3. Orbit sectorization (Document 234(Rev.1), § 4.5)

To study the potential benefits and potential disadvantages of orbit sectorization, for example:

- reduction of inhomogeneity;
- constraints on choice of orbit location;
- impact on efficiency of use of orbit/spectrum, in particular the need for guard arcs between sectors.

4. Interference and harmonization.

- a) To consider the role of the "single entry of permissible interference" in an interference-limited situation and to determine the value of a single entry allowance in FDM/FM systems which is appropriate to a total interference entry of 2500 pWOp. The possible need to revise the $\Delta T/T = 4\%$ threshold in Appendix 29 of the Radio Regulations in the light of any proposed change in the single entry value which may be found desirable during the intersessional studies should also be considered. Considerations should also be given to the possible need to revise permissible interference levels for digital systems and also to the compatibility of these new values for FDM-FM telephony with the corresponding levels for analogue FM television given in CCIR Recommendation 483.
Document 238(Rev.1), § 2.8)

- b) To identify the potential benefits of spectrum segmentation and the way in which they may best be achieved.
(Document 238(Rev.1), § 4.4.7)
- c) To study the concept of burden-sharing, including equitable interference and relocation, to determine the extent of parameter adjustments practicable over a period of time.
(Document 238(Rev.1), § 5.3)
- d) To evaluate the benefits and the technical, operational and economic problems arising from a requirement for flexibility of orbital position and to consider what regulatory action might be appropriate. These studies should consider two situations, firstly where the relative order of satellites in orbit remains unchanged but their respective angular separation is changed, and secondly where the order is changed.
(Document 238(Rev.1), § 4.2.6)

5. Generalized parameters

To identify and evaluate various sets of generalized parameters for planning and coordination. (Document 232(Rev.1), § 2.3)

In this evaluation, study should include consideration of the feasibility of using earth station antennas which do not meet CCIR Recommendation 580 in plans which are based on generalized parameters which assume conformity with that Recommendation (that is, in frequency bands and orbital arcs where the special needs of developing countries have not been identified). (Document 232(Rev.1) § 3)

6. Earth station antennas

To determine an appropriate side-lobe reference radiation pattern for earth station antennas for which D/λ is less than 150, to be assumed in determining generalized performance criteria for use in the first planning period in those frequency bands and orbital arcs where the special needs of developing countries have not been identified. (Document 232(Rev.1), § 3)

7. Physical interference in orbit (Document 234(Rev.1), § 11)

For the CCIR to develop in the intersessional period a better understanding of the physical interference process leading to:

- an identification of the relevant factors of what is thought at present to be a theoretical problem;
- an evaluation of the risks that this phenomenon could present in the future, and;
- a Recommendation for a solution to the problem should the study results justify further action.

8. Reverse band working

These studies should be focussed primarily on national or regional systems. Consideration should be given to:

- a) - problems that may arise from inter-Regional differences of frequency allocations;
- the possible need for coordination modes not covered in Appendices 28 and 29;
- the extent to which the introduction of RBW would increase the orbit/spectrum resources available to the FSS;
- the impact of the introduction of RBW on freedom to locate earth stations within a service area and ability to reposition satellites;
- sub-division of permissible interference budgets between interference from FSS networks operating in the same frequency band mode and interference from FSS networks in the opposite mode;
- the most appropriate means of facilitating sharing between RBW satellite networks and terrestrial services;
- the most economically advantageous way of implementing RBW;

It would be valuable to confirm the outcome of these studies by experimentation. (Document 234(Rev.1), § 6.5)

- b) whether the introduction of reverse band working will require limits to be applied to satellite antenna side-lobe gain in the direction of neighbouring satellites in frequency bands used in both directions of transmission; (Document 232(Rev.1), § 4)
- [c) whether regulatory constraints would need to be applied to orbital ellipticity in frequency bands where reverse band working is implemented;] (Document 232(Rev.1), § 1)
- d) planning of bands using reverse band working could well impose additional constraints on other space and terrestrial services, particularly when a terrestrial fixed service is also primary service in the same band. As a first step, studies must be carried out to ensure that the introduction of reverse band working will not restrict existing operational terrestrial networks and their system parameters.
(Document 282 (Annex 2), § X.2.5)

9. Polarization discrimination between networks
(Document 234(Rev.1), § 7.5)

Intersessional studies should be carried out to ascertain how much benefit could be obtained:

- a) from polarization discrimination between nominally co-located single-polarization satellites serving different coverage areas;
- b) between adjacent satellites, perhaps serving the same coverage area, both also having single-polarization.

10. Criteria for satellite beams (Document 232(Rev.1), § 4)

To determine the necessary criteria for satellite beams, including:

- i) reference radiation patterns for elliptical and shaped beams;
- ii) an appropriate minimum required beam size, as a function of frequency;

and to study whether

- iii) beam pointing constraints more stringent than those in Article 29 of the Radio Regulations are desirable.

11. Determination of the need to coordinate satellite networks

To consider the revision of the technical content of Appendix 29 of the Radio Regulations in order to:

- i) increase the accuracy with which the need to coordinate is determined, reducing the likelihood of unjustified affirmative results without introducing a significant risk of failing to detect a real need to coordinate;
- ii) simplify the application of the process.

12. Review of technical aspects of Appendices 3 and 4 of the Radio Regulations

To examine the technical information called for by Appendices 3 and 4 and to ascertain whether any parts of it have no significant value for the purposes of Articles 11 and 13 as they now stand. [Note that Committee 5 is reviewing the administrative aspects of Articles 11 and 13 which may, in turn, have an impact on these Appendices.]

13. Further studies for different combinations of services
(Document 282, § X.2.6)

Further study may be needed for a number of combinations of services, listed below, which may share a band or bands. Certain of these sharing situations are more likely to occur, and more problematic than others. In view of the limited time and resources to be available during the intersessional

period, attention should be focussed on those situations identified in Chapter 8 as critical to the requirements of the second session.

- a) BSS/FSS at 2.5 GHz;
 - b) BSS/FSS at 12 GHz - Inter-Regional;
 - c) FSS/EESS (passive) at 18.6 - 18.8 GHz;
 - d) FSS/MetSS at around 7/8 GHz and at 18 GHz;
 - e) ISS/BSS at 22.5 - 23 GHz;
 - f) FSS/FS in bidirectional bands;
 - g) MSS/FS at 1.6/1.5 GHz;
 - h) BSS/FS at 22.5 - 23 GHz;
 - i) FSS/EES at 8 GHz.
14. Spurious emissions from space stations (Document 282, § X.2.8)
15. Sharing criteria for the bands and services identified by ORB-85 to be planned (Document 282, § X.2.9)
16. Sharing situations subject to Article 14 of the Radio Regulations (Document 282, § X.2.13)
17. Sharing criteria for digital systems for bands below 15 GHz (Document 282, § Y.3)
18. Satellite sound broadcasting systems for individual reception by portable and automobile receivers
(Document 237, § 7.2.4.1 Quality of service
§ 7.2.4.2 Frequency of operation
§ 7.2.4.3 Modulation type
§ 7.2.4.4 Bandwidth required
§ 7.2.4.5 Receivers
§ 7.2.4.6 Antenna design
§ 7.2.4.7 Feeder links
§ 7.2.4.8 Appropriate sharing criteria (including those applicable to geographical separation)
§ 7.2.4.9 Cost considerations
§ 7.2.4.10 Ability of technology to enable compliance with Provision 2674
§ 7.2.4.11 Multiple user satellite)
19. High-Definition Television
- To include in its report to the second session of the Conference the results of its studies relevant to the following matters:
- the development of technical parameters for HDTV transmissions by satellite;
 - which frequency bands would be possible and appropriate from the point of view of propagation; and
 - inter- and intra-service sharing aspects.

ANNEX [8/2]

CCIR Work plan guidelines

- Questions identified for study in Annexes [8/1, 8/2 and 8/3] are initially assigned by the Director of the CCIR to the relevant Study Groups during their final meetings, mid-September to mid-November, 1985.
 - The Plenary Assembly in May 1986 formalizes the establishment of a Joint Interim Working Party (JIWP) which will coordinate the studies required and produce a final report in the fall of 1987.
 - The Plenary Assembly also authorizes the JIWP to transmit its report directly to administrations and to the Secretary-General for the second session of the Conference.
 - The JIWP holds its first meeting (one week) in the fall of 1986 to review progress made and effect the necessary coordination among related studies.
 - The final meeting of the JIWP (two weeks) is to be held in the fall of 1987, concurrently with the Block B CCIR meetings already scheduled.
 - The final report is sent to administrations in February 1988.
-

INTERNATIONAL TELECOMMUNICATION UNION

ORB-85

WARC ON THE USE OF THE
GEOSTATIONARY-SATELLITE ORBIT AND THE PLANNING
OF SPACE SERVICES UTILIZING IT

FIRST SESSION, GENEVA, AUGUST/SEPTEMBER 1985

Document DT/95-E
12 September 1985
Original: English

AD HOC WORKING GROUP
OF THE PLENARY

Intersessional work on FSS allotment planning

REPORT ON A MEETING OF THE SOFTWARE ADVISORY GROUP

A meeting of the Software Advisory Group of PLA/1 was convened to examine the questions of the development of the software needed for FSS allotment planning, and to determine the feasibility of various possible approaches to performing this task. Documents 41, 320 and 324 were taken into account.

The following general conclusions emerged:

- a) The precise nature of the planning exercise which has been requested by Committee 5 in Document 324 is not sufficiently well defined. No-one could proceed with confidence with the development of a truly responsive programme. BETTER GUIDANCE IS CONSIDERED ABSOLUTELY ESSENTIAL before such a task is undertaken at all.
- b) If such guidance can be given by this Conference, and given soon, then the related financial aspects can be addressed. In this respect, the following points are pertinent:
 - i) the development of a completely new computer program, or something close to that, would require more than 20 person-years and take more than 3 years to accomplish;
 - ii) waiting for an Administrative Council decision for more money cannot, therefore, be a valid solution by itself;
 - iii) it will be necessary to build upon existing software within administrations in order to meet the 1988 deadline, and work will have to be performed by experts within these same administrations in order to reduce the cost to the ITU;
 - iv) the establishment of a Software Working Group should be considered, as one way of giving effect to the above.

J.R. MARCHAND
Chairman of Sub-Working Group PLA/1