Documents of the World Administrative Radio Conference for the planning of the HF bands allocated to the broadcasting service (2nd session) (WARC HFBC-87 (2))
(Geneva, 1987)

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- This PDF includes Document DT No. 1-73
- The complete set of conference documents includes Document No. 1-279, DL No. 1-33, DT No. 1-73

HFBC (2)

UNION INTERNATIONALE DES TÉLÉCOMMUNICATIONS
CAMR POUR LA PLANIFICATION DES BANDES D'ONDES DÉCAMÉTRIQUES ATTRIBUÉES AU SERVICE DE RADIODIFFUSION
SECONDE SESSION, GENÈVE, **Février-Mars 1987**

Corrigendum 1 au
Document DT/1-F/E/S
2 février 1987 X

PROJET
STRUCTURE DE LA CONFERENCE

Page 2, Mandat de la Commission 4, et

Page 3, Mandat de la Commission 6 :

Dans le dernier paragraphe, supprimer les mots :

"et d´autres conférences,"

DRAFT
CONFERENCE STRUCTURE

Page 2, Commission 4 Terms of Reference, and

Page 3, Commission 6 Terms of Reference :

In the last paragraph, delete the words :

"and other conferences,"

PROYECTO DE ESTRUCTURA
DE LA CONFERENCIA

Página 2, Mandato de la Comisión 4, y

Página 3, Mandato de la Comisión 6:

En el último punto, suprímase las palabras siguientes:

"y de otras conferencias,"

HFBC (2) INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS
ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/1-E
2 February 1987
Original: English

PLENARY MEETING

Note by the Secretary-General

DRAFT
CONFERENCE STRUCTURE

SECOND SESSION OF THE WORLD ADMINISTRATIVE RADIO CONFERENCE
FOR THE PLANNING OF HF BANDS ALLOCATED TO
THE BROADCASTING SERVICE - HFBC(2)
(Geneva, 1987)

The agenda of the Conference appears in Resolution No. 912 which was adopted by the Administrative Council at its 39th Session (Geneva, 1984).

Bearing in mind Nos. 464 to 479 inclusive of the International Telecommunication Convention, Nairobi, 1982, the following committees 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.

Committee 1 - Steering Committee

Terms of Reference :

Coordinate all matters connected with the smooth execution of work and 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 :

Verify the credentials of delegations and 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 :

Determine the organization and the facilities available to the delegates, examine and approve the accounts of expenditure incurred throughout the duration of the Second Session of the Conference and report to the Plenary Meeting the estimated total expenditure of the Second 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 48).

Committee 4 - Technical Committee

Terms of Reference :

On the basis of the Report of the First Session and taking into account the reports on the intersessional work carried out by the IFRB (see Resolution COM5/2 of the First Session) and the CCIR (see Recommendation COM5/1 of the First Session), prepare for adoption technical standards and any appropriate procedures for future SSB operation including a schedule for its progressive introduction (agenda items 2.1 and 2.1.4).

- review and, where necessary, prepare revisions of and recommend action to be taken on Resolutions and Recommendations of the WARC-79 and other conferences, relevant to technical studies, without adverse impact on other radio services operating in accordance with the Radio Regulations (agenda item 2.1.6).

Committee 5 - Planning Method* and Associated Procedures Committee

Terms of Reference :

On the basis of the Report of the First Session and taking into account the reports on the intersessional work carried out by the IFRB (see Resolution COM5/2 of the First Session) and the CCIR (see Recommendation COM5/1 of the First Session) (agenda item 2.1):

- consider one or more trial seasonal plans, developed by the IFRB, for the purpose of refining and adopting the planning method (agenda item 2.1.1);

- prepare for adoption the procedures** for the preparation and implementation of seasonal plans for DSB operation based on the requirements submitted by administrations (agenda item 2.1.2);

- if possible, draw up one or more basic plans for the first seasons in accordance with the above-mentioned procedures (agenda item 2.1.3).

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* Including consideration of Resolution COM5/3 of the First Session relating to the requirement file.

**In the form of guidelines and flow charts to be developed into definitive regulatory provisions by Committee 6.

Committee 6 - Regulatory Committee

Terms of Reference :

On the basis of the Report of the First Session and taking into account the conclusions of Committees 4 and 5 and the list of Articles and Appendices prepared by the IFRB (agenda item 2.1):

- review and, where necessary, prepare revisions of the relevant provisions* of the Radio Regulations relating to the use of the HF bands allocated exclusively to the broadcasting service. Any revision of the Radio Regulations consequential to the decisions of the Conference shall in no way affect the other services to which the HF bands are allocated, in particular any revision of Article 8 shall be limited to the modifications of existing footnotes relating to bands exclusively allocated to the HF broadcasting service or the addition of such footnotes (agenda item 2.1.5);

- review and, where necessary, prepare revisions of and recommend action to be taken on Resolutions and Recommendations of the WARC-79 and other conferences, relevant to regulatory provisions, without adverse impact on other radio services operating in accordance with the Radio Regulations (agenda item 2.1.6).

Committee 7 - Editorial Committee

Terms of Reference :

Perfect the form of the texts prepared in the various committees of the Conference, without altering the sense, for submission to the Plenary Meeting (Nos. 473 and 474 of the International Telecommunication Convention, Nairobi, 1982).

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* Including regulatory provisions relating to planning procedures.

R.E. BUTLER
Secretary-General

HFBC (2) INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/2-E
2 February 1987

HEADS OF DELEGATIONS

DRAFT AGENDA

OF THE

FIRST PLENARY MEETING

Monday, 2 February 1987, at 1100 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	21
11.	Date by which the Credentials Committee must submit its conclusions	-
12.	Working hours of the meetings of the Conference	-
13.	Financial responsabilities of administrative conferences	19
14.	Presentation of the HFBC System	-
15.	Other business	

R.E. BUTLER
Secretary-General

HFBC (2)

UNION INTERNATIONALE DES TÉLÉCOMMUNICATIONS
CAMR POUR LA PLANIFICATION DES BANDES D'ONDES DÉCAMÉTRIQUES ATTRIBUÉES AU SERVICE DE RADIODIFFUSION
SECONDE SESSION, GENÈVE, Février-Mars 1987

Document DT/3-F/E/S
2 février 1987
Original : français
anglais
espagnol

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

Séance plénière Plenary Meeting Sesión Plenaria	: 1, 19, 21
C2 - Pouvoirs Credentials Credenciales	: 2
C3 - Budgétaire Budget Presupuesto	: 17, 18, 19
C4 - Technique Technical Técnica	: 4 (+Corr.1+Add.1), 5, 8, 10, 11, 12, 13, 16 (AUS)*), 24, 25, 27 (E)*), 28, 32 (B)*)
C5 - Méthode de planification et procédures associées Planning method and Associated Procedures Método de planificación y procedimientos asociados	: 3, 6, 8, 9, 10, 11, 12, 13, 15, 16 (AUS)*), 23, 24, 27 (E)*), 29 (F)*), 30 (D)*), 31 (IFRB)*), 33 (F)*)
C6 - Réglementation Regulatory Reglamento	: 7, 9, 16 (AUS)*), 25, 33 (F)*)

R.E. BUTLER
Secrétaire général

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*) Documents en préparation
Documents being prepared
Documentos en preparación

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, **February-March 1987**

Document DT/4-E
28 January 1987
Original : English

Note by the Secretary-General

At the request of the Chairman of the IFRB, I have the honour to transmit herewith a copy of a document prepared to the intention to the Second Session of the Conference on the "HFBC intersessional work".

R.E. BUTLER
Secretary-General

Annex: 1

TRAVAUX ENTRE LES SESSIONS DE LA HFBC

Afin de permettre aux délégués de mieux suivre les exposés concernant "les travaux entre les sessions de la HFBC" qui seront donnés par l'IFRB les lundi 2 et mardi 3 février 1987, on trouvera ci-joint le programme des exposés et le texte joint aux diapositives qui seront utilisées.

HFBC INTERSESSIONAL WORK

In order to permit delegates to better follow the presentations on the "HFBC intersessional work" to be given by the IFRB on Monday and Tuesday 2/3 February 1987, the programme of presentations and the text of the transparencies or slides to be used are enclosed.

TRABAJO ENTRE REUNIONES DE LA HFBC

Con el objeto de que los delegados puedan seguir con mayor facilidad la presentación del trabajo entres reuniones de la HFBC que hará la IFRB el lunes 2 y el martes 3 de febrero de 1987, se adjunta el programa de dicha presentación y el texto correspondientes a las diapositivas que se utilizarán.

PROGRAMME

1. INTRODUCTION
2. **MODULE 1:** GENERAL PRESENTATION
3. **MODULE 2:** INTERPRETATION AND SIMPLIFICATIONS INTRODUCED BY THE BOARD
4. **MODULE 3:** HFBC PLANNING SYSTEM
5. **MODULE 4:** TENTATIVE REQUIREMENTS FILE
6. **MODULE 5:** ANALYSIS OF THE INDIVIDUAL REQUIREMENTS IN THE LIGHT OF THE TECHNICAL CRITERIA ADOPTED BY THE FIRST SESSION OF THE CONFERENCE
7. **MODULE 6:** GLOBAL ANALYSIS OF THE INTERACTION BETWEEN REQUIREMENTS
8. **MODULE 7:** SUSPENSION RULES
9. **MODULE 8:** ANALYSIS OF PLANS
10. **MODULE 9:** COMPUTER ASPECTS AND ASSISTANCE AVAILABLE
11. CONCLUSIONS

MODULE 1

GENERAL PRESENTATION OF

THE HFBC INTERSESSIONAL WORK

BACKGROUND

THE FIRST SESSION OF THE WARC HFBC (1984) ADOPTED A REPORT TO THE SECOND SESSION WHICH:

- CONTAINS THE PRINCIPLES TO BE FOLLOWED IN ESTABLISHING SEASONAL PLANS, THE PLANNING METHOD AND TECHNICAL CRITERIA TO BE USED IN THE DEVELOPMENT OF SEASONAL PLANS.

- SPECIFIES THE MONITORING ACTIVITIES TO BE UNDERTAKEN IN THE INTERSESSIONAL PERIOD.

THE ABOVE DECISIONS ARE EMBODIED IN THE REPORT ITSELF AND IN FOUR RESOLUTIONS NAMELY:

- PLEN/2
- COM5/1
- COM5/2
- COM5/3

CONTENTS OF THE REPORT TO THE SECOND SESSION OF THE CONFERENCE

- DEFINITIONS

- TECHNICAL CRITERIA

  . SOLAR INDEX
  . NOISE
  . PROPAGATION
  . TEST POINTS
  . RF PROTECTION RATIOS
  . RELIABILITY
  . USE OF ADDITIONAL FREQUENCIES

- OTHER TECHNICAL CRITERIA

  . SSB SPECIFICATIONS
  . MINIMUM VALUES OF TECHNICAL PARAMETERS
  . ANTENNAS

PLANNING PRINCIPLES ADOPTED BY THE FIRST SESSION

4.1.2.1 EQUALITY OF RIGHTS

4.1.2.2 TREATMENT OF NATIONAL/INTERNATIONAL REQUIREMENTS

4.1.2.3 FREQUENCY CONTINUITY

4.1.2.4 NEW REQUIREMENTS AND ADDITIONS

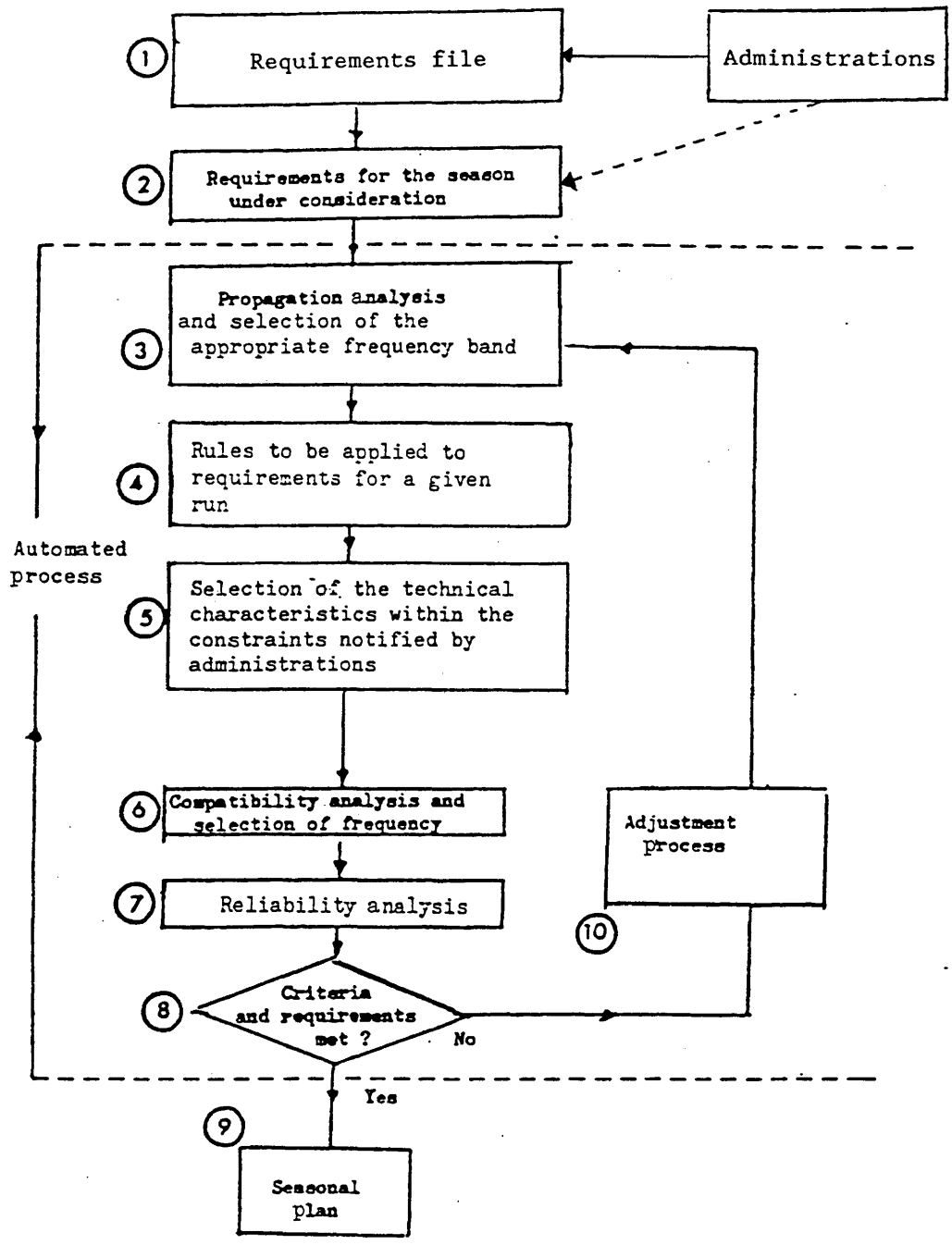
4.1.2.5 DOUBLE SIDE BAND

4.1.2.6 EFFICIENT USE OF THE SPECTRUM

4.1.2.7 PROPORTIONALLY REDUCED PROTECTION

4.1.2.8 HIGHEST NUMBER OF REQUIREMENTS

4.1.2.9 MINIMUM NUMBER OF REQUIREMENTS WITH ADOPTED QUALITY CRITERIA



FLOWCHART OF THE AUTOMATED PROCESS

HFBC INTERSESSIONAL WORK

- DURING THE INTERSESSIONAL PERIOD THE IFRB:

  . ESTABLISHED THE TENTATIVE REQUIREMENTS FILE (DOCUMENT NO. 3);

  . DEVELOPED THE "HFBC PLANNING SYSTEM" (DOCUMENT NO. 8);

  . PUBLISHED THE RESULTS OF THE PLANNING EXERCISES;

  . PUBLISHED A REPORT CONTAINING A COMPARATIVE ANALYSIS OF THE DIFFERENT PLANNING EXERCISES (DOCUMENT NO. 11);

  . PREPARED A REPORT ON MONITORING ACTIVITIES (DOCUMENT NO. 9);

  . PREPARED A LIST OF PROVISIONS OF THE RADIO REGULATIONS (DOCUMENT NO. 7);

  . ORGANIZED TWO HFBC INFORMATION MEETINGS IN GENEVA RESPECTIVELY IN 1985 AND 1986;

  . PARTICIPATED IN A NUMBER OF OTHER REGIONAL MEETINGS;

HFBC PLANNING SYSTEM

(DOCUMENT NO. 8)

. ON THE BASIS OF THE DECISIONS OF THE FIRST SESSION OF THE CONFERENCE THE IFRB DEVELOPED THE "HFBC PLANNING SYSTEM".

. IT PROVIDES FULL DETAILS REGARDING THE INTERPRETATION GIVEN BY THE IFRB TO SOME PROVISIONS OF THE REPORT TO THE SECOND SESSION AND INCLUDES A DESCRIPTION OF THE SIMPLIFICATIONS THAT WERE ADOPTED.

. THE HFBC PLANNING SYSTEM IS STRUCTURED IN FOUR FUNCTIONAL PHASES AS FOLLOWS:

PHASE I

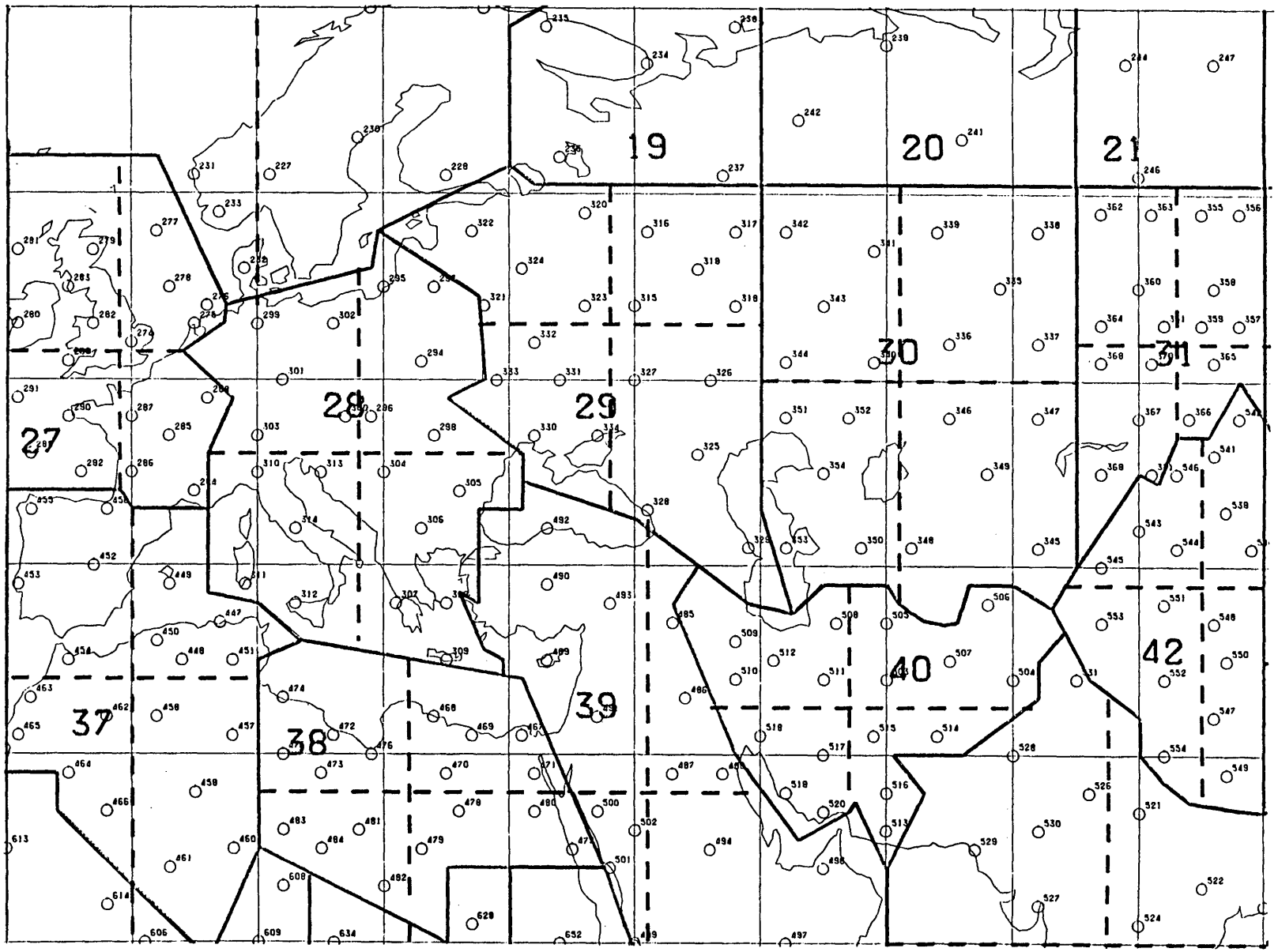
PHASE II

PHASE III

PHASE IV

PHASE I

DURING THIS PHASE ALL THE NECESSARY FILES OF BASIC DATA ARE ESTABLISHED, USING DATA FROM THE REQUIREMENT FILE ESTABLISHED IN ACCORDANCE WITH RESOLUTION COM5/3 AS WELL AS THE DATA PERTAINING IN PARTICULAR TO THE CIRAF ZONES, TEST POINTS, MINIMUM FIELD-STRENGTH VALUES AND THE ANTENNA DIAGRAMS.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PHASE II

THE PURPOSE OF THIS PHASE IS TO DETERMINE, ON THE BASIS OF THE INFORMATION EXTRACTED FROM THE REQUIREMENT FILE, THE FOLLOWING DATA:

- THE MOST APPROPRIATE BAND(S) FOR EACH REQUIREMENT;
- THE REQUIREMENTS FOR WHICH UP TO THREE FREQUENCY BANDS ARE NECESSARY;
- THE REQUIREMENTS THAT WILL BE AFFORDED PROPORTIONALLY REDUCED PROTECTION;
- THE REQUIREMENTS THAT DO NOT MEET THE MINIMUM STANDARDS OF SERVICE QUALITY.

SELECTION OF THE APPROPRIATE BAND

HOUR UTC	BAND (MHZ)				
	6	9	11	15	17
23	0	64	76	82	88
24	10	85	88	92	94
1	85	92	94	95	94
2	90	94	95	92	62
3	88	94	95	69	2
4	88	94	93	19	0
5	88	94	88	0	0
6	88	92	62	0	0

PHASE III

ON THE BASIS OF THE INFORMATION DETERMINED DURING THE PREVIOUS PHASE, THE FOLLOWING MAJOR STAGES OF PROCESSING ARE UNDERTAKEN DURING THIS PHASE:

- DISTRIBUTION OF REQUIREMENTS TO THEIR MOST APPROPRIATE BANDS;
- CONSTRUCTION OF SIGNAL-TO-INTERFERENCE MATRICES;
- ESTABLISHMENT OF COMPATIBILITY MATRICES;
- PROCESSING OF REQUIREMENTS BY HOUR, BAND AND UNIT OF SERVICE AREA;
- GENERATION OF A PLAN BY ASSIGNING FREQUENCIES TO REQUIREMENTS;
- DETERMINATION OF THE OVERALL BROADCASTING RELIABILITIES (OBR).

PHASE IV

DURING THIS PHASE, WHICH IS PART OF THE INTERSESSIONAL WORK BUT NOT PART OF THE HFBC PLANNING SYSTEM, THE PLANS THAT HAVE BEEN GENERATED ARE COMPARED AND THE IMPACT OF THE VARIOUS REFERENCE PARAMETERS OF EACH PLAN (80 PER CENT OR 90 PER CENT OBR, ETC.) ARE ASSESSED.

AVAILABILITY OF THE COMPUTERIZED

HFBC PLANNING SYSTEM

THE VARIOUS MODULES OF THE HFBC PLANNING SYSTEM HAVE BEEN DEVELOPED ON THE ITU COMPUTER SYSTEM; HENCE THE CODE IS OPTIMIZED TO RUN ON A SPECIFIC COMPUTER SYSTEM CONFIGURATION WITH ITS LIMITATIONS CONCERNING THE SPEED OF THE CPU, ITS MAIN MEMORY AND PERIPHERAL STORAGE DEVICES. ANY ADMINISTRATION WISHING TO AVAIL ITSELF OF ANY MODULE ALREADY DEVELOPED IS INVITED TO COMMUNICATE WITH THE IFRB REGARDING THE TECHNICAL CONDITIONS CONCERNING ITS AVAILABILITY AS WELL AS THE EXPENDITURES TO BE INCURRED.

PARAMETRES PARAMETERS PARÁMETROS	NUMERO DU PLAN PLAN NUMBER NÚMERO DEL PLAN														
	10	11	20	30	31	32	33	40	50	52	53	55	56	58	59
NOMBRE DE TACHES SOLAIRES SUNSPOT NUMBER NÚMERO DE MANCHAS SOLARES	5	5	5	60	60	60	60	60	120	120	120	120	120	120	120
SAISON SEASON ESTACIÓN	D-85	D-85	J-86	M-88	M-88	M-88	M-88	J-88	D-85	D-85	D-85	D-85	D-85	D-85	D-85
CENTILE PERCENTILE PERCENTILO	80	80	80	80	90	90	80	80	80	90	80	80	80	80	80
REDUCTION DE E_{MIN} REDUCTION OF E_{MIN} REDUCCIÓN DE E_{MIN}	0	0	0	0	-5	0	-5	0	0	0	-5	0	0	0	0
FREQ. PREREGLEES PRESET FREQ. FREC. PREFIJADAS	OUI YES SI	NON NO NO	OUI YES SI	OUI YES SI	OUI YES SI	OUI YES SI	OUI YES SI	OUI YES SI	OUI YES SI	OUI YES SI	OUI YES SI	OUI YES SI	OUI YES SI	OUI YES SI	OUI YES SI

PLANNING EXERCISES

- THE RESULTS OF THE FOLLOWING 5 PLANNING EXERCISES HAVE BEEN PUBLISHED ON MICROFICHE SUPPORT.

PLAN 10, D-85, SSN 5: IFRB CIRCULAR-LETTER 665
DATED 30 JULY 1986

PLAN 20, J-86, SSN 5: ADD. TO CIRCULAR-LETTER 665
DATED 26 SEPTEMBER 1986

PLAN 30, M-88, SSN 60: ADD. TO CIRCULAR-LETTER 665
DATED 26 SEPTEMBER 1986

PLAN 40, SSN 60: ADD. TO CIRCULAR-LETTER 665
DATED 30 OCTOBER 1986

PLAN 50, SSN 120: ADD. TO CIRCULAR-LETTER 665
DATED 30 OCTOBER 1986

- ALL OTHER PLANNING EXERCISES CAN BE MADE AVAILABLE ON MAGNETIC TAPE

- THE ESSENTIAL FILES ASSOCIATED WITH ALL PLANNING EXERCISES CAN BE CONSULTED THROUGH COMPUTER TERMINALS LOCATED IN LEVEL D.

- A COMPARATIVE ANALYSIS OF ALL PLANNING EXERCISES HAS BEEN CARRIED OUT AND ITS RESULTS ARE GIVEN IN DOCUMENT NO. 11.

BASIC CONCEPTS AND TERMINOLOGY

USED WITHIN THE PLANNING SYSTEM

. A NUMBER OF IMPORTANT DEFINITIONS AND CONCEPTS ARE CONTAINED IN THE REPORT TO THE SECOND SESSION

EG: BCR, BRR, BBR, ETC.

. THESE HAVE BEEN SUMMARIZED AND ARE DESCRIBED IN A SEPARATE DOCUMENT.

MODULE 2

INTERPRETATIONS AND SIMPLIFICATIONS INTRODUCED

BY THE BOARD

BACKGROUND

- IMMEDIATELY FOLLOWING THE FIRST SESSION OF THE CONFERENCE THE IFRB INITIATED A DETAILED STUDY OF THE REPORT TO THE SECOND SESSION.

- THE RESULTS OF THIS STUDY REVEALED A LACK OF CLARITY IN DIFFERENT PARTS OF THE REPORT.

- THE TIME AVAILABLE TO DESIGN, DEVELOP AND FULLY TEST A SYSTEM OF SUCH MAGNITUDE WAS SHORT.

- THE COMPUTER RESOURCES REQUIRED EXCEEDED BY FAR THE CAPACITY OF THE AVAILABLE COMPUTER INSTALLATION.

- CONSEQUENTLY THE BOARD:

  . INTERPRETED SOME OF THE PROVISIONS CONTAINED IN THE REPORT.

  . INTRODUCED SOME SIMPLIFICATIONS IN THE DESIGN OF THE HFBC PLANNING SYSTEM

  . ASKED THE ADMINISTRATIVE COUNCIL TO APPROVE THE RESOURCES TO EXPAND THE COMPUTER INSTALLATION.

INTERPRETATIONS AND SIMPLIFICATIONS

DEFINITION OF A REQUIREMENT

"A REQUIREMENT INDICATED BY AN ADMINISTRATION TO PROVIDE A BROADCASTING SERVICE AT SPECIFIED PERIODS OF TIME TO A SPECIFIED RECEPTION AREA FROM A PARTICULAR TRANSMITTING STATION" (PARA. 4.2.2).

THE BOARD DECIDED TO QUALIFY THE DEFINITION OF A REQUIREMENT BY SPECIFYING THAT THE RECEPTION AREA IS COMPOSED OF ADJACENT CIRAF ZONES OR ADJACENT PARTS OF CIRAF ZONES.

USE OF A "SERVICE AREA UNIT"

IN THE RESOLUTION OF INCOMPATIBILITIES

"IF THE PROCESSING SYSTEM CANNOT SATISFY ALL REQUIREMENTS IN A CERTAIN BAND, FOR A CERTAIN CIRAF ZONE OR PART OF A CIRAF ZONE IN A SPECIFIC PERIOD OF TIME, EVEN AFTER ALL POSSIBILITIES OF ADJUSTMENTS ARE EXHAUSTED, IT SHALL IDENTIFY ADMINISTRATIONS WHOSE REQUIREMENTS CANNOT BE COMPLETELY SATISFIED WITH THE AGREED OVERALL BROADCASTING RELIABILITY ADOPTED BY THE CONFERENCE" (PARA. 4.2.3.4.5).

THE BOARD INTRODUCED THE CONCEPT OF A "SERVICE AREA UNIT" OR A QUADRANT TO IDENTIFY THE REQUIREMENTS TO WHICH THE RULES FOR THE RESOLUTION OF INCOMPATIBILITIES WOULD BE APPLIED.

USE OF REDUCED PROTECTION CRITERIA AS A STEP IN THE PLANNING METHOD

MINIMUM VALUES OF TECHNICAL CRITERIA ARE INDICATED IN SECTION 3.11 OF THE REPORT TO THE SECOND SESSION.

DISCUSSIONS WITH EXPERTS FROM ADMINISTRATIONS INDICATED A STRONG PREFERENCE FOR ATTEMPTING TO SATISFY AT LEAST ONE REQUIREMENT PER ADMINISTRATION WITH REDUCED PROTECTION CRITERIA BEFORE INITIATING ANY REDUCTION OF THE TRANSMISSION PERIOD DURING THE MOST CONGESTED HOUR. THIS INTERMEDIATE STEP INCLUDED IN THE SYSTEM WAS NOT FORESEEN IN PARAGRAPH 4.2.3.4.5 OF THE REPORT, RELATING TO THE RULES TO BE APPLIED FOR DEALING WITH INCOMPATIBLE REQUIREMENTS.

REDUCTION OF THE TRANSMISSION PERIOD

IN THE CONGESTED HOUR

"4.2.3.4.5.5 THE SYSTEM SHALL SATISFY A MINIMUM NUMBER $(N)^2$ OF BROADCASTING REQUIREMENTS OF EACH ADMINISTRATION WITH THE OVERALL BROADCASTING RELIABILITY ADOPTED BY THE CONFERENCE".

"2 EXPRESSED IN TERMS OF NUMBER OF TRANSMISSIONS IN THE CONGESTED HOUR. IF THIS FAILS TO ACCOMMODATE AT LEAST ONE REQUIREMENT OF EACH CONCERNED ADMINISTRATION, N MAY BE EXPRESSED IN NUMBER OF FREQUENCY HOURS WITHIN A BLOCK OF THREE HOURS CENTERED ON THE CONGESTED HOUR. THE TESTS SHALL INCLUDE A RANGE OF VALUES OF N TO ENABLE A DECISION ON THIS MATTER TO BE TAKEN AT THE SECOND SESSION".

THE BOARD DECIDED TO APPLY THIS STEP BY REDUCING THE TRANSMISSION PERIOD OF EACH ADMINISTRATION CONCERNED IN THE CONGESTED HOUR BY NO MORE THAN 30 MINUTES. THE REMAINING 30 MINUTES WILL BE INCLUDED IN THE PLAN ONLY UNDER THE CONDITION OF NOT DETERIORATING THE ASSIGNMENTS ALREADY INCLUDED. SHIFTING OF REQUIREMENTS IN THE TIME DOMAIN WILL NOT BE IMPLEMENTED.

FINAL STEP FOR THE RESOLUTION OF INCOMPATIBILITIES

THE REDUCTION OF THE TRANSMISSION PERIOD, MAY NOT BE THE FINAL SOLUTION, AT LEAST THEORETICALLY, IN THE CASE OF A VERY CONGESTED HOUR. PARAGRAPH 4.2.3.4.5 OF THE REPORT TO THE SECOND SESSION DOES NOT SPECIFY ANY LIMIT TO THE REDUCTION OF THE PERIOD OF TRANSMISSION.

THE BOARD CONSIDERED IT UNREALISTIC TO REDUCE THE PERIOD OF TRANSMISSION TO LESS THAN 30 MINUTES. FOR THIS REASON, THE BOARD INTRODUCE AN ADDITIONAL STEP WHICH CONSISTS IN REDUCING THE PROTECTION CRITERIA BELOW THE LIMITS INDICATED IN SECTION 3.11 OF THE REPORT TO THE SECOND SESSION UNTIL A SOLUTION, GIVING AT LEAST 30 MINUTES' TRANSMISSION FOR EACH OF THE ADMINISTRATIONS CONCERNED IN A CONGESTED HOUR, IS REACHED.

CONSULTATION WITH ADMINISTRATIONS

AMONG THE RULES TO BE APPLIED WHEN DEALING WITH INCOMPATIBLE REQUIREMENTS, THE FOLLOWING REFERS TO CONSULTATION WITH ADMINISTRATIONS:

> "4.2.3.4.5.2. THE IFRB WILL SUGGEST CHANGES WHICH WILL BE USEFUL FOR THE ADMINISTRATIONS CONCERNED AND WHICH WOULD REDUCE CONGESTION (SEE PARAGRAPH 4.1.1)."

IF THE SECOND SESSION DECIDES THAT THE SEASONAL PLANS SHALL BE PREPARED SEMI-ANNUALLY, THE TIME REQUIRED FOR COMPUTATIONS AND GENERATION OF PLANS MAY NOT PERMIT CONSULTATION WITH ADMINISTRATIONS TO BE CARRIED OUT.

IN ADDITION, THIS CONSULTATION MAY IMPOSE RESTRICTIONS ON THE PREPARATION OF SEASONAL PLANS. IT MAY LEAD TO THE FREEZING OF THE PLANNING PROCESS DURING THE TIME REQUIRED FOR THE CONSULTATION. IN THE ABSENCE OF A FINAL DECISION ON THE PERIODICITY OF THE PREPARATION OF THE SEASONAL PLANS, THE BOARD DID NOT INCLUDE IT IN THE DESIGN OF THE SYSTEM. THE SECOND SESSION IS REQUESTED TO SPECIFY THE CONDITIONS AND TIMING OF THE CONSULTATIONS IF IT WISHES TO INCLUDE THEM IN THE SYSTEM.

USE OF EXTENDED BANDS

THE REPORT TO THE SECOND SESSION DOES NOT MAKE ANY REFERENCE TO THE BANDS TO BE USED FOR THE PLANNING EXERCISES TO BE CARRIED OUT IN THE INTERSESSIONAL PERIOD.

THE BOARD DECIDED TO USE ALL BAND EXTENSIONS IN THE PLANNING EXERCISES.

HFBC BANDS

BEFORE WARC-79 kHz	AFTER WARC-79 kHz	
5 950 - 6 200	5 950 - 6 200	+ 0
7 100 - 7 300	7 100 - 7 300	+ 0
9 500 - 9 775	9 500 - 9 900	+ 125
11 700 - 11 975	11 650 - 12 050	+ 125
----------	13 600 - 13 800	+ 200
15 100 - 15 450	15 100 - 15 600	+ 150
17 700 - 17 900	17 550 - 17 900	+ 150
21 450 - 21 750	21 450 - 21 850	+ 100

OPTIMUM AND APPROPRIATE FREQUENCY BANDS

"THE OPTIMUM FREQUENCY BAND FOR A HIGH FREQUENCY BROADCASTING SERVICE IS THAT WHICH HAS THE HIGHEST MEDIAN VALUE OF RADIO-FREQUENCY SIGNAL-TO-NOISE RATIO AT THE TEST POINTS IN THE REQUIRED SERVICE AREA.

THE OPTIMUM COMBINATION OF BANDS, IF NEEDED BY THE PLANNING METHOD, IS THAT WHICH GIVES THE HIGHEST VALUE OF BASIC BROADCAST RELIABILITY IN THE REQUIRED SERVICE AREA" (PARA. 3.2.1.4).

"THE PROPAGATION PREDICTION METHOD DESCRIBED IN PARAGRAPH 3.2 (PAGE 9) WILL BE USED TO CALCULATE FOR EACH REQUIREMENT, FOR THE SEASON AND FOR THE DIFFERENT TIMES, THE OPTIMUM FREQUENCY BAND. THE APPROPRIATE FREQUENCY BAND(S) FOR EACH REQUIREMENT AT THE DIFFERENT TIMES WILL BE SELECTED ON THE BASIS OF THE RESULTS OF THE ABOVE CALCULATIONS" (PARA 4.2.3.3).

THE BOARD ADOPTED A DEFINITION OF APPROPRIATE BAND WHICH TAKES INTO ACCOUNT EQUIPMENT CAPABILITIES AND LIMITATIONS, COVERAGE CONSIDERATIONS AND CONTINUITY OF USAGE OF A BAND.

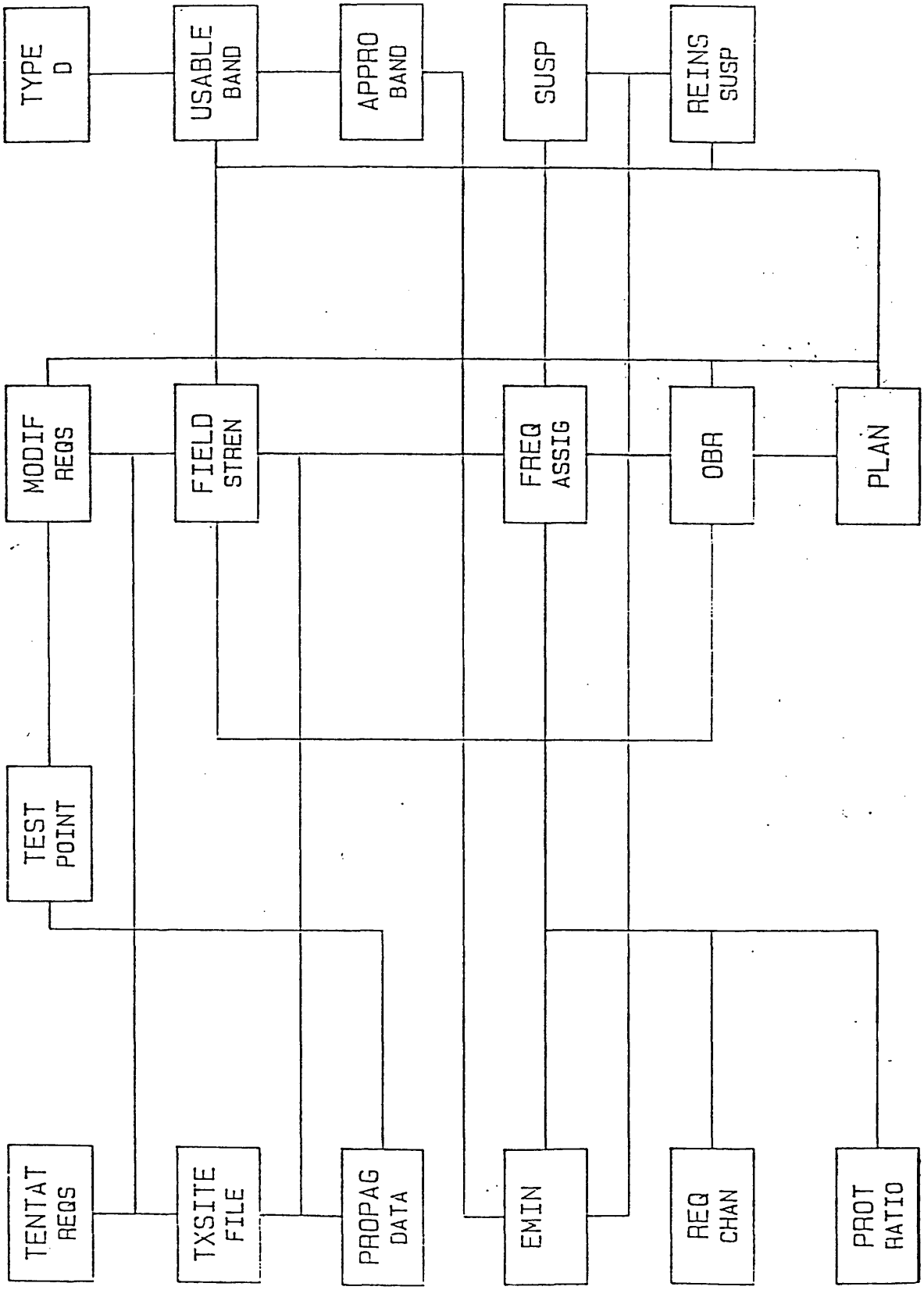
DEFINITIONS OF BANDS

- OPTIMUM
- AVAILABLE
- USABLE
- PREFERRED
- APPROPRIATE

MODULE 3

"OVERVIEW OF THE HFBC PLANNING SYSTEM"

HFBC PLANNING FILES AND PROGRAMS



TENTATIVE REQUIREMENT FILE

TO PUT INTO MACHINE-READABLE FORM THE REQUIREMENTS SUBMITTED BY ADMINISTRATIONS IN ACCORDANCE WITH RESOLUTION COM5/3, THE IFRB DEVELOPED A COMPLEX DATA CAPTURE AND VALIDATION SYSTEM. THE RESULTANT FILE, WHICH IS THE SUBJECT OF A SEPARATE IFRB REPORT (SEE DOCUMENT NO. 3 OF THE SECOND SESSION), CONTAINS THE PARTICULARS OF THE REQUIREMENTS, WHICH APPLY TO A PERIOD OF 12 SEASONS (FROM 1 AUGUST 1985 TO 1 AUGUST 1988).

TRANSMITTER SITES

THE TRANSMITTER SITE FILE CONTAINS A LIST OF ALL THE TRANSMITTER SITES CONSIDERED TO BE ACTIVE IN EACH SEASON AND EACH PERIOD OF ONE HOUR. THIS FILE IS REQUIRED BECAUSE PROPAGATION CALCULATIONS ARE BASED SOLELY ON THE COORDINATES OF THE TRANSMITTING STATION, THE COORDINATES OF TEST POINTS, THE SEASON, THE SUNSPOT NUMBER AND THE HOURS OF OPERATION.

TEST POINTS

ON THE BASIS OF THE REPORT TO THE SECOND SESSION THE IFRB DEVELOPED A FILE OF TEST POINTS, WHICH WAS PRESENTED TO ADMINISTRATIONS AT THE TWO HFBC INFORMATION MEETINGS AND WHICH CONTAINS 911 TEST POINTS (SEE CHAPTER 3, SECTION 3 OF DOCUMENT 8 OF THE SECOND SESSION), DISTRIBUTED THROUGHOUT THE EXISTING AND NEWLY CREATED CIRAF ZONES.

MODIFIED MASTER REQUIREMENT FILE

THE MODIFIED MASTER REQUIREMENT FILE IS ESSENTIALLY A COPY OF THE TENTATIVE REQUIREMENT FILE.

THE INFORMATION CONCERNING THE COORDINATES OF THE TRANSMISSION STATION IS REPLACED BY ITS CORRESPONDING TRANSMITTER SITE CODE.

THE INFORMATION CONCERNING THE REQUIRED SERVICE ARE EXPRESSED AS CIRAF ZONES OR SERVICE SECTORS IS REPLACED BY THE CORRESPONDING TEST POINT NUMBERS.

PROPAGATION DATA BASE

FOR EACH OF THE FIVE COMBINATIONS OF SEASONS AND SUNSPOT NUMBERS SELECTED BY THE BOARD, A SEPARATE PROPAGATION DATA BASE WAS ESTABLISHED. IT CONTAINS FOR EACH HOUR BLOCK AND FOR EACH CIRCUIT (I.E. COMBINATION OF A UNIQUE TRANSMITTER SITE AND A UNIQUE TEST POINT), AND IN ALL OF THE NINE HFBC BANDS, THE PROPAGATION MODES (6E MODES AND 6F MODES), THE ELEVATION ANGLE OF EACH MODE, THE DISTANCE, THE AZIMUTH, THE MUF VALUE, ETC.

A TOTAL OF FIVE PROPAGATION DATA BASES WERE ESTABLISHED BY THE IFRB, A TASK WHICH REQUIRED OF THE ORDER OF 20 CPU DAYS AND A TOTAL STORAGE SPACE OF 120 MAGNETIC TAPES OF 100 MBYTES EACH.

FIELD STRENGTH FILE

AFTER THE ESTABLISHMENT OF THE PROPAGATION DATA BASE AS WELL AS THE MODIFIED MASTER REQUIREMENT FILE FOR A PARTICULAR SEASON AND SUNSPOT NUMBER, A FILE OF FIELD STRENGTH VALUES IS CREATED BY CONSIDERING THE PARTICULARS OF THE EQUIPMENT, NAMELY THE ANTENNA TYPE, AZIMUTH, ETC. HENCE, THIS FILE, WHICH ACTUALLY CONSISTS OF 24 SEPARATE FILES, ONE FOR EACH HOUR BLOCK, GIVES FOR EACH REQUIREMENT THE RESULTANT FIELD STRENGTH AT ALL OF THE 911 TEST POINTS IN EACH OF THE AVAILABLE BANDS. THE CREATION OF THIS SET OF 24 FILES FOR A GIVEN SEASON REQUIRED OF THE ORDER OF ONE CPU DAY AND ABOUT SIX MAGNETIC TAPES OF 100 MBYTES EACH.

EMIN FILE

THE E_{MIN} FILE PROVIDES THE VALUES OF THE MINIMUM USABLE FIELD STRENGTH FOR EACH HOUR BLOCK, AT EACH TEST POINT, IN EACH OF THE NINE HFBC BANDS AND FOR THE FOUR SEASONS OF THE YEAR. TO CREATE THIS FILE A PROGRAM WAS DEVELOPED WHICH USES THE NUMERIC NOISE COEFFICIENTS OF CCIR REPORT 322-2.

THE PROCESS OF CALCULATIONS OF E_{MIN} REQUIRES ABOUT ONE CPU HOUR, AND THE RESULTANT FILE OCCUPIES ABOUT 2 MBYTES OF DISK SPACE STORAGE.

USABLE BANDS

ON THE BASIS OF THE FIELD STRENGTH AND E_{MIN} FILES, AN ANALYSIS OF EACH REQUIREMENT IS CARRIED OUT FOR EACH OF ITS HOURS OF OPERATION, IN ORDER TO DETERMINE WHICH OF THE BANDS INDICATED IN THE REQUIREMENTS FORM AS AVAILABLE IS ACTUALLY USABLE. ALL AVAILABLE BANDS, ARE CLASSIFIED INTO VARIOUS TYPES (EG: A, B, C, D), THE BANDS THAT MAY BE COMBINED ARE IDENTIFIED, AND THOSE BANDS FOUND TO BE NON-USABLE ARE CONSIDERED TO BE NO LONGER AVAILABLE.

IT IS ALSO AT THIS STAGE OF THE PROCESS THAT THE CALCULATION OF PROPORTIONALLY REDUCED PROTECTION (PRP) IS MADE.

THE PROCESS OF CALCULATION OF THE USABLE BAND FILE REQUIRES OF THE ORDER OF TWO CPU HOURS, AND THE RESULTANT FILE OCCUPIES ABOUT 3 MBYTES OF DISK SPACE STORAGE.

REQUIREMENTS WITH BANDS OF TYPE "D"

AS A BY-PRODUCT OF THE DETERMINATION OF THE USABLE BAND FILE, A SEPARATE FILE, REFERRED TO AS THE FILE OF REQUIREMENTS WITH BANDS OF TYPE "D", IS ALSO CREATED. THIS FILE CONTAINS THE SET OF REQUIREMENTS FOR WHICH, IN ONE OR MORE OF THEIR HOURS OF OPERATION, ALL OF THE AVAILABLE BANDS ARE CONSIDERED TO BE NON-USABLE.

APPROPRIATE BANDS

USING THE INFORMATION CONTAINED IN THE USABLE BAND FILE, AN ANALYSIS OF THE REQUIREMENTS IS UNDERTAKEN TO DETERMINE WHICH OF THE USABLE BANDS CAN BE CONSIDERED THE APPROPRIATE BAND.

ACCOUNT IS TAKEN OF ANY PREFERENCES THAT MAY HAVE BEEN INDICATED, AS WELL AS OF THE NEED TO PROVIDE FREQUENCY CONTINUITY WITHIN THE HOURS OF OPERATION OF A SINGLE REQUIREMENT, OR OF THE REQUEST FOR FREQUENCY CONTINUITY AMONGST TWO OR MORE DIFFERENT REQUIREMENTS.

FREQUENCY ASSIGNMENT PROCESS

- DETERMINATION OF THE DEGREE OF CONGESTION OF EACH HOUR AND BAND;

- APPLICATION OF THE RULES FOR SUSPENSION OF REQUIREMENTS IF NECESSARY, AND THE APPLICATION OF THE FREQUENCY ASSIGNMENT METHOD;

- OF THE ORDER OF 2.5 CPU DAYS ARE REQUIRED TO APPLY THE FREQUENCY ASSIGNMENT PROCESS;

- THE TIME REQUIRED TO APPLY THIS PROCESS VARIES CONSIDERABLY FROM ONE HOUR BLOCK TO THE NEXT, OWING TO THE VARYING NUMBER OF REQUIREMENTS BEING HANDLED AND THE CORRESPONDING DEGREE OF CONGESTION;

- THE COMPUTING TIME REQUIRED VARIES ALMOST EXPONENTIALLY WITH THE NUMBER OF REQUIREMENTS BEING HANDLED.

BY PRODUCTS OF FREQUENCY ASSIGNMENT PROCESS

- FILES OF THE REQUIRED NUMBER OF CHANNELS;
- PROTECTION RATIO FILES;
- SUSPENSION FILES.

REINSERTION OF SUSPENDED REQUIREMENTS

ONCE SUSPENSIONS HAVE BEEN MADE, IT IS NECESSARY TO ATTEMPT TO SATISFY THE SUSPENDED REQUIREMENTS WITHOUT AFFECTING THE REQUIREMENTS PREVIOUSLY SATISFIED. THIS IS DONE BY SORTING THE SUSPENDED REQUIREMENTS IN THE REVERSE ORDER TO THAT IN WHICH THEY WERE SUSPENDED (SEE CHAPTER 5, SECTION 9 OF DOCUMENT 8 OF THE SECOND SESSION), AND BY CONSIDERING AS WELL ALL OF THEIR USABLE BANDS.

AS A RESULT OF THIS PROCESS, THE FREQUENCY ASSIGNMENT FILE IS UPDATED AND ALL THE REQUIREMENTS THAT COULD NOT BE SATISFIED ARE KEPT IN THE SUSPENSION FILES AS UNSATISFIED REQUIREMENTS.

OVERALL BROADCAST RELIABILITY FILE

THE NEXT STEP IN THE PROCESS CONSISTS IN EXAMINING THE FREQUENCY OR FREQUENCIES THAT HAVE BEEN ASSIGNED TO EACH REQUIREMENT, IN CONJUNCTION WITH THE FIELD STRENGTH FILE, THE E_{MIN} FILE AND THE MODIFIED MASTER REQUIREMENT FILE,, IN ORDER TO COMPUTE THE VALUES OF THE OVERALL BROADCAST RELIABILITIES.

ACCOUNT IS TAKEN OF THE FREQUENCY SEPARATIONS (UP TO 20 kHz) BETWEEN ANY PAIR OF ASSIGNMENTS, AND THE PROCESS IS APPLIED TO EACH 15 MINUTE PERIOD WITHIN EACH HOUR BLOCK.

PLAN FILE

THE LAST STEP IN THE PROCESS CONSISTS IN ASSEMBLING IN A FILE, REFERRED TO AS THE PLAN FILE, ALL THE ESSENTIAL INFORMATION THAT HAS BEEN COMPUTED IN PREVIOUS STEPS.

MODULE 4

ANALYSIS OF THE

TENTATIVE REQUIREMENTS FILE

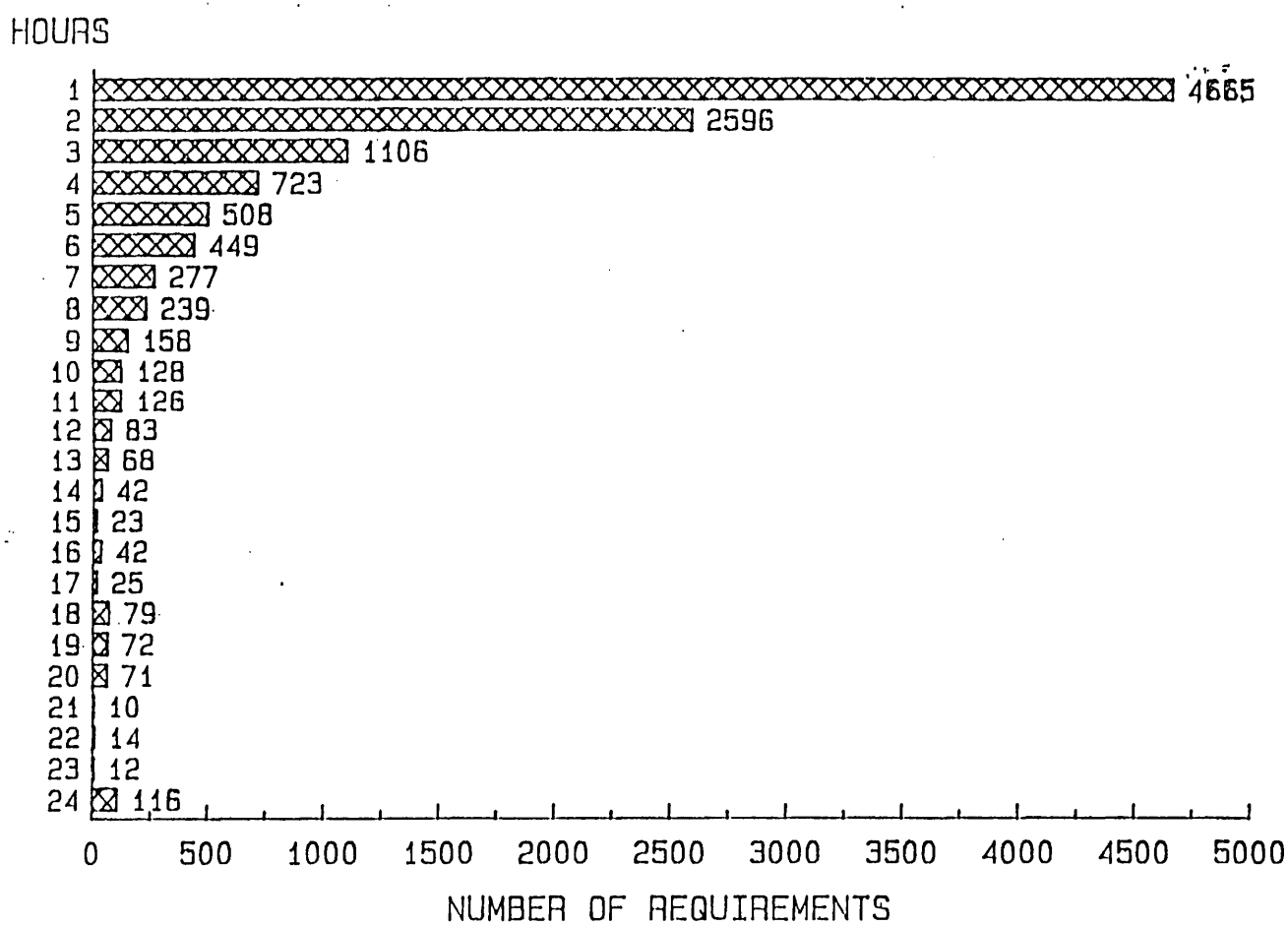
BACKGROUND

ALL REQUIREMENTS COMMUNICATED TO THE IFRB HAVE BEEN PUBLISHED IN DOCUMENT 3.

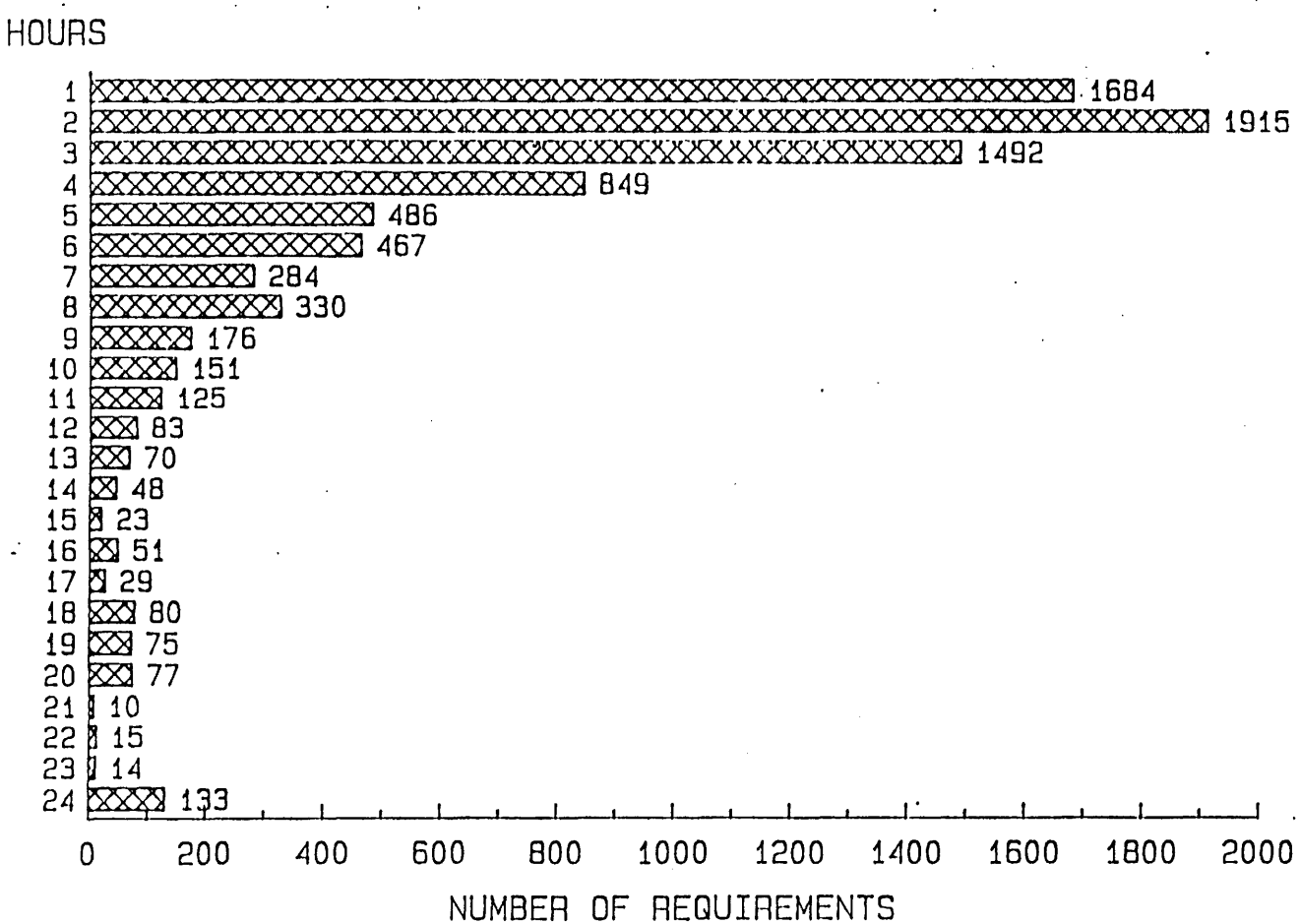
THE FOLLOWING ANALYSIS APPLIES ONLY TO THE REQUIREMENTS THAT WERE PROCESSED (D-85, J-86, M-88, J-88).

	SEASON			
	D-85	J-86	M-88	J-88
No. of requirements	7 016	9 027	11 632	10 902
No. of requirement hours	28 303	32 333	37 787	36 382
No. of requirements with the service area expressed as a service sector	429	1 434	1 539	1 537
No. of requirement hours with a service area expressed as a service sector	3 763	5 140	5 894	5 902
No. of requirements with one or more maritime areas in their service area	50	51	80	75
No. of requirement hours with one or more maritime areas in their service area	202	210	638	583
No. of synchronous requirements	84	83	99	85
No. of requirements requesting frequency continuity between two or more requirements	697	2 920	3 017	2 963
No. of concurrent requirements i.e. requirements serving non contiguous CIRAF zones	31	43	39	49

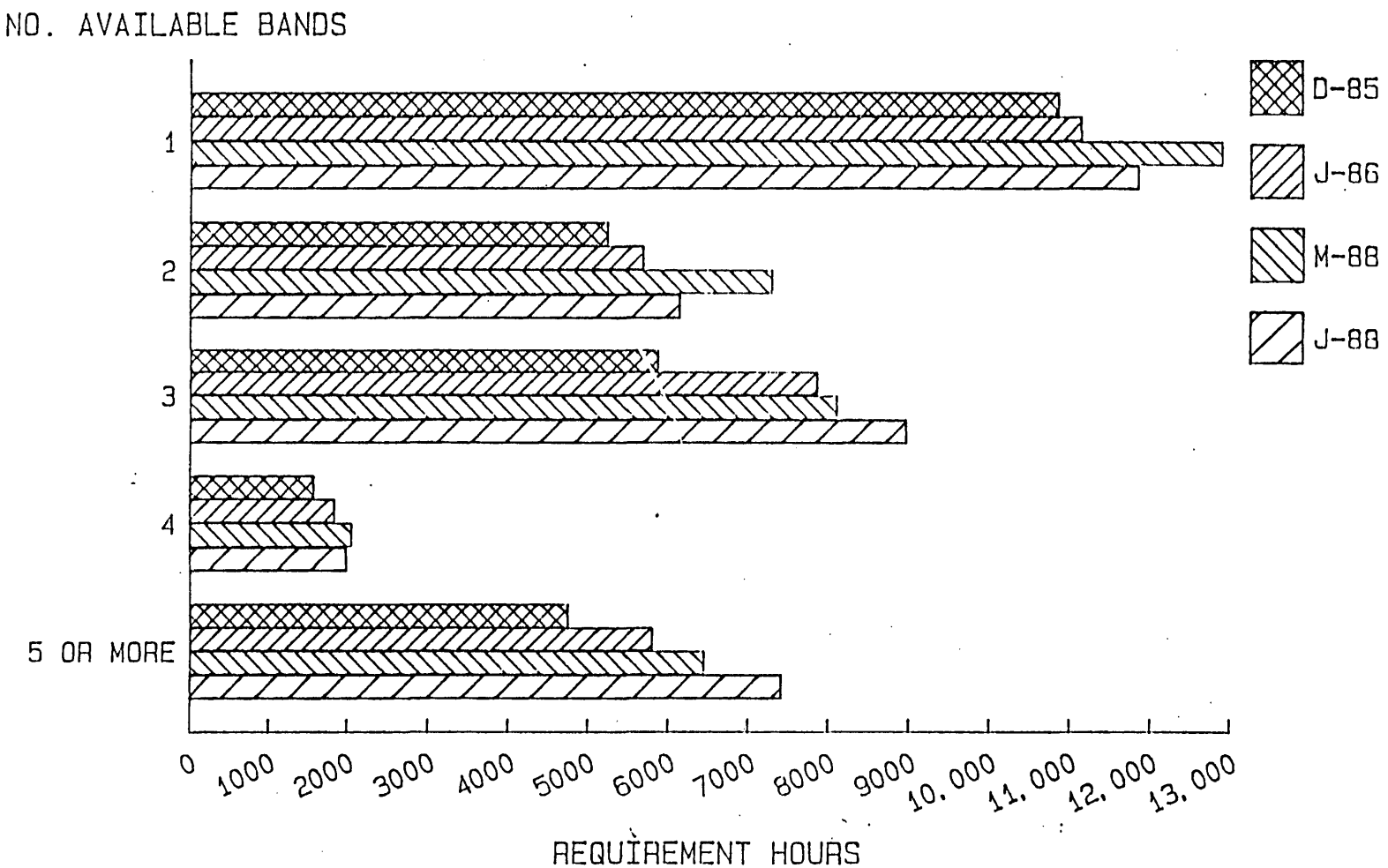
DURATION OF REQUIREMENTS
SEASON M-88



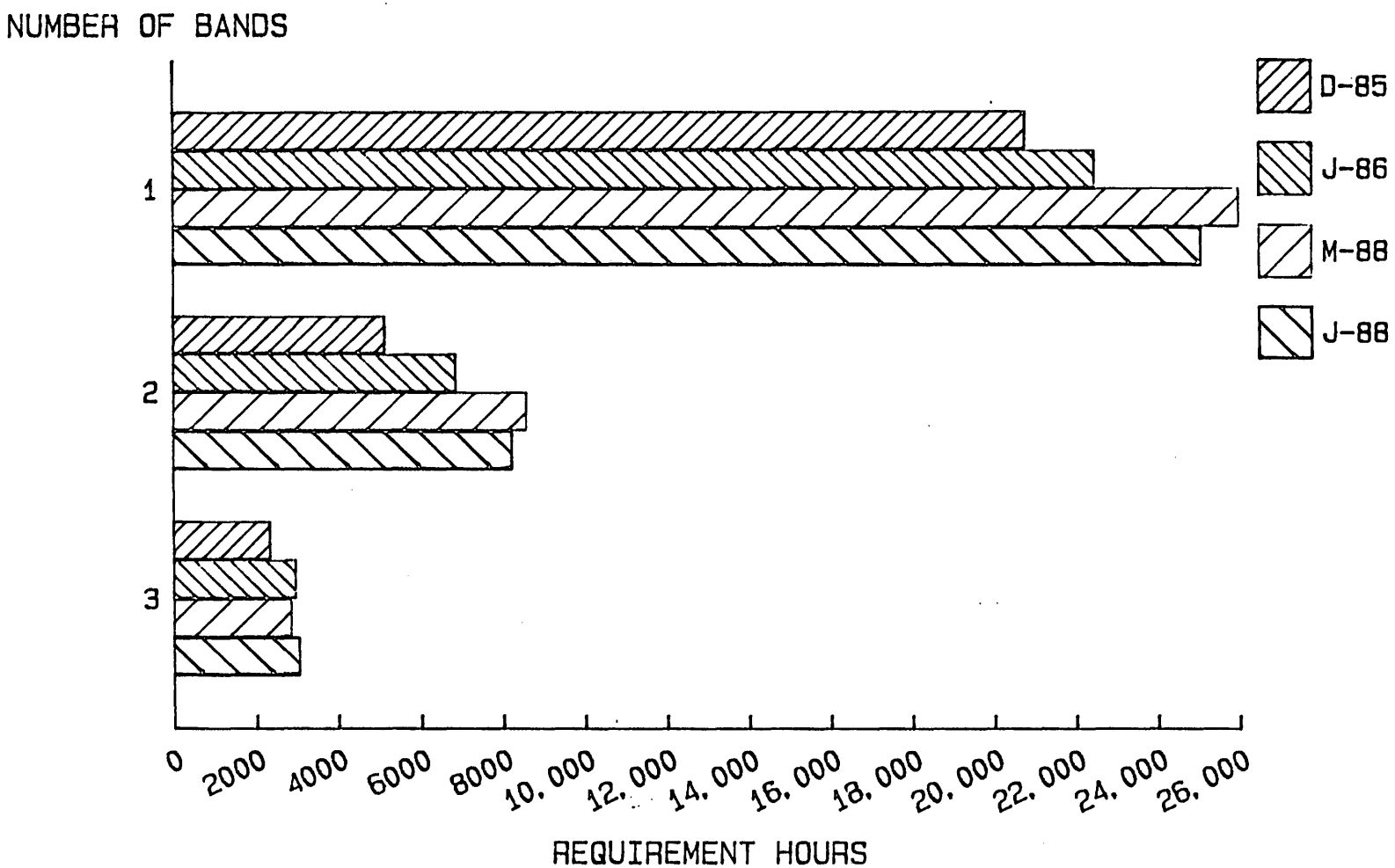
DURATION OF REQUIREMENTS TAKING INTO ACCOUNT REQUESTS FOR FREQUENCY CONTINUITY SEASON M-88



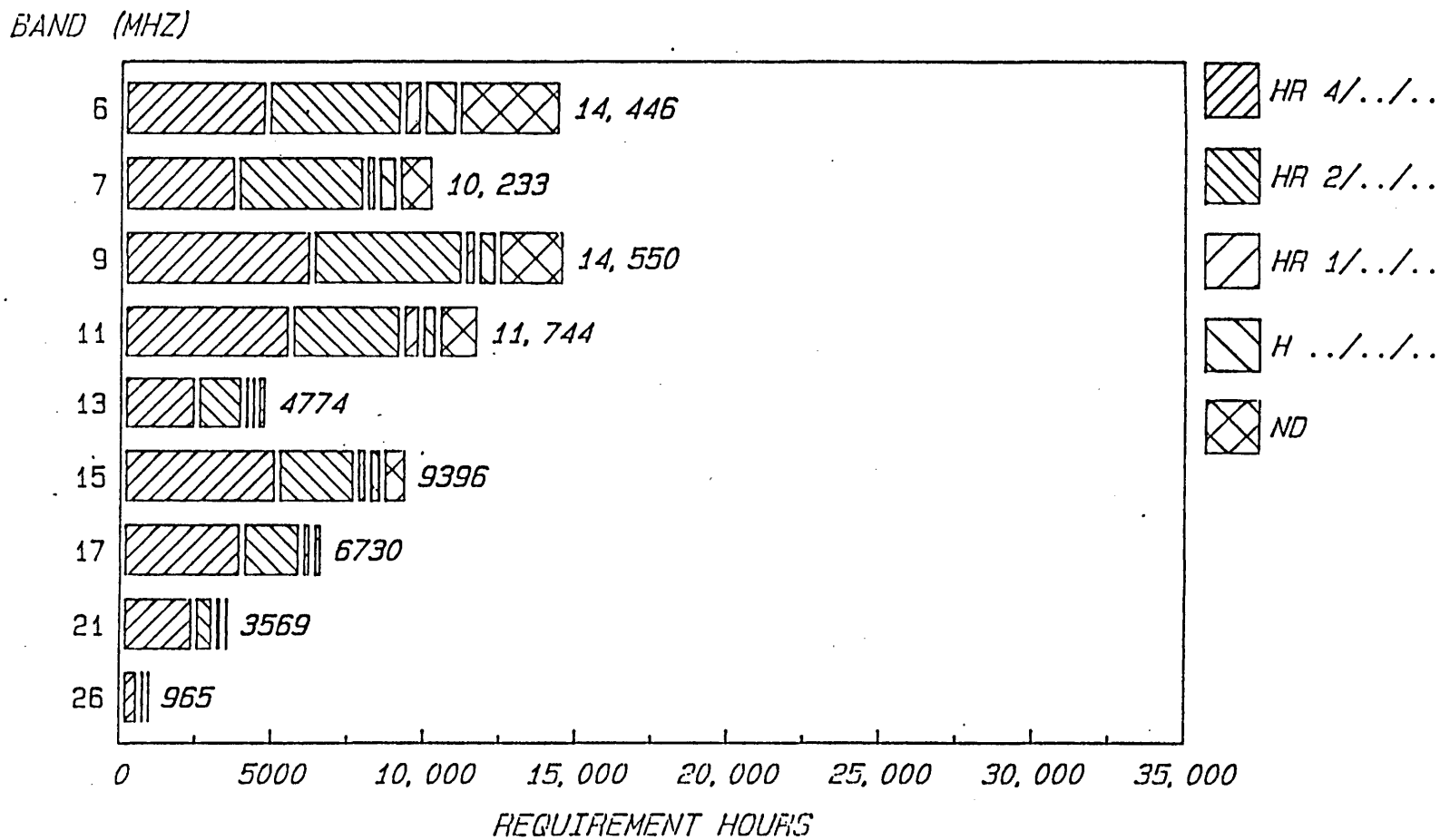
DISTRIBUTION OF THE NUMBER OF REQUIREMENT HOURS BY THE NUMBER OF AVAILABLE BANDS SEASONS D-85 J-86 M-88 J-88



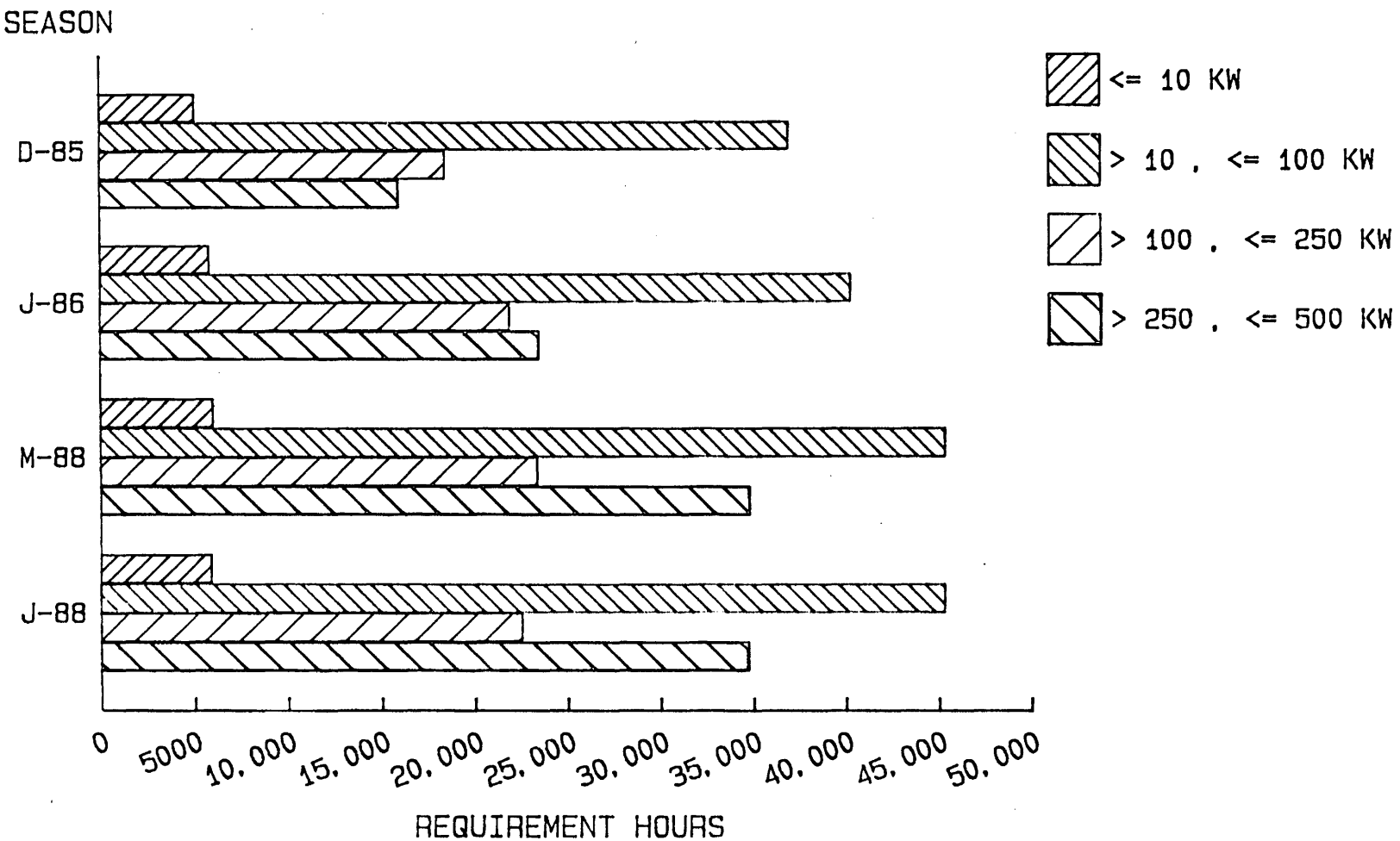
DISTRIBUTION OF THE NUMBER OF REQUIREMENT HOURS AS A FUNCTION OF THE NUMBER OF BANDS THAT CAN BE USED SIMULTANEOUSLY



DISTRIBUTION OF REQUIREMENT HOURS BY ANTENNA TYPE AND BAND SEASON D-85



DISTRIBUTION OF THE NUMBER OF REQUIREMENT HOURS BY SEASON AND MAXIMUM POWER LEVEL



	D-85	J-86	M-88	J-88
NO. OF REQUIREMENT HOURS	28 303	32 333	37 787	36 382
NO. OF REQUIREMENT HOURS WITH PRESET FREQUENCIES	8 333	8 865	9 756	9 714
% OF REQUIREMENT HOURS WITH PRESET FREQUENCIES	29.4	27.4	25.8	26.7

MODULE 5

ANALYSIS OF INDIVIDUAL REQUIREMENTS

BACKGROUND

(DOCUMENT 11, CHAPTER 3)

- IN THE HFBC PLANNING SYSTEM PRIOR TO APPLYING THE FREQUENCY ASSIGNMENT PROCESS, EACH INDIVIDUAL REQUIREMENT IS ANALYSED FROM A PROPAGATION POINT OF VIEW TAKING INTO ACCOUNT ITS EQUIPMENT CHARACTERISTICS.

- THE RESULTS OBTAINED ARE INDEPENDENT FROM THE NUMBER OF REQUIREMENTS AND OR REQUIREMENT HOURS PROCESSED AND MERELY REFLECT THE CHARACTERISTICS OF EACH REQUIREMENT AND THE TECHNICAL CRITERIA ADOPTED BY THE FIRST SESSION.

CHARACTERISTICS OF REQUIREMENTS

EQUIPMENT AVAILABILITY AND LIMITATIONS

- NUMBER OF AVAILABLE BANDS;
- NUMBER OF BANDS THAT CAN BE USED SIMULTANEOUSLY;
- REQUIRED SERVICE AREA;
- HOURS OF OPERATION;
- PREFERRED FREQUENCY OR BAND.

TECHNICAL CRITERIA

- PERCENTILE;
- E_{MIN} VALUES;
- PROPAGATION METHOD;
- BASIC CIRCUIT RELIABILITY (BCR);
- BRR, BBR;
- METHOD USED TO ASSIGN TWO OR THREE FREQUENCIES.

RESULTS OF ANALYSIS

- DISTRIBUTION OF THE NUMBER OF REQUIREMENTS AS A FUNCTION OF THE NUMBER OF USABLE BANDS;

- NUMBER OF REQUIREMENTS WITH 1, 2, 3 FREQUENCIES;

- NUMBER OF REQUIREMENTS WITH BANDS OF TYPE "D";

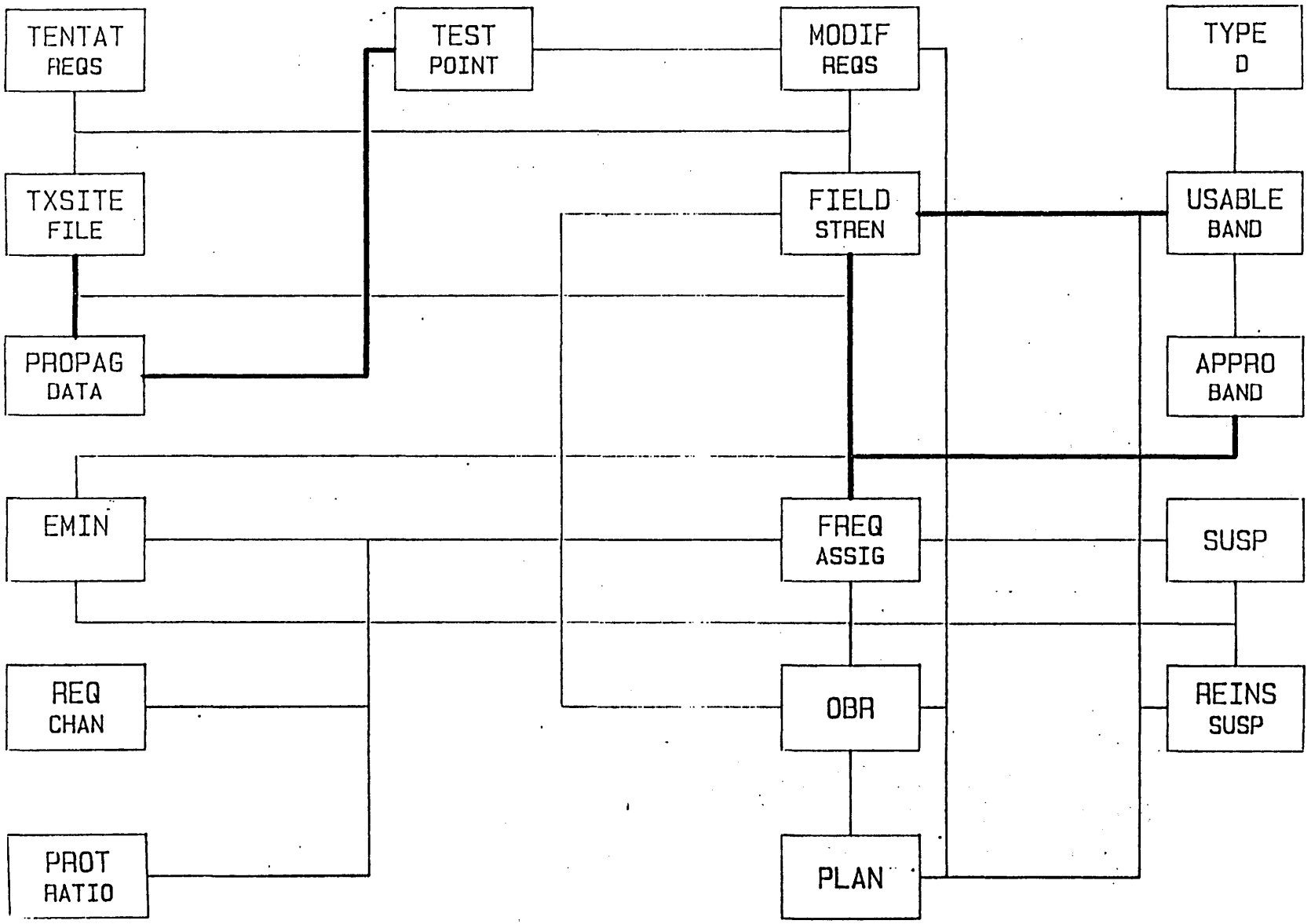
- NUMBER OF REQUIREMENTS WITH PROPORTIONALLY REDUCED PROTECTION;

- DISTRIBUTION OF REQUIREMENTS BY RANGE OF BBR;

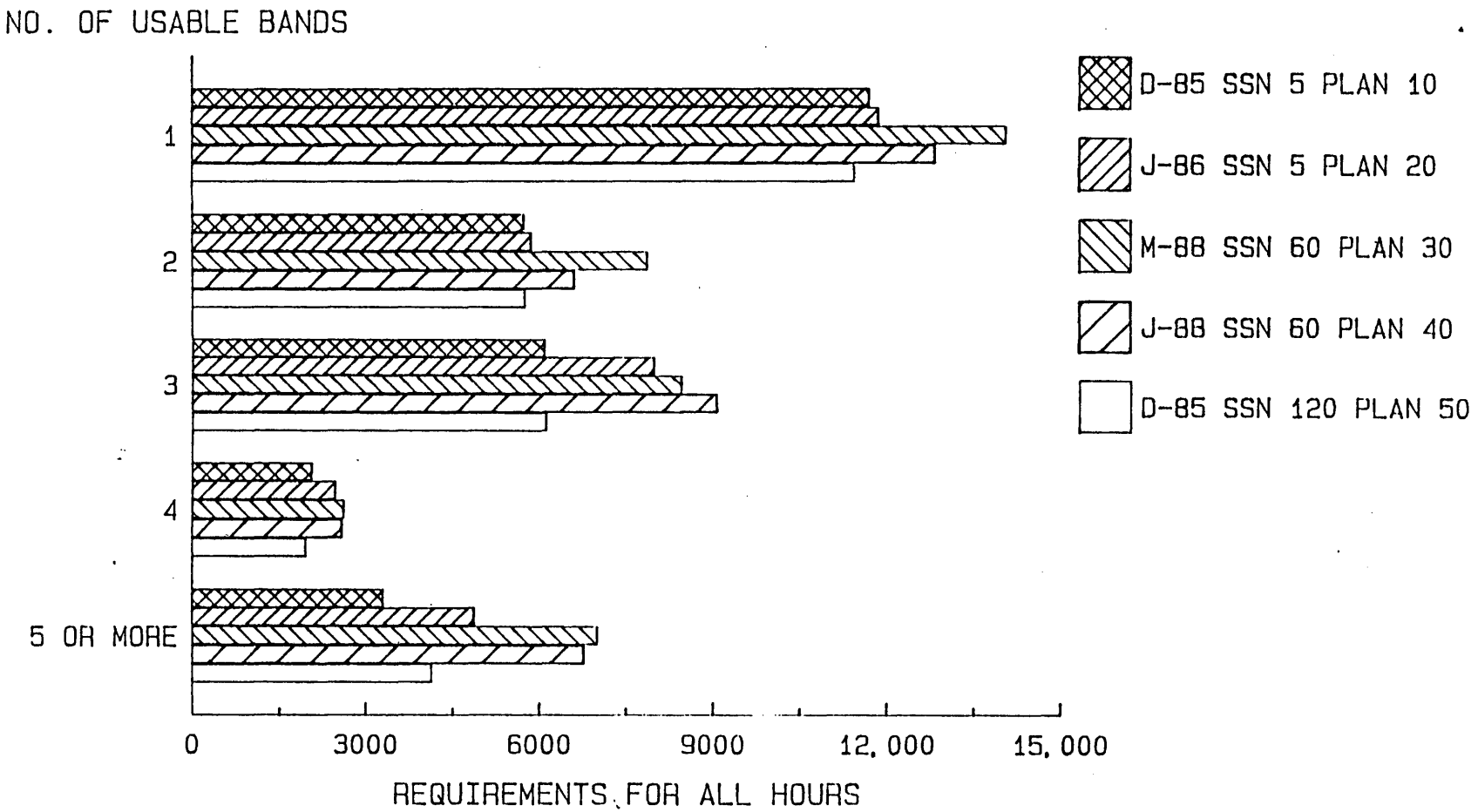
- DISTRIBUTION OF REQUIREMENTS BY APPROPRIATE BAND;

- INFLUENCE OF PARAMETERS.

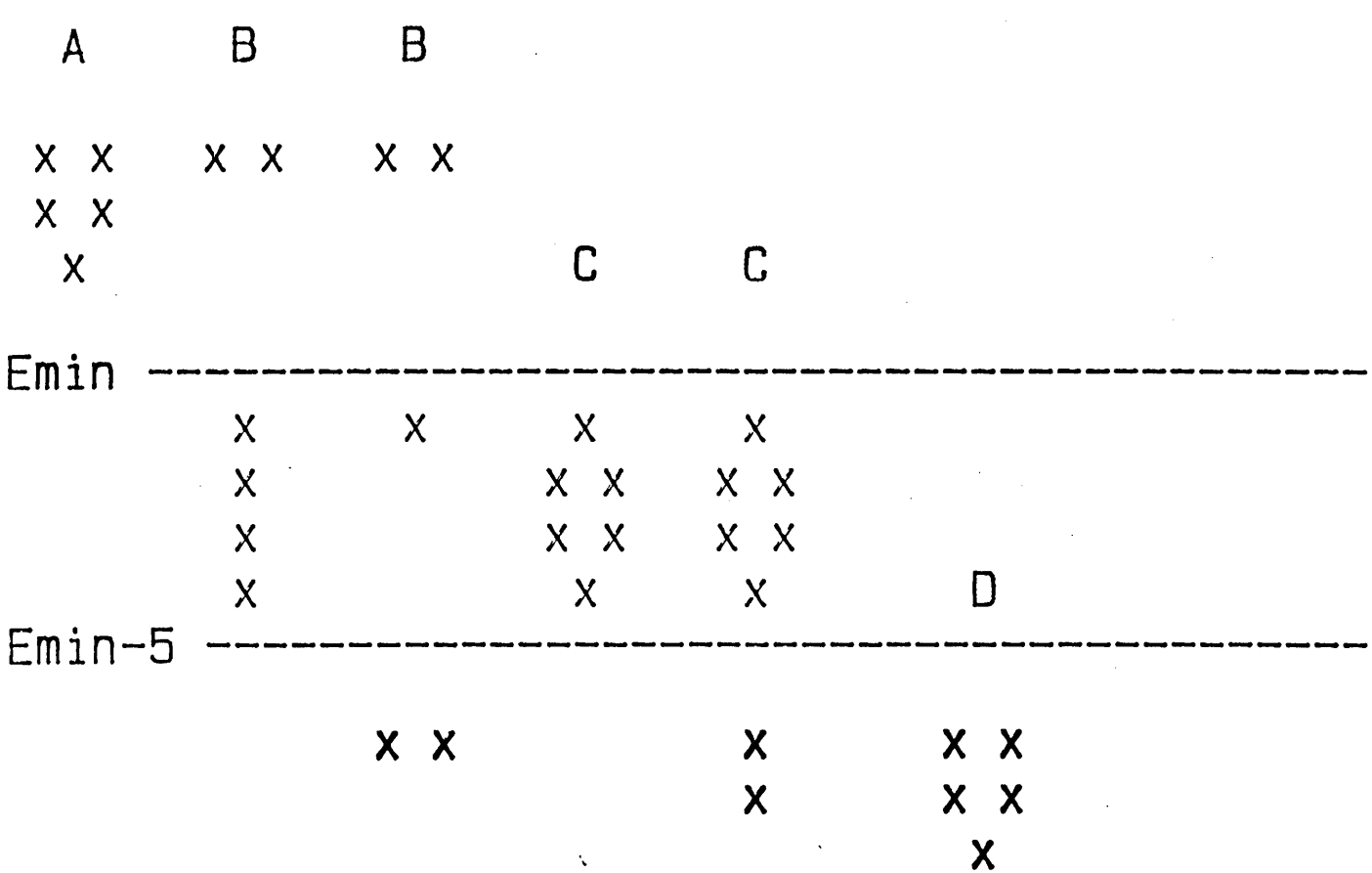
HFBC PLANNING FILES AND PROGRAMS



DISTRIBUTION OF REQUIREMENTS FOR ALL HOURS AS A FUNCTION OF THEIR NUMBER OF USABLE BANDS AFTER PROPAGATION PREDICTIONS



IDENTIFICATION OF BAND TYPES

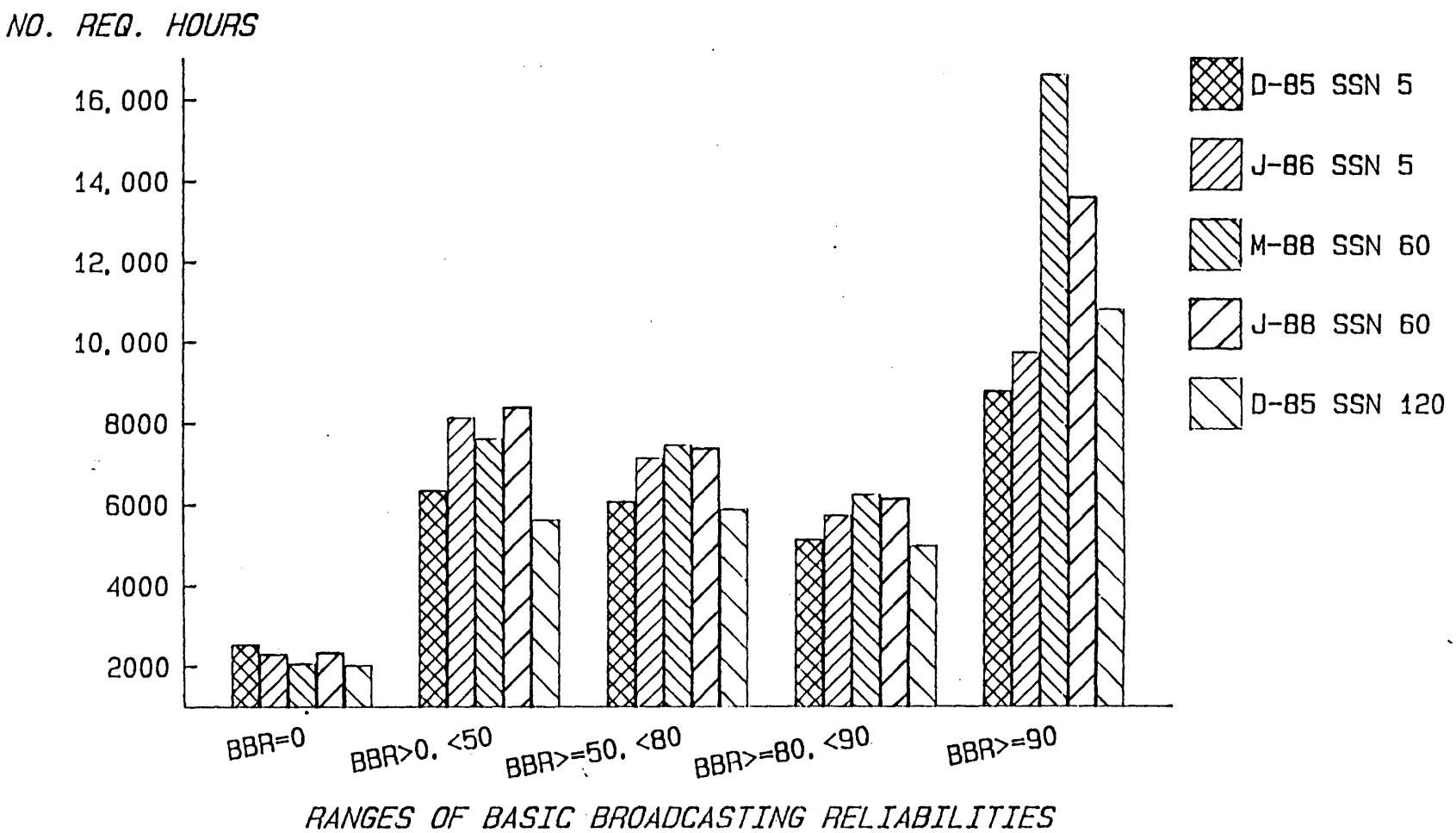


SEASON	SSN	E_{MIN}	PERCENTILE	NO. REQ. HOURS WITH 1, 2, 3 FREQ.			REQ. HOURS (Bands of type D)		NO. OF REQ. WITH BANDS OF TYPE D IN ALL HOURS	TOTAL NO. OF REQS. HOURS
				F = 1	F = 2	F = 3	NO.	%		
D-85	5	0	80	27618	1327	14	1435	4.7	135	30394
D-85	120	0	80	28330	1131	11	922	3.0	117	30394
D-85	120	-5	90	28681	1037	18	658	2.1	90	30394
D-85	120	0	90	28024	1412	36	922	3.0	117	30394
D-85	120	-5	80	28850	874	12	658	2.1	90	30394
J-86	5	0	80	31275	1821	26	1883	5.3	351	35005
M-88	60	0	80	38429	1601	31	877	2.1	199	40938
M-88	60	-5	90	38852	1543	31	512	1.2	115	40938
M-88	60	0	90	38005	2020	36	877	2.1	199	40938
M-88	60	-5	80	39082	1325	19	512	1.2	115	40938
J-88	60	0	80	36191	1715	34	1280	3.2	300	39220

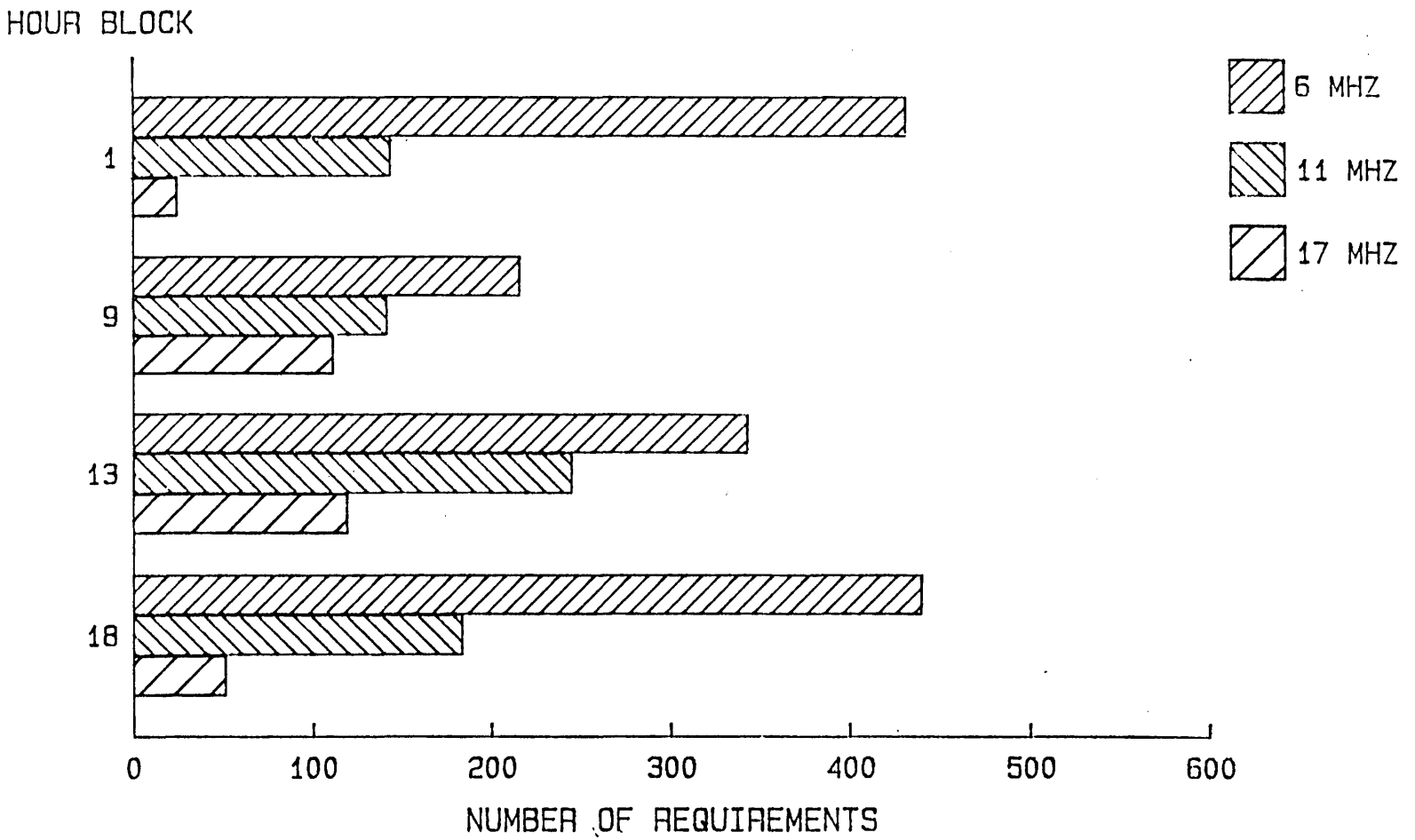
PROPORTIONALLY REDUCED PROTECTION (PRP)

SEASON	SSN	PERCENTILE	E_{MIN}	Proportionally reduced protection applied	Percentage of PRP cases
D85	5	80%	0	10 884	37.58
J86	60	80%	0	12 855	38.81
M88	60	80%	0	12 485	31.16
M88	60	90%	-5	9 409	23.27
M88	60	90%	0	13 648	34.06
M88	60	80%	-5	8 308	20.55
J88	60	80%	0	13 261	34.95
D85	120	80%	0	9 886	33.54
D85	120	90%	0	10 821	36.71
D85	120	80%	-5	6 722	22.60

NUMBER OF REQUIREMENT HOURS AS A FUNCTION OF BASIC BROADCASTING RELIABILITY RANGES



DISTRIBUTION OF REQUIREMENTS BY APPROPRIATE BAND AND HOUR BLOCK
SEASON D-85 SSN=5 80% EMIN NORMAL



SUMMARY

TWO OR THREE FREQUENCIES

- NUMBER OF CASES WHERE 3 FREQUENCIES WERE ASSIGNED IS INSIGNIFICANT;

- RAISING THE PERCENTILE VALUE FROM 80% TO 90% THE NUMBER OF CASES WHERE 2 OR 3 FREQUENCIES ARE ASSIGNED INCREASES SLIGHTLY.

BANDS OF TYPE "D"

- RELATIVELY LOW NUMBER OF CASES OF BANDS OF TYPE "D";

- A REDUCTION OF THE E_{MIN} FLOOR LEVEL FURTHER REDUCES THE NUMBER OF CASES OF BANDS OF TYPE "D".

PROPORTIONALLY REDUCED PROTECTION

- VERY SIGNIFICANT NUMBER OF CASES WHERE PRP IS APPLIED;
- A REDUCTION OF THE E_{MIN} FLOOR LEVEL LEADS TO A SIGNIFICANT REDUCTION OF THE NUMBER OF CASES WHERE PRP IS APPLIED.

BASIC BROADCASTING RELIABILITY

- THE VAST MAJORITY OF REQUIREMENTS HAVE A BBR VALUE < 90%;
- A LARGE NUMBER OF REQUIREMENTS HAVE A BBR = 0%.

APPROPRIATE BAND

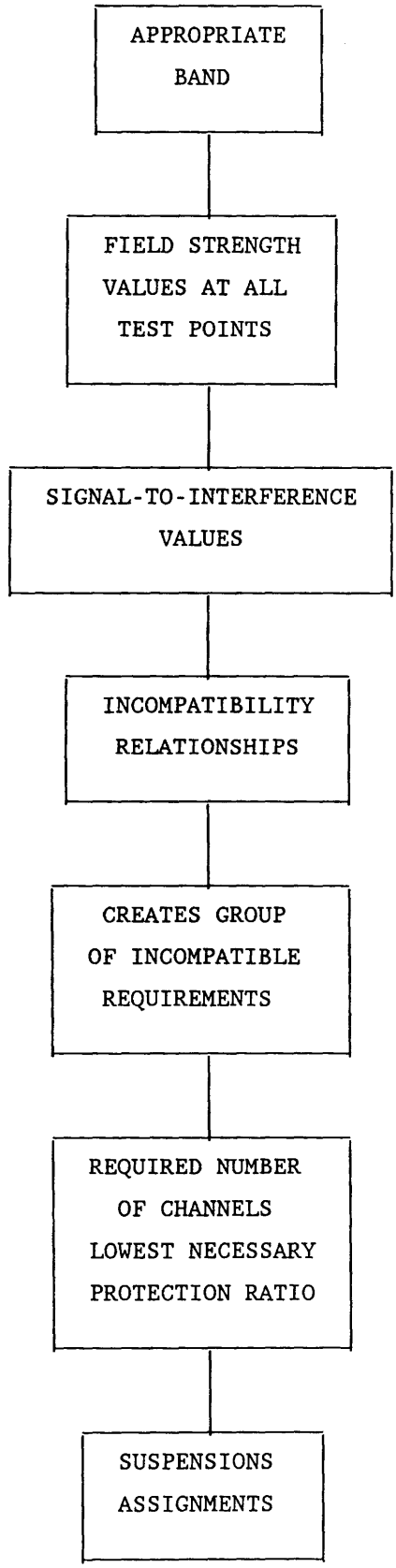
- LOADING OF BANDS VARIES CONSIDERABLY AS A FUNCTION OF TIME;
- MOSTLY LOADED BANDS ARE THE LOWER BANDS.

MODULE 6

GLOBAL ANALYSIS OF THE

INTERACTION BETWEEN REQUIREMENTS

GENERAL OVERVIEW



A. SERVICE CONDITIONS

- SERVICE AREA 'A' WITH TPs i = 1, 2, 3, 4, 5

  SERVED BY Tx 'A'

- SERVICE AREA 'B' WITH TPs i = 11, 12, 13, 14

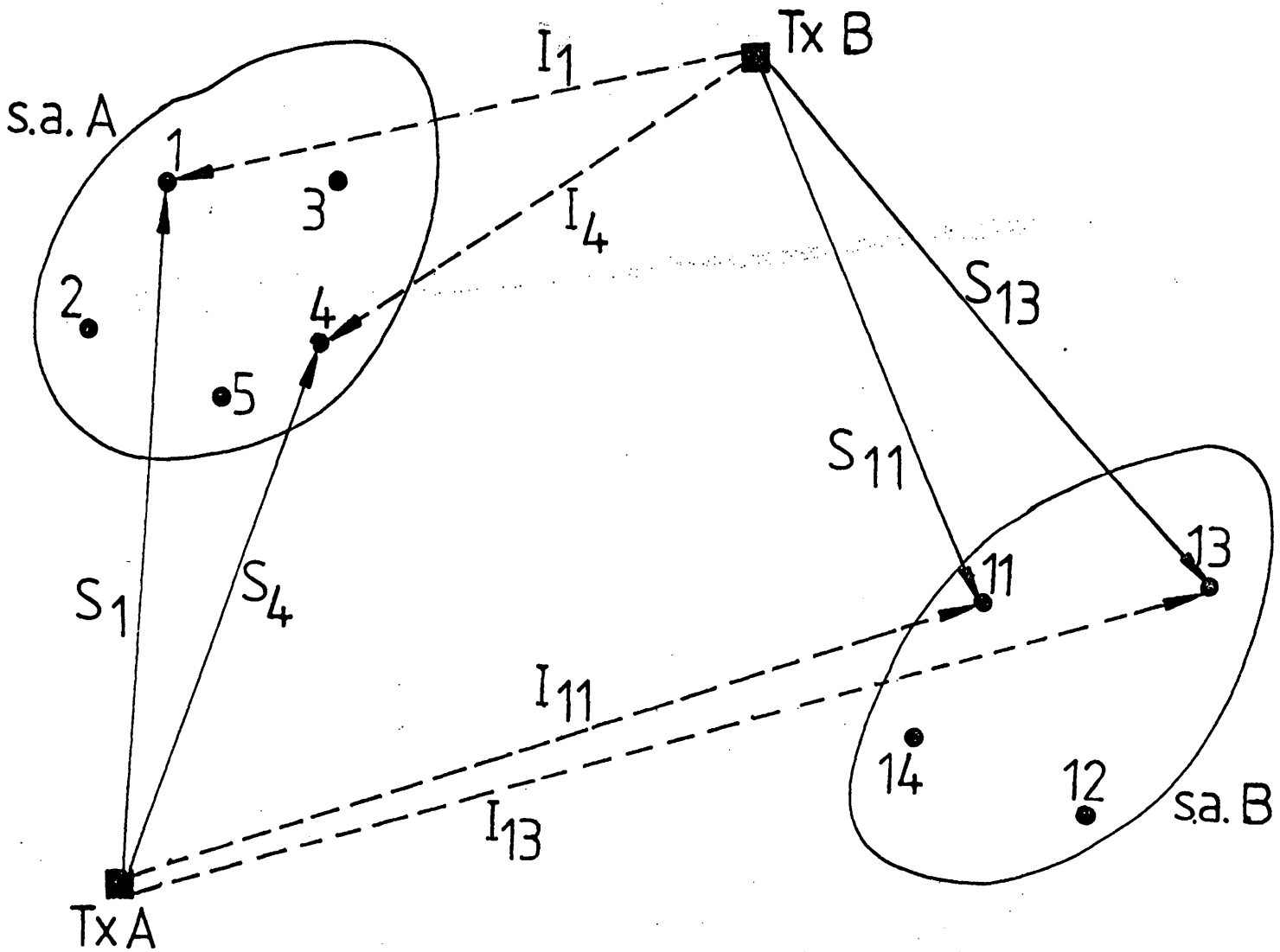
  SERVED BY Tx 'B'

S_i = WANTED FIELD STRENGTH AT TPi

B. INTERFERENCE CONDITIONS

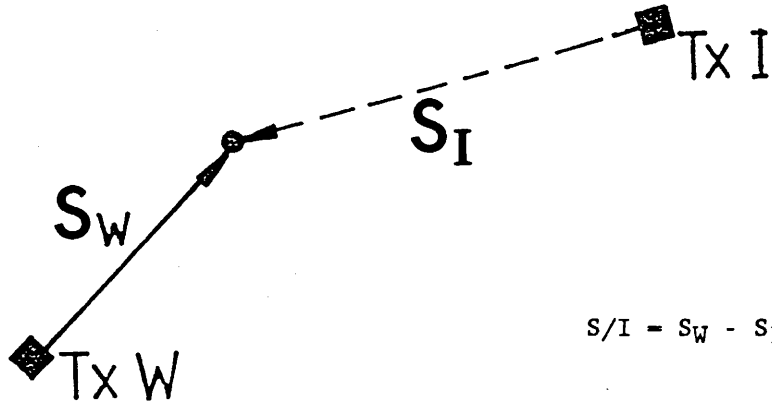
- Tx 'A' CAUSES INTERFERENCE IN SERVICE AREA 'B'
- Tx 'B' CAUSES INTERFERENCE IN SERVICE AREA 'A'

I_j = INTERFERING FIELD STRENGTH AT TPj



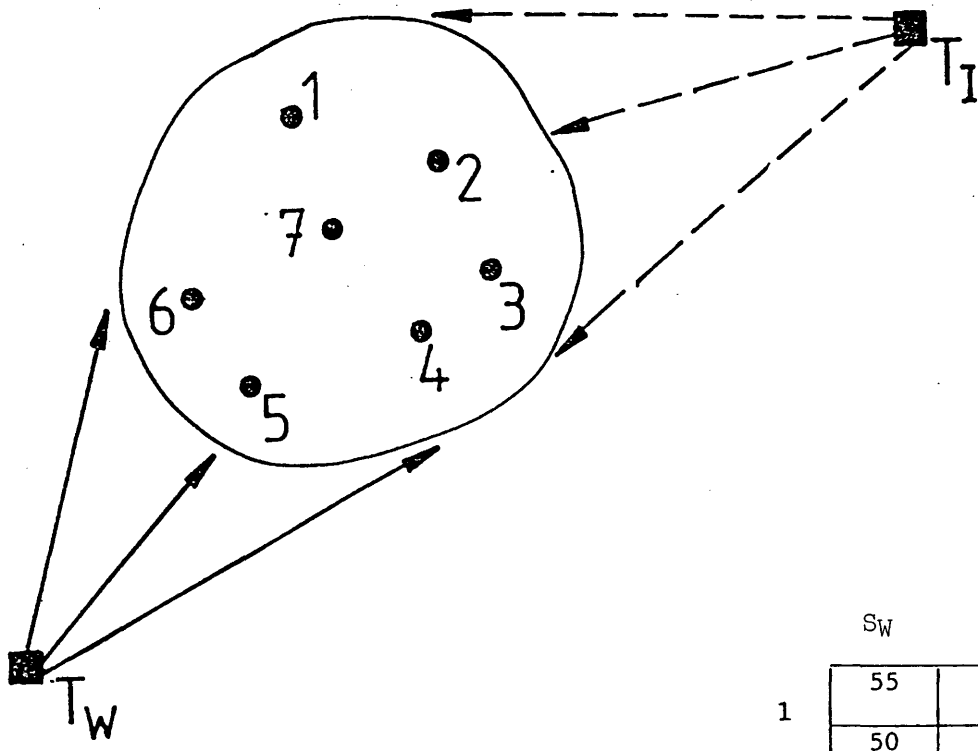
SERVICE AND INTERFERENCE CONDITIONS

RECEPTION AT A POINT



$S/I = S_W - S_I$

RECEPTION OVER AN AREA

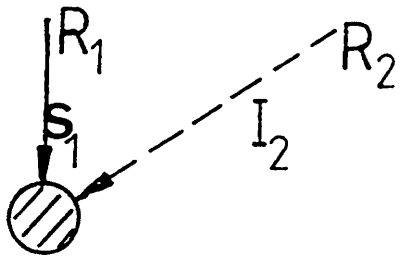


	S_W	S_I	S/I
1	55	35	20
2	50	26	24
3	50	24	26
4	53	26	27
5	50	21	31
6	60	28	32
7	60	24	36

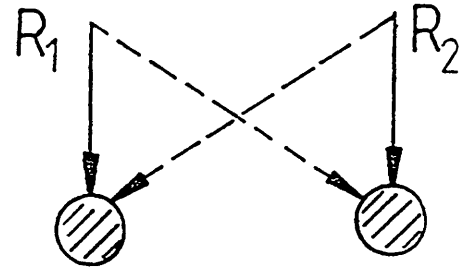
EXAMPLE

S/I (80 PERCENTILE) = 24

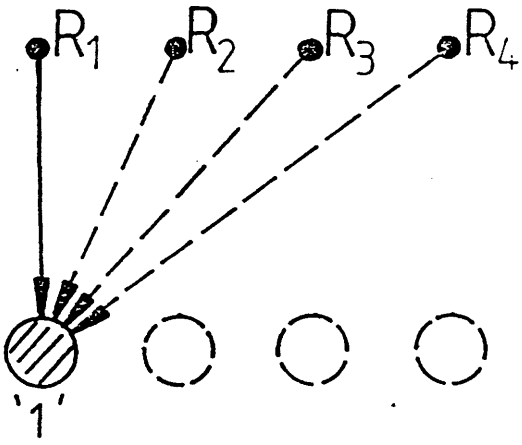
PAIRWISE INTERFERENCE RELATIONSHIPS

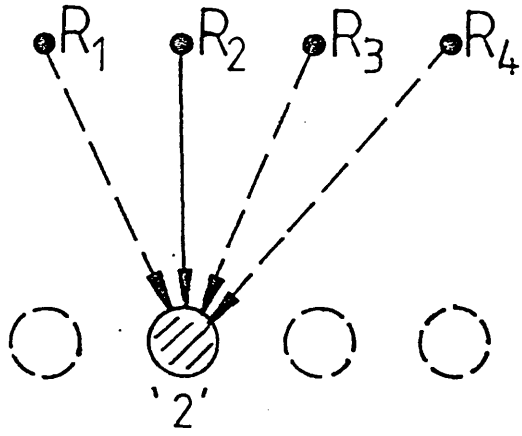


$(S/I)_{12} = S_1 - I_2$



$(S/I)_{21} = S_2 - I_1$



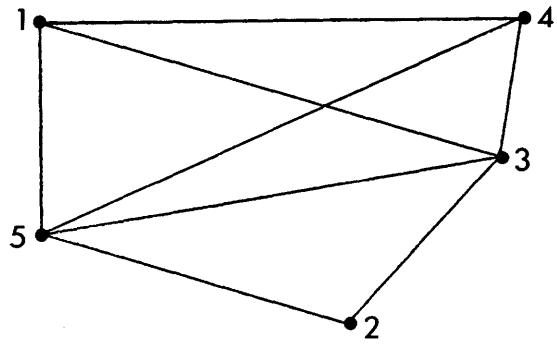


	1	2	3	4
1		(S/I) 12	(S/I) 13	(S/I) 14
2	(S/I) 21		(S/I) 23	(S/I) 24
3	(S/I) 31	(S/I) 32		(S/I) 34

S/I MATRIX

	1	2	3	4	5
1	\	0	1	1	1
2	0	\	1	0	1
3	1	1	\	1	1
4	1	0	1	\	1
5	1	1	1	1	\

IC MATRIX



VISUALISATION OF IC MATRIX

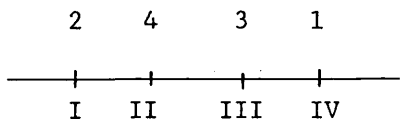
GROUP OF INCOMPATIBLE RQUIREMENTS (GIR) IS A SET OF REQUIREMENTS, EACH OF WHICH IS INCOMPATIBLE WITH EVERY OTHER MEMBER OF THE SET.

EX: GIR = {1, 3, 4, 5}

SIGNIFICANCE OF GIR

EXAMPLE: [GIR] = 4

	1	2	3	4
1	\	1	1	1
2	1	\	1	1
3	1	1	\	1
4	1	1	1	\



[GIR] = 4 = > AT LEAST
4 CHANNELS ARE NECESSARY

THUS [GIR] CAN INDICATE A LOWER BOUND TO THE NUMBER OF CHANNELS NECESSARY FOR ASSIGNMENT.

REQUIRED NUMBER OF CHANNEL (RNC)

EXAMPLE: [GIR] = 45

$\Longrightarrow$ RNC $\geq$ 45

- IF ANC $\geq$ RNC THERE MAY BE NO CONGESTION

- IF ANC $<$ RNC THERE WILL BE CONGESTION

BAND	6	7	9	11	13	15	17	21	27
ANC	25	20	40	40	20	50	35	40	43

LOWEST NECESSARY PROTECTION RATIO

EXAMPLE:

	1	2	3	4
1	\	1	1	1
2	1	\	1	1
3	1	1	\	1
4	1	1	1	\

PR = 27 $\Longrightarrow$ GIR = 4 $\Longrightarrow$ RNC = 4

	1	2	3	4
1	\	1	1	0
2	1	\	1	1
3	1	1	\	1
4	0	1	1	\

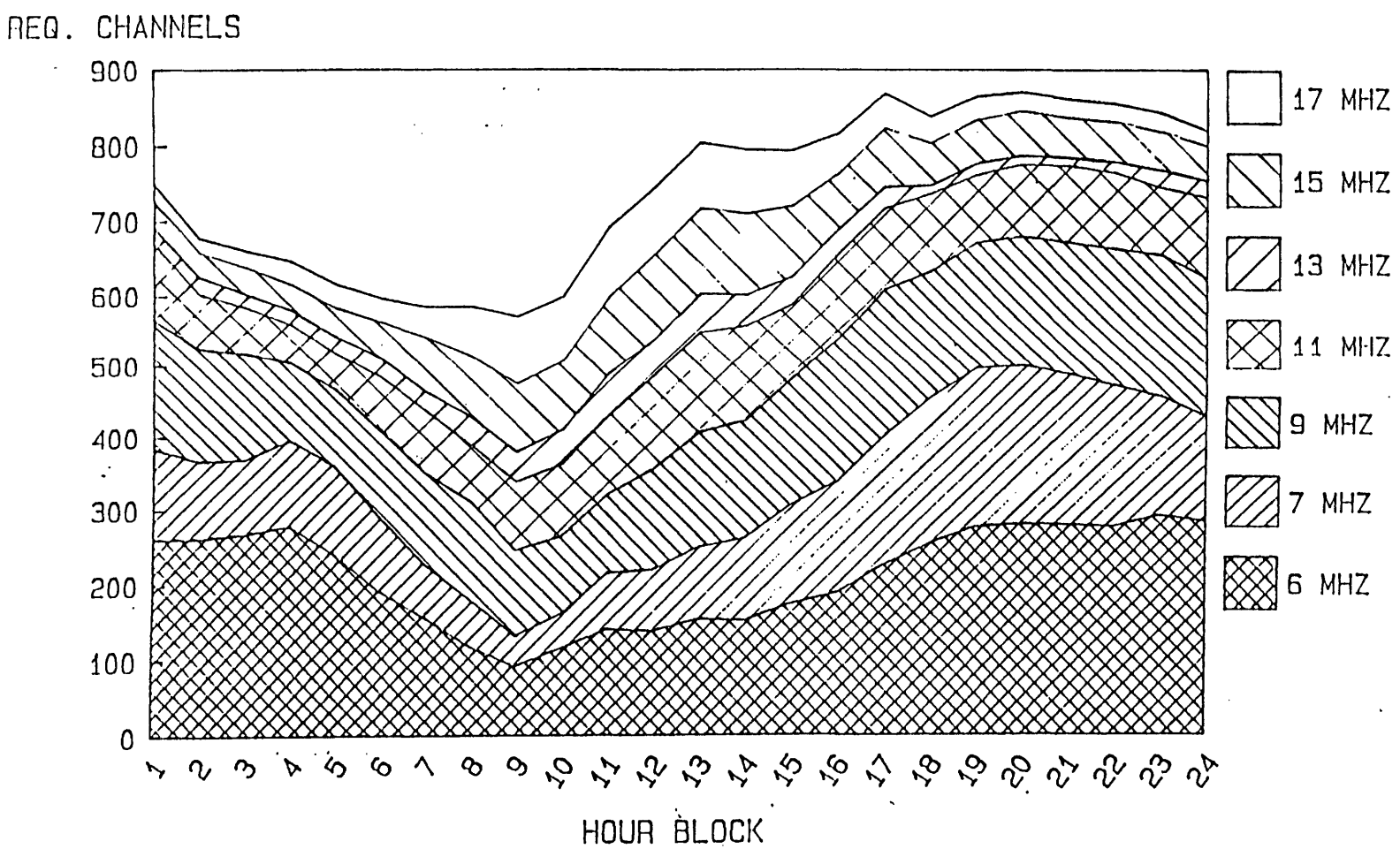
PR = 24 $\Longrightarrow$ GIR = 3 $\Longrightarrow$ RNC = 3

THUS: IF RNC > ANC THE PROTECTION RATIO CAN BE REDUCED.

WHEN RNC = ANC WE HAVE REACHED THE LOWEST NECESSARY PROTECTION RATIO

	PLAN NUMBER: 10					HOUR BLOCK = 1				
	BANDS (MHZ)									
	6	7	9	11	13	15	17	21	26	TTL
REQTS:	431	149	282	144	26	55	25	5		1117
CHNLS:	260	123	182	105	21	37	21	5		754
AVL:	25	20	40	40	20	50	35	40	43	313
RULE										
N1 :	122	39	58	40	2					261
N2 :	92	21	45	19						177
N3 :	13	20	29	16						78
N4 :	3	1	6							10
N6 :	175	44	98							317
FRQ-A:	201	68	144	69	24	55	25	5		592
PROT R										
-VE :	109									109
0-17:	79	50	85							214
17-23:	12	10	47							69
23-27:		4	3	46						53
>27:	1	4	9	23	24	55	25	5		146
PR-NE:					18	27	27	27		

REQUIRED NUMBER OF CHANNELS AS A FUNCTION OF HOUR BLOCK AND BAND
SEASON D-85 SSN = 5 PERCENTILE = 80 EMIN-0



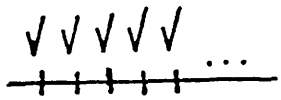
MODULE 7

SUSPENSION RULES

STATEMENT OF PROBLEM

CONGESTION IS PRESENT WHEN THERE EXISTS A GREATEST GIR SUCH THAT RNC > ANC

(1)	(2)	(3)	(...)	(N)
\	1	1	...	1
1	\	1		1
1	1	\		⋮
⋮			\	1
1	1	...	1	\



RNC = N

HOW TO RELIEVE CONGESTION?

1. REDUCE PROTECTION RATIOS

2. REDUCE NO. OF REQUIREMENTS

REDUCTION OF PROTECTION RATIO

FOR INTERSESSIONAL WORK THE FOLLOWING HAS BEEN USED

PROTECTION RATIO	27 DB
FADING MARGIN (80%)	3 DB (10)
MULTIPLE INTERFERENCE MARGIN	3 DB (6)
TOTAL (TPR)	33 DB (43)

AS A FIRST STEP IN REDUCING CONGESTION

A) THE FADING MARGIN IS IGNORED (TPR) = 30

B) THE MULTIPLE INTERFERENCE MARGIN IS IGNORED (TPR) = 27

THESE REDUCTIONS IN PROTECTION RATIO ARE CARRIED OUT FOR MEMBERS OF GIR ONLY.

EXAMPLE:

TPR	33	30	27
RNC	100	79	67

REDUCTION OF THE NUMBER OF REQUIREMENTS

1. BREAK ALL SERVICE AREAS INTO QUADRANTS

2. RANK UTILISATION OF QUADRANTS BY ADMINISTRATION

3. DETERMINE DEFICIT d (> 0)

$$d = RNC - ANC \text{ (1s in GIR)}$$

4. MAKE d + 1 SUSPENSIONS:

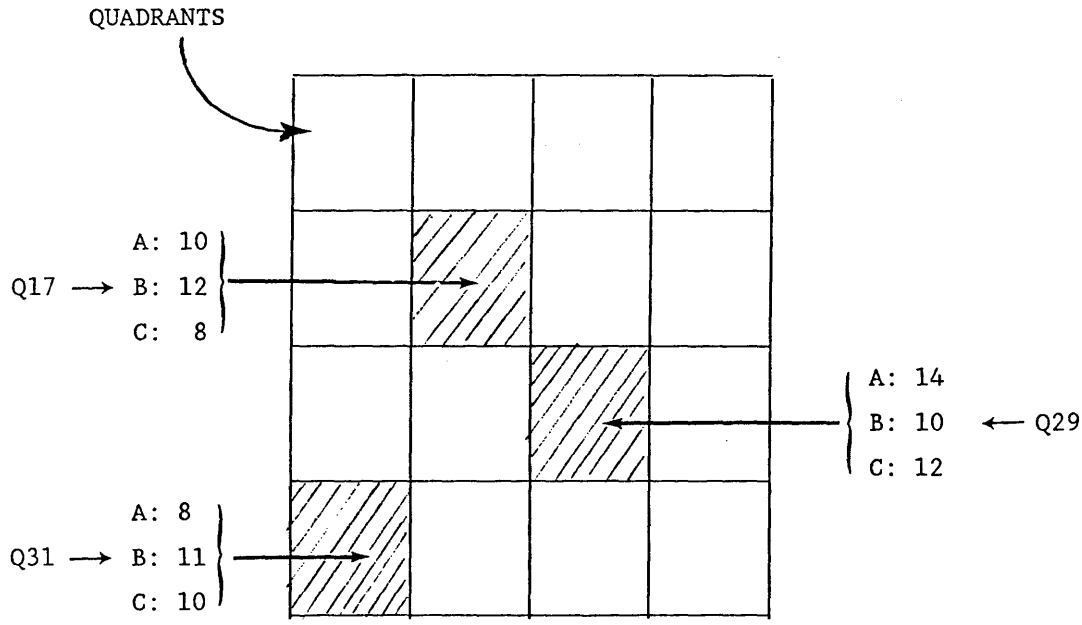
   - DETERMINE CANDIDATES FOR SUSPENSION FROM AMONGST REQS. CONTAINED IN THE MAXGIR USING THE RULES N_1, N_2, N_3

   - FOR A GIVEN ADMINISTRATION/QUADRANT, EXHAUST RULE N_i BEFORE PASSING TO RULE N_i+1

5. RE-EVALUATE GIR

RANK UTILIZATION OF QUADRANTS BY ADMINISTRATION

MEMBERS OF GIR: A1, A2, ..., A17
B1, B2, ..., B20
C1, C2, ..., C16



START SUSPENSIONS WITH REQUIREMENTS OF ADMINISTRATION A, Q29

SUSPENSION RULES

RULE N1: IDENTICAL SERVICE AREAS, SAME BAND

RULE N2: COMMON UNIT OF SERVICE AREA, SAME BAND

RULE N3: COMMON UNIT OF SERVICE AREA, DIFFERENT BANDS

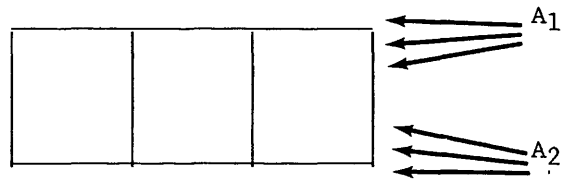
RULE N4: REQUIREMENT NECESSITATING 2 OR 3 FREQUENCIES SIMULTANEOUSLY

RULE N5: LOWER PROTECTION RATIO

RULE N6: REDUCE TRANSMISSION TIME

RULE N1

EXAMPLE:



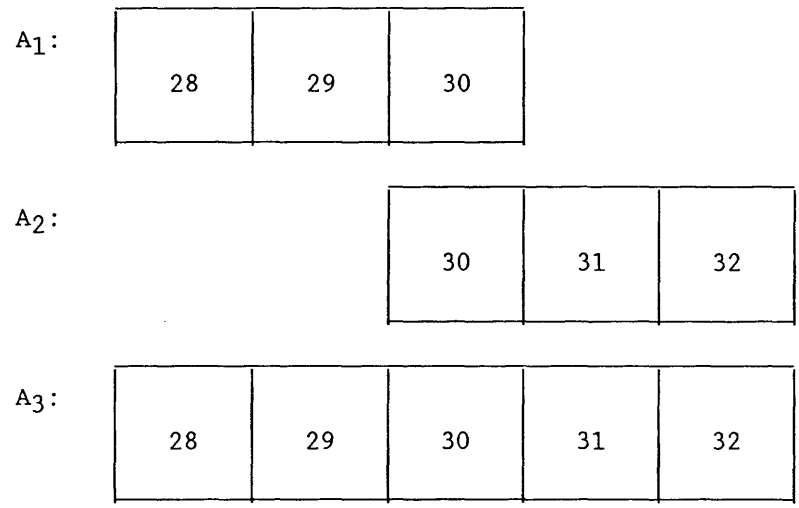
IDENTICAL AREAS

A_1: 28, 29, 30 ← THIS

A_2: 28, 29, 30 ← OR THIS

RULE N2

EXAMPLE:



A_1 OR A_2 (OR BOTH) COULD BE SUSPENDED

RULE N3

BAND 6 (UNDER CONSIDERATION)

B_{10}:						28,	29,	30,	31
B_{14}:				26,	27,	28			
B_{17}:			25,	26,		28			

EXAMPLE

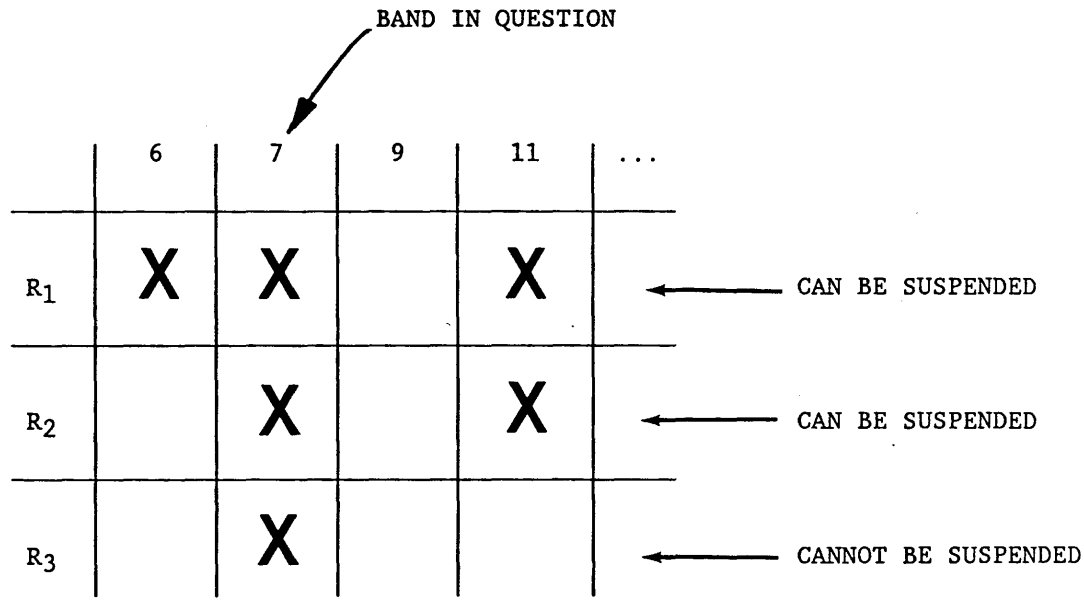
BAND 7 B_{28}: 27, 31, 32

→ B_{14} CAN BE SUSPENDED

→ B_{17} CANNOT BE SUSPENDED

RULE N4

SUSPEND REQUIREMENT FROM THE BAND UNDER CONSIDERATION IF THE REQUIREMENT IS PRESENT IN 2 OR 3 BANDS



RULE N5

REDUCE PROTECTION RATIO IN STEPS OF 3 DB (RETAIN OVERALL PR OF 17 DB)

THIS REDUCTION IS CARRIED OUT SIMILARLY TO THAT EFFECTED BEFORE EVOKING RULE N_1.

THESE REDUCTIONS IN PROTECTION RATIO ARE CARRIED OUT FOR MEMBERS OF GIR ONLY.

EXAMPLE:

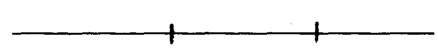
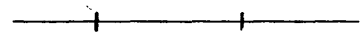
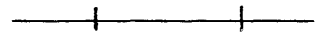
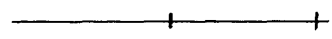
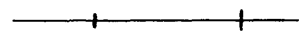
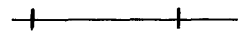
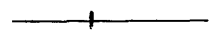
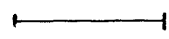
TPR	27	24	21
RNC	52	52	48

RULE N6

REDUCTION OF TRANSMISSION TIME RULE

REDUCE TRANSMISSION TIME BY A MAXIMUM OF 30 MINUTES

ORDER REQS. OF MAX GIR BY TRANSMISSION HOURS DURING PERIOD OF 3 HOURS CENTRED ON HOUR UNDER CONSIDERATION.

GROUP	TOTAL NO. OF HOURS	EXAMPLES
H_1	3.00	
H_2	2.45	
H_3	2.30	
H_4	2.15	
H_5	2.00	
H_6	1.45	
H_7	1.30	
H_8	1.15	
H_9	1.00	
H_{10}	0.45	

NO. REQ. OF DURATION 30 MINUTES OR 15 MINUTES IN THE HOUR UNDER CONSIDERATION WILL BE REDUCED.

SUMMARY

A. DETERMINE GGIR
IF RNC > ANC THEN

B. DETERMINE REQS. OF GIR

C. 1. QUALITY REDUCTION
(PR: 33 ⟶ 30 ⟶ 27)

2. REQUIREMENT SUSPENSIONS
RULES N_1, N_2, N_3

3. FURTHER REDUCTION IN QUALITY

3.1 RULE N_4 (2ND, 3RD BANDS)

3.2 RULE N_5 (27⟶24⟶21⟶17)

4. TIME REDUCTIONS
RULE N_6

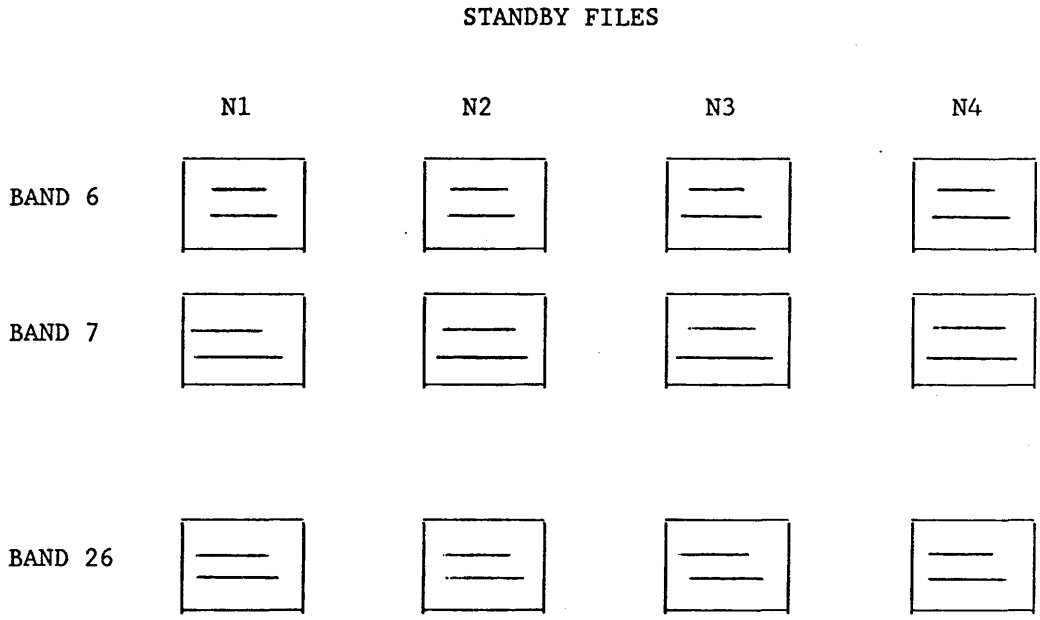
5. FURTHER QUALITY REDUCTIONS
(PR: 17⟶14⟶..?)

	PLAN NUMBER: 10 HOUR BLOCK = 1									
	BANDS(MHZ)									
	6	7	9	11	13	15	17	21	26	TTL
REQTS:	431	149	282	144	26	55	25	5		1117
CHNLS:	260	123	182	105	21	37	21	5		754
AVL :	25	20	40	40	20	50	35	40	43	313
RULE										
N1 :	122	39	58	40	2					261
N2 :	92	21	45	19						177
N3 :	13	20	29	16						78
N4 :	3	1	6							10
N6 :	175	44	98							317
FRQ-A:	201	68	144	69	24	55	25	5		591
PROT R										
-VE :	109									109
0-17:	79	50	85							214
17-23:	12	10	47							69
23-27:		4	3	46						53
>27:	1	4	9	23	24	55	25	5		146
PR-NE:					18	27	27	27		

TREATMENT OF SUSPENDED REQUIREMENTS

RULE N6

ORDER OF TREATMENT

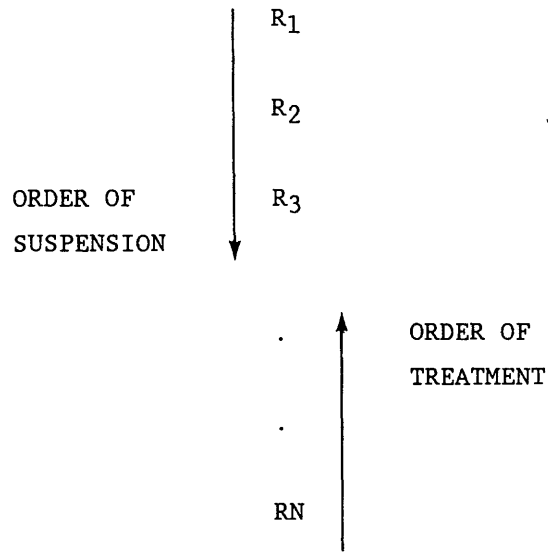


1. TREAT IN REVERSE ORDER OF N-RULE APPLIED

E.G. TREAT: FIRST N_4 STANDBY FILES
THEN N_3 STANDBY FILES
THEN N_2 STANDBY FILES
THEN N_1 STANDBY FILES

2. WITHIN A GIVEN STANDBY FILE, TREAT EACH SUSPENDED REQ. IN REVERSE ORDER OF SUSPENSION

E.G. BAND X, RULE N_i



MODULE 8

ANALYSIS OF PLANS

PLANNING EXERCISES

. BASIC PLANS PUBLISHED ON MICROFICHE:

PLANS 10, 20, 30, 40, 50

. VARIATIONS OF BASIC PLANS NOT PUBLISHED:

PLANS 11, 31, 32, 33, 52, 53

PERCENTILE, E_{MIN} FLOOR LEVEL

. OTHER VARIATIONS NOT PUBLISHED:

PLANS 55, 56, 58, 59

IMPACT OF CARRIER SPACING AND FREQUENCY CONTINUITY

. IMPACT OF MARITIME ZONES NOT ASSESSED DUE TO THE INSIGNIFICANT NUMBER OF REQUIREMENTS WITH 1 OR MORE MARITIME AREAS.

PARAMETRES PARAMETERS PARÁMETROS	NUMERO DU PLAN PLAN NUMBER NÚMERO DEL PLAN										
	10	**11**	**20**	**30**	**31**	**32**	**33**	**40**	**50**	**52**	**53**
NOMBRE DE TACHES SOLAIRES SUNSPOT NUMBER NÚMERO DE MANCHAS SOLARES	5	5	5	60	60	60	60	60	120	120	120
SAISON SEASON ESTACIÓN	D-85	D-85	J-86	M-88	M-88	M-88	M-88	J-88	D-85	D-85	D-85
CENTILE PERCENTILE PERCENTILO	80	80	80	80	90	90	80	80	80	90	80
REDUCTION DE E_{MIN} REDUCTION OF E_{MIN} REDUCCIÓN DE E_{MIN}	0	0	0	0	-5	0	-5	0	0	0	-5
FREQ. PREREGLEES PRESET FREQ. FREC. PREFIJADAS	OUI YES SI	NON NO NO	OUI YES SI	OUI YES SI	OUI YES SI	OUI YES SI	OUI YES SI	OUI YES SI	OUI YES SI	OUI YES SI	OUI YES SI

BASIC PLANS AND THEIR VARIATIONS

FREQUENCY HOURS ≥ 17 DB OR 27 DB

PLAN NUMBER	FREQUENCY HOURS INCLUDED IN THE PLAN	PERCENTAGE OF FREQ. HOURS ≥ 17 DB		PERCENTAGE OF FREQ. HOURS ≥ 27 DB	
		IN THE PLAN	ALL	IN THE PLAN	ALL
10	20555	59	43	36	26
11	21690	64	49	40	30
20	22584	62	43	37	26
30	26444	58	39	35	24
31	24471	53	33	32	20
32	24846	56	35	34	21
33	25846	57	38	34	22
40	25807	62	43	38	26
50	21068	63	46	41	30
52	19955	60	41	39	27
53	20789	61	44	40	29

PERCENTAGE OF FREQUENCY HOURS

WITH S/I $\geq$ 17 DB OR S/I $\geq$ 27 DB BY BAND

PLAN 50

FREQ. BAND (MHZ)	FREQUENCY HOURS INCLUDED IN THE PLAN	PERCENTAGE WITH S/I $\geq$ 17 DB	PERCENTAGE WITH S/I $\geq$ 27 DB
6	4104	43	26
7	2221.15	50	33
9	4359	58	32
11	3515	65	35
13	879.45	87	77
15	2762.45	74	51
17	1751.45	81	58
21	1223.15	84	66
26	291.15	94	93
TOTAL	21068	63%	41%

BASIC PLANS AND THEIR VARIATIONS

NUMBER OF OCCURENCES OF GIVEN OBR VALUES BY PLAN

PLAN NUMBER	OVERALL BROADCASTING RELIABILITY				
	≥ 90	$\geq 80, < 90$	$\geq 50, < 80$	$> 0, < 50$	$= 0$
10	2753	3718	11985	28779	31570
11	2933	3924	13896	31304	31115
20	2513	3904	13530	36209	30075
30	4427	4919	16020	40901	36103
31	5626	4183	12936	34480	37898
32	3965	4083	13533	35651	38416
33	6071	4952	15896	39291	34740
40	3761	4571	16579	40831	33697
50	3843	4381	14693	30098	28458
52	3451	5734	11867	26826	30944
53	5495	4764	14335	28583	28035

PLAN NUMBER	10	11 *	20	30	31	32	33	40	50	52	53
SEASON and SUN SPOT NUMBER	D-85 5	D-85 5	J-86 5	M-88 60	M-88 60	M-88 60	M-88 60	J-88 60	D-85 120	D-85 120	D-85 120
PERCENTILE AND E_{MIN}	80, 0	80, 0	80, 0	80, 0	90, -5	90, 0	80, -5	80, 0	80, 0	90, 0	80, -5
Number of req. hours submitted	28303	28303	32333	37787	37787	37787	37787	36382	28303	28303	28303
Number of req. hours eliminated (band type D)	1364	1364	1790	828	487	828	487	1199	896	896	638
Number of req. hours processed	26939	26939	30542	36958	37299	36958	37299	35183	27407	27407	27665
Number of frequency hours processed	28186	28186	32243	38497	38811	38858	38595	36799	28463	28762	28503
Number and percentage of frequency hours entered in the plan	20555 72.93	21690 76.95	22584 70.04	26444 68.69	24471 63.05	24846 63.94	25846 66.96	25807 70.13	21068 74.02	19955 69.38	20789 72.94
Percentage of frequency hours with S/I $\geq$ 17 dB	59%	64%	62%	58%	53%	56%	57%	62%	63%	60%	61%
Percentage of frequency hours with S/I $\geq$ 27 dB	36%	40%	37%	35%	32%	34%	34%	38%	41%	39%	40%

* PRESET FREQUENCIES DISREGARDED

LIST OF OTHER VARIATIONS

PARAMETERS	PLAN NUMBER				
	50	55	56	58	59
SUNSPOT NUMBER	120	120	120	120	120
SEASON	D-85	D-85	D-85	D-85	D-85
PERCENTILE	80%	80%	80%	80%	80%
REDUCTION OF EMIN	0	0	0	0	0
PRESET FREQ.	YES	YES	YES	YES	YES
CHANNEL SPACING	10 kHz	5 kHz	5 kHz	5 kHz	10 kHz
ADJACENT CHANNEL PROTECTION RATIO REDUCTION	-3dB	-3dB	-8dB	-12dB	-3dB
FREQUENCY CONTIN. MANDATORY	NO	NO	NO	NO	YES

OTHER PLAN VARIATIONS

AVERAGE REQUIRED SPECTRUM (KHZ) BY BAND

PLAN NUMBER	BAND (MHz)								
	6	7	9	11	13	15	17	21	26
50	1830	1210	1500	1120	210	770	730	460	90
55	1680	1155	1410	1040	190	730	680	435	85
56	1455	1035	1225	920	170	650	605	395	85
58	1255	935	1055	820	155	585	515	350	85
59	1830	1210	1500	1120	210	770	730	460	90
AVAILABLE SPECTRUM	250	200	400	400	200	500	350	400	430
No. OF 10 kHz CHANNELS	25	20	40	40	20	50	35	40	43

INFLUENCE OF CARRIER SPACING AND RELATIVE PROTECTION RATIOS

PLAN NUMBER	50	55	56	58
SEASON AND SUN SPOT NUMBER	D-85 120	D-85 120	D-85 120	D-85 120
Carrier spacing and relative value of the protection ratio	10 kHz - 3 dB	5 kHz - 3 dB	5 kHz - 8 dB	5 kHz - 12 dB
Number of req. hours submitted	28303	28303	28303	28303
Number of req. hours eliminated (band type D)	896	896	896	896
Number of req. hours processed	20407	27407	27407	27407
Number of frequency hours processed	28463	28463	28463	28463
Number and percentage of frequency hours entered in the plan	21068 74.02	20949 73.60	20403 71.68	20583 72.31
Percentage of frequency hours with S/I $\geq$ 17 dB	62.75	61.42	69.53	74.42
Percentage of frequency hours with S/I $\geq$ 27 dB	40.92	39.74	46.83	51.85

INFLUENCE OF FREQUENCY CONTINUITY

PLAN NUMBER	50	59
SEASON AND SUN SPOT NUMBER	D-85 120	D-85 120
PERCENTILE AND E_{MIN}	80, 0	80, 0
FREQUENCY CONTINUITY IMPOSED	NO	YES
Number of req. hours submitted	28303	28303
Number of req. hours eliminated (band type D)	896	896
Number of req. hours processed	27407	27407
Number of frequency hours processed	28463	28463
Number and percentage of frequency hours entered in the plan	21068 74.02	20009 70.30
Percentage of frequency hours with S/I $\geq$ 17 dB	62.75	54.29
Percentage of frequency hours with S/I $\geq$ 27 dB	40.92	35.12

SUMMARY

BASIC PLANS AND THEIR VARIATIONS

. PERCENTAGE OF FREQUENCY HOURS INCLUDED IN THE PLANS CAN BE AS HIGH AS 77%

. PERCENTAGE OF FREQUENCY HOURS NOT INCLUDED IN THE PLANS CAN BE AS HIGH AS 27%

. PERCENTAGE OF FREQUENCY HOURS INCLUDED IN THE PLANS WITH S/I $\geq$ 17 DB IS $\approx$ 60%

. PERCENTAGE OF FREQUENCY HOURS INCLUDED IN THE PLANS WITH S/I $\geq$ 27 DB IS $\approx$ 40%

. WHEN PRESET FREQUENCIES ARE DISREGARDED THE NUMBER AND QUALITY OF FREQUENCY HOURS INCLUDED IN THE PLAN IS SIGNIFICANTLY INCREASED.

. THE PERCENTAGE OF THE FREQUENCY HOURS WITH S/I $\geq$ 17 DB OR $\geq$ 27 DB IS HIGHER IN THE HIGHER BANDS.

. THE VAST MAJORITY OF OBR VALUES IS $\leq$ 50.

SUMMARY

5 KHZ CARRIER VARIATIONS

. A REDUCTION OF THE RELATIVE ADJACENT CHANNEL PROTECTION RATIO INCREASES THE CAPACITY OF THE BANDS, DECREASES THE REQUIRED SPECTRUM, INCREASES THE QUALITY OF THE ASSIGNMENTS.

FREQUENCY CONTINUITY

. A SYSTEMATIC APPLICATION OF FREQUENCY CONTINUITY HAS TWO CONSEQUENCES:

- THE NUMBER OF FREQUENCY HOURS NOT INCLUDED IN THE PLAN INCREASES ($\approx$ 14%)

- THE NUMBER OF FREQUENCY HOURS WITH AN S/I $\geq$ 17 DB DECREASES ($\approx$ 18%).

MODULE 9

PLAN OF PRESENTATION

1. HARDWARE

2. CHANGES TO SOFTWARE AND FILES

3. ASSISTANCE DURING THE CONFERENCE

HARDWARE

MACHINE A — 4.5 MIPS

RESERVED FOR USES WITH IDMS

MACHINE B

1984	1.4 MIPS
1985	2.7 MIPS
1986/1987	4.5 - 6.0 MIPS
MEMORY	16 MBYTES

CAPACITY INCREASE APPROVED BY THE ADMINISTRATIVE COUNCIL

SIZE OF FILES

FOR EACH PLANNING EXERCISE

FILE	MBYTES
PROPAGATION	2400
FIELD-STRENGTH	500
USABLE BAND	3
APPROPRIATE BAND	2
FREQUENCY ASSIGNMENT	5
OBR	2
OTHER	100

1 MAGNECTIC TAPE $\approx$ 100 MBYTES

1 MBYTE $\approx$ 60 PAGES

200 PAGES $\approx$ 1 CM

1. SOFTWARE CHANGES

SOFTWARE CHANGES DURING THE CONFERENCE ARE TO BE AVOIDED IF POSSIBLE.

CHANGES TO THE FOLLOWING PROGRAMS CANNOT BE UNDERTAKEN DURING THE CONFERENCE:

- PROPAGATION METHOD
- DETERMINATION OF USABLE BANDS
- SELECTION OF APPROPRIATE BAND
- ASSIGNMENT OF FREQUENCIES AND SUSPENSION RULES
- MODULE, OBR

2. CHANGES TO DATA FILES

2.1 CHANGES TO SYSTEM FILES

- ANTENNA DIAGRAMS
- E_{MIN} VALUES
- TEST POINTS

2.2 CHANGES TO REQUIREMENT FILE

- MOD., ADD., SUP.
- NEW FORM

CHANGES POSSIBLE.

AVERAGE TIME REQUIRED TO PRODUCE A PLAN

CHANGE FOR GENERATION OF NEW FILE	CPU HOURS	ELAPSED TIME (X 2) HOURS	DAYS
PROPAGATION	204	408	17
FIELD-STRENGTH	108	216	9
USABLE BAND	84	168	7
APPROPRIATE BAND	82	164	6.8
FREQ. ASSIGNMENTS AND SUSPENSIONS	81	162	6.7
OBR	21	42	1.75
OTHER	9	18	0.75

3. DESIGN CHANGES

NO CHANGES IN THE ARCHITECTURE OF THE HFBC PLANNING SYSTEM MAY BE UNDERTAKEN UNTIL AFTER THE SECOND SESSION.

SUMMARY TABLE

TASKS	POSSIBILITY OF CHANGE DURING THE CONFERENCE
SOFTWARE CHANGES	NO
SYSTEM FILE CHANGES	POSSIBLE
REQUIREMENT FILE CHANGES	POSSIBLE
GENERATION OF A NEW PLANNING EXERCISE:	DEPENDS ON ASSUMPTIONS:
- NEW PROPAGATION FILE	- NOT RECOMMENDED - 17 DAYS
- NEW FIELD-STRENGTH FILE	- NOT RECOMMENDED - 9 DAYS
- USABLE AND APPROPRIATE BAND FILE	- NOT RECOMMENDED - 7 DAYS
- FREQ. ASSIGNMENT AND SUSPENSION	- YES - 7 DAYS
- OBR WITH DIFFERENT PERCENTILE VALUES	- YES - 2 DAYS
PREPARATION AND TESTING TIME	VARIES ACCORDING TO TASK MINIMUM 1 TO 2 DAYS

ASSISTANCE DURING THE CONFERENCE

1. PLANNING EXERCISE DATA

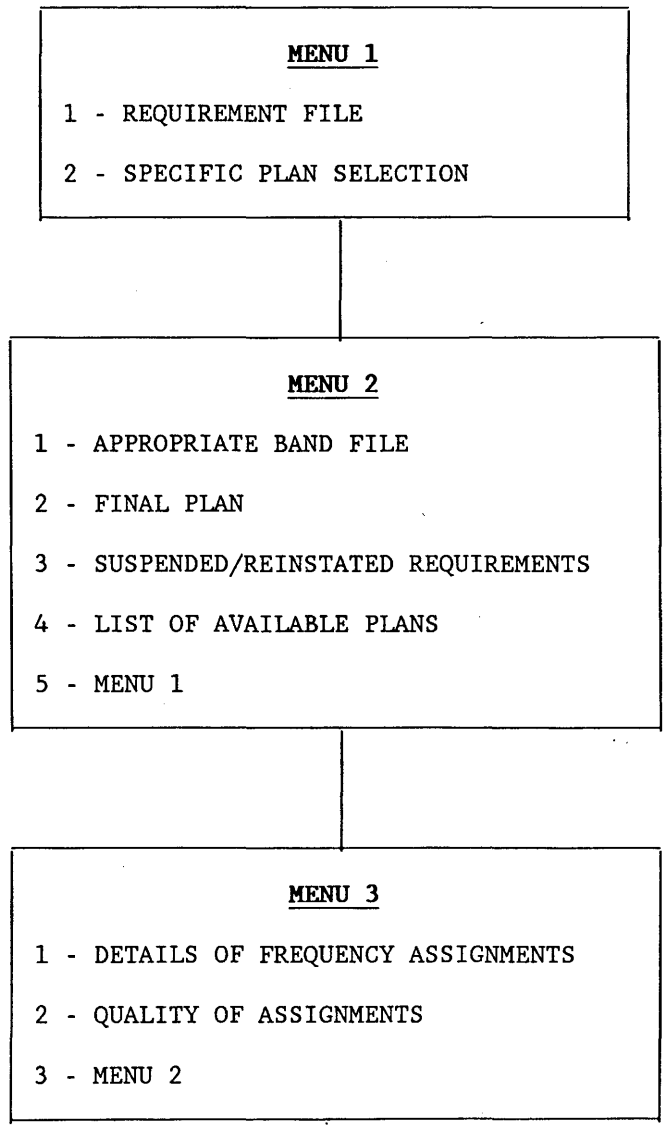
A TERMINAL ACCESS SYSTEM WITH A SET OF MICROCOMPUTERS IS AVAILABLE TO DELEGATES ON LEVEL D.

2. PREPARATION OF REPORT EXTRACTS AND LOAN OF MICROFICHE READERS COPIES OF MAGNETIC TAPES, DISKETTES OF PROGRAMMES OR RESULTS OF PLANNING EXERCISES

REQUESTS SHOULD BE ADDRESSED IN WRITING TO THE TECHNICAL SECRETARY.

3. GUIDE TO USE OF TERMINALS AVAILABLE ON LEVEL D

TERMINAL ACCESS



HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, **February-March 1987**

Document DT/5-E
27 January 1987
Original : English

Note by the Secretary-General

At the request of the Chairman of the IFRB, I have the honour to transmit herewith a copy of a note established to the intention of the Conference "Basic Definitions and Terminology used in the context of the HFBC Planning System".

R.E. BUTLER
Secretary-General

Annex: 1

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BASIC DEFINITIONS AND TERMINOLOGY USED IN THE CONTEXT OF THE HFBC PLANNING SYSTEM

INTRODUCTION

Certain technical terms and concepts are used frequently in the context of the HFBC Planning System (Document No. 8) and its implementation. The Board felt that it would be useful to define in the present document the most essential terms and give examples where appropriate. Since the intention is simply to elucidate the basic ideas, the definitions are kept at the simplest level. Complete information can be found in the references given. Further information can also be obtained from members of the IFRB Technical Secretariat.

1. PERCENTILE

In order to determine the **X** percentile of a given set of values (e.g. a set of field strength values or set of basic circuit reliability values), the following method is used:

a) the values contained in the set are sorted in decreasing order from the highest to the lowest, as in the following example:

Original values	Sorted values
40, 70, 80, 50, 60	80, 70, 60, 50, 40

b) the number of elements belonging to the set is determined. In the above example there are 5 elements in the set;

c) the value **X** is multiplied by the number of elements in the set. Assuming that **X** = 80% we obtain (80%) x (5) = 4;

d) the value found, namely 4 in the example, gives the rank of the element which constitutes the 80th percentile. In our example the fourth value from the top is 50; hence we say that the 80th percentile of the given set of values is 50.

If the set contains, say, 6 elements, the 80th percentile would be the value assumed by the element of the set located in the 5th position, since the result of the multiplication (80%) x (6) = 4.8 is rounded to the nearest integer. In summary, the **X** percentile of a given set of values is the largest value which is equal to or less than **X** per cent (at least) of the values contained in the set.

Applications involving the concept of percentile are given in paragraphs 3.2.4.5 and 3.5.2 of the Report to the Second Session and in Annex 2 to Chapter 4, section 3 and in Chapter 5, section 2 of the HFBC Planning System (Document No. 3). For the purposes of intersessional work, the IFRB has used two values of percentile: 80 and 90, in accordance with paragraph 4.2.4 of the Report to the Second Session.

2. BASIC RELIABILITIES

In the context of HFBC, **reliabilities** are defined in the form of probabilities that a specified performance with respect to the field strength can be achieved. The word **basic** is used to indicate that the specified performance is achieved in the presence of noise only.

2.1 Basic circuit reliability (BCR)

The propagation prediction method is used to determine for a given circuit, i.e. transmitter, test point and single frequency, the median field strength value at the test point, assuming stable conditions of propagation. Thus, if we say that at a given test point the predicted field strength value is 40(dB V/m), we are simply saying that for 50% of the time the field strength value may be greater or smaller than 40(dB V/m). If the minimum usable field strength value at the same test point is 38(dB V/m), it is then clear that the probability of exceeding the value 38 is greater than 50%. This probability, referred to as the **basic circuit reliability**, is calculated, in the context of the HFBC Planning System, using the method described in paragraph 3.2.4.1 of the Report to the Second Session.

2.2 Basic broadcasting reliability (BBR)

The concept of BBR is simply an extension of the BCR concept to a given area of service, and is determined using a given percentile value and the method described in paragraph 3.2.4.5 of the Report to the Second Session.

As an example, if it is assumed that the area of service contains five test points and the percentile value to be used is 80 the five values of BCR are ranked and the 80th percentile value is determined as in the example given in section 1, above. The value obtained is referred to as the basic broadcasting value of the given requirement.

In cases where two or three distinct frequencies are used to satisfy a given requirement, it is also possible to determine the basic broadcasting reliability using the method given in paragraph 3.2.4.5 of the Report to the Second Session.

3. PROTECTION RATIO

If, in the presence of co-channel interference, a wanted signal is to be received with a specified quality, it must be sufficiently stronger than the interfering signal. The **protection ratio (PR)** is the minimum value of the ratio, expressed in dB, of the wanted field strength to the interfering field strength that will ensure the specified quality. A co-channel protection ratio of 27 dB has been adopted for stable conditions (see paragraph 3.3.1 of the Report to the Second Session). For carrier-frequency separations larger than about 5 kHz, a decrease in required protection ratio as a function of the carrier-frequency separation is foreseen, as set out in paragraph 3.3.2 of the Report to the Second Session.

3. (cont.)

In the presence of two or more interfering signals, a co-channel protection ratio of 27 dB will not be sufficient to guarantee the specified quality, owing to the fact that multiple sources of interference tend to produce an aggregate effect greater than any of the individual contributions. In order to compensate this group effect it is necessary to add a **multiple interference margin (M1)** to the (single interference) protection ratio of 27 dB. Though this margin could be taken as high as 6 dB, the Board felt that a large value would prove too restrictive for planning purposes and decided to use a 3 dB margin instead. See paragraph 3.1 of Chapter 5, section 2 of the HFBC Planning System document for more details.

The (single interference) protection ratio is specified for stable conditions, i.e. 50 per cent of the time. In the case of a plan based on 80 per cent or 90 per cent of the time it is necessary to add a **fading margin (M2)** to ensure that the (single interference) protection ratio will be exceeded 80 per cent or 90 per cent of the time. In paragraph 3.2.4.2 of the Report to the Second Session, a fading margin of 10 dB for 90 per cent of the time is specified. The Board felt that such a large value would prove too restrictive for planning purposes and decided to use instead the value of 6 dB as a fading allowance for a 90 per cent plan and 3 dB as a fading allowance for an 80 per cent plan. See also paragraph 3.2 of Chapter 5, section 2 of the HFBC Planning System document for more details. The overall protection ratio (OPR) is then given by

$$OPR = PR + M_1 + M_2$$

Example:

PR (protection ratio, stable conditions, single interference)	27 dB
M_1 (margin, multiple interference)	3 dB
M_2 (fading margin, 80% time)	3 dB
OPR (overall protection ratio) = 27 + 3 + 3 =	33 dB

4. PROPORTIONALLY REDUCED PROTECTION

Test points at which the median wanted field strength, E, is greater than or equal to E_{min} (the minimum usable field strength) are to be given full protection from interference, i.e. protection based on the reference co-channel protection ratio plus whatever margins may be included. Normally no protection is to be afforded at points where E is less than E_{min}. However, **proportionally reduced protection (PRP)** will be afforded, under certain circumstances, at points where $E_{min} - Z^* \leq E < E_{min}$.

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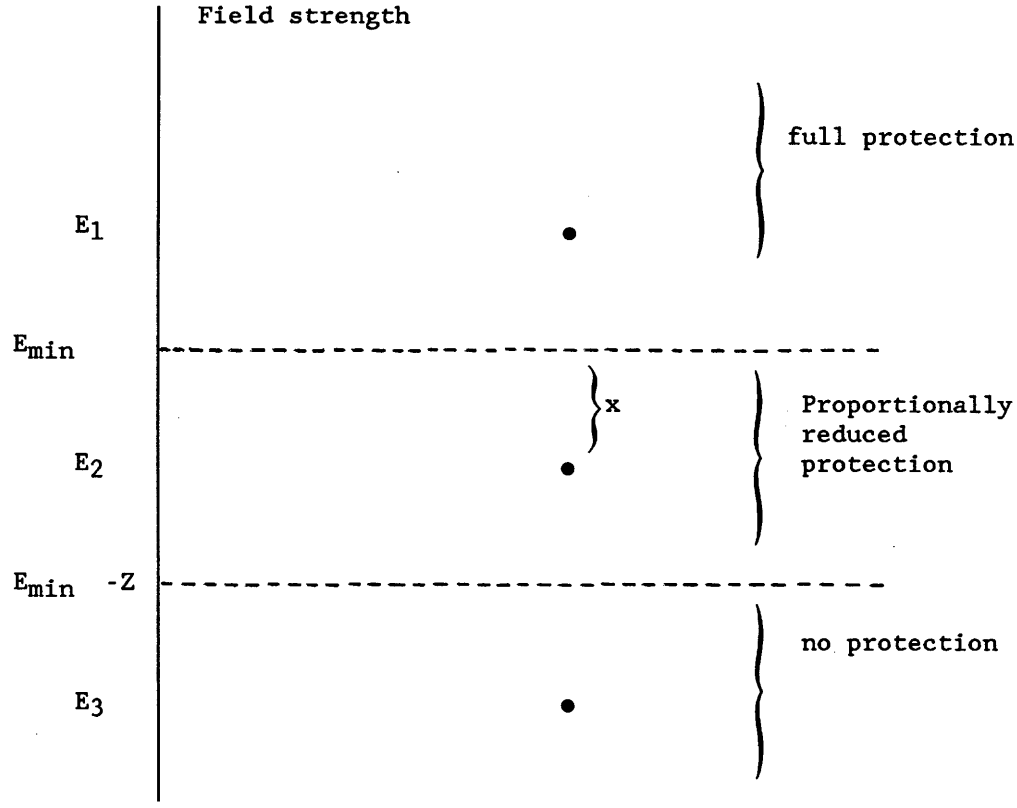
*) Z is 5 dB for the purpose of intersessional work.

4. (cont.)



The reduced protection ratio in this case is equal to the required protection ratio reduced by $X = E_{min} - E$

i.e. $PR_{red} = PR - (E_{min} - E)$

4. (cont.)

Example:

PR	(protection ratio)	=	27 dB
E	(wanted field strength)	=	39 dB
E_{min}	(minimum usable field strength)	=	42 dB
X	(E_{min} - E)	=	3 dB
PR_{red}	(protection ratio for PRP) = PR - X	=	24 dB

Applications where PRP can be used are discussed in Chapter 5, section 2 (signal-to-interference ratio to be protected) and Chapter 5, section 10 (determination of the OBR) of the HFBC Planning System document.

5. GROUP OF INCOMPATIBLE REQUIREMENTS

If, within a given area, the difference between the field strength of a wanted requirement and the field strength of an unwanted (interfering) requirement is less than the relevant protection ratio, the two requirements are said to be incompatible. A **group of incompatible requirements (GIR)** is a set of (two or more) requirements each of which is incompatible with all other requirements in the set. A **greatest GIR (GGIR)** is a GIR which contains the largest number of requirements. A **maximal GIR (MGIR)** is the set of all requirements contained in at least one GGIR.

Because each requirement of a GGIR is incompatible with all other requirements of the GGIR, no two requirements of the GGIR can utilize the same channel in a frequency assignment plan. Thus, the number of requirements in a GGIR gives an indication of the smallest number of channels required (spectrum) for a complete frequency assignment. In the case where the required spectrum exceeds the available spectrum and suspensions are necessary, it is the MGIR which determines the set of requirements which may be subject to suspension. See Annex 1 to Chapter 5, section 7, and Chapter 5, section 4 of the HFBC Planning System document for a more detailed discussion of the concept of GIR and its application with respect to spectrum requirements and suspension rules.

Example:

Incompatibilities can be represented pictorially

5. (cont.)

The dots represent the requirements and lines joining the dots represent incompatibilities. Thus req. 1 is incompatible with reqs. 2, 3 and 4, req. 2 is incompatible only with req. 1, etc. Reqs. 1 and 3, for example, form a GIR consisting of two requirements. The GGIR consists of 3 requirements: 1, 3 and 4. Thus, at least three channels would be necessary to make a complete frequency assignment plan in this case.

6. SIGNAL-TO-INTERFERENCE RATIOS

The **signal-to-interference (S/I) ratio** is obtained at each receiving point in the required service area of the wanted signal by calculating the ratio in dB between the wanted and the unwanted signals. The S/I ratio with respect to two requirements (i.e. relative to a required service area) is determined as the relevant percentile (e.g. 80 or 90) of the S/I ratios at all the test points within the required service area. The overall S/I ratio between the wanted signal and two or more interferes is obtained by summing the interferences at each test point, determining the signal-to-total-interference ratio at each test point, and finding the appropriate percentile of the resulting values. A more detailed discussion, including the complications due to fading, PRP, etc., can be found in Chapter 5, section 2 of the HFBC Planning System document.

Example:

Test point	S	I	S/I
1	40	12	28
2	39	10	29
3	37	12	25
4	41	10	31
5	38	11	27

The 80th percentile S/I value is 27 dB.

7. OVERALL RELIABILITIES

In the context of the HFBC Planning System, **reliabilities** are defined in the form of probabilities that a specified performance with respect to the field strength can be achieved. The word **overall** is used to indicate that the specified performance is achieved in the presence of both noise and interference. The method used to determine overall reliabilities is given in paragraph 3.2.4.2 of the Report to the Second Session.

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/6-E
4 February 1987
Original: English

COMMITTEE 4
WORKING GROUPS 4-A AND 4-B

ARTICLES OF THE RADIO REGULATIONS CONCERNING THE USE OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE RELATED TO THE WORK OF COMMITTEE 4 AND ITS WORKING GROUPS

Appendix 2, section III

III. Symbols for Type of Antenna

HOR	Horizontal non-directive antenna
VER	Vertical non-directive antenna

DP	Dipole
H	Horizontal
V	Vertical
R	With reflector

Example: DPHR means: Horizontal dipole with reflector.

H	Horizontal dipole curtain antenna
R	With reflector curtain
S	Slewed antenna
/..	Number of half-wave elements in each row
/..	Number of half-wave elements in each stack (one above the other)
/..	Height above ground in full wavelengths of the bottom row of elements
S..	Angle of slew, if any

Example: HRS/4/3/2S15 means: Horizontal array with reflector curtain, 4 half-wave elements in each row, 3 stacks of dipoles, bottom element 2 wavelengths above the ground, slewed with an angle of 15 degrees.

RHO	Rhombic antenna
/..	Length of one side of the rhombus, in wavelengths
/..	Height of rhombus above ground, in wavelengths
/..	One half of the interior side angle of rhombus

Example: RHO/2.5/0.4/65 means: Rhombic antenna, length of one side 2.5 wavelengths, height above ground 0.4 wavelengths, one half of the interior side angle 65 degrees.

TRO	Tropical broadcasting antenna
/..	Number of rows
/..	Height above the ground in wavelengths

Example: TRO/4/0.2 means: Tropical BC antenna with 4 rows (and 4 dipoles in each row) at a height of 0.2 wavelengths above the ground.

AP7-1

APPENDIX 7

Table of Transmitter Frequency Tolerances

(See Article 5)

1. Frequency tolerance is defined in Article 1 and is expressed in parts in 10^6, unless otherwise indicated.

2. The power shown for the various categories of stations is the peak envelope power for single-sideband transmitters and the mean power for all other transmitters, unless otherwise indicated. The term "power of a radio transmitter" is defined in Article 1.

3. For technical and operational reasons, certain categories of stations may need more stringent tolerances than those shown in the table.

Frequency Bands (lower limit exclusive, upper limit inclusive) and Categories of Stations	Tolerances applicable until 1 January 1990 to transmitters in use and to those to be installed before 2 January 1985	Tolerances applicable to new transmitters installed after 1 January 1985 and to all transmitters after 1 January 1990
1	2	3
Band: **9 kHz to 535 kHz**		
1. *Fixed Stations:*		
— 9 kHz to 50 kHz	1 000	100
— 50 kHz to 535 kHz	200	50
2. *Land Stations:*		
a) Coast Stations:		100 *1)*
— power 200 W or less	500 *2)*	
— power above 200 W	200 *2)*	
b) Aeronautical Stations	100	100

AP7-2

1	2	3
3. *Mobile Stations:*		
a) Ship Stations	1 000 *3)*	200 *4)*
b) Ship's Emergency Transmitters	5 000	500 *5)*
c) Survival Craft Stations	5 000	500
d) Aircraft Stations	500	100
4. *Radiodetermination Stations*	100	100
5. *Broadcasting Stations*	10 Hz	10 Hz
***Band:* 535 kHz to 1 605.5 kHz (1 605 kHz in Region 2)**		
Broadcasting Stations	10 Hz *6)*	10 Hz *6)*
***Band:* 1 605.5 kHz (1 605 kHz in Region 2) to 4 000 kHz**		
1. *Fixed Stations:*		
— power 200 W or less	100	100 *7) 8)*
— power above 200 W	50	50 *7) 8)*
2. *Land Stations:*		
— power 200 W or less	100 *2) 9) 10)*	100 *1) 7) 10)*
— power above 200 W	50 *2) 9) 10)*	50 *1) 7) 10)*
3. *Mobile Stations:*		
a) Ship Stations	200 *3) 11)*	40 Hz *12)*
b) Survival Craft Stations	300	100
c) Emergency Position-Indicating Radiobeacons	300	100
d) Aircraft Stations	100 *10)*	100 *10)*
e) Land Mobile Stations	200	50 *13)*
4. *Radiodetermination Stations:*		
— power 200 W or less	100	20 *14)*
— power above 200 W	50	10 *14)*
5. *Broadcasting Stations*	20	10 Hz *15)*

AP7-3

1	2	3
***Band:* 4 MHz to 29.7 MHz**		
1. *Fixed Stations:*		
— power 500 W or less	50	
— power above 500 W	15	
a) Single-sideband and independent-sideband emissions:		
— power 500 W or less		50 Hz
— power above 500 W		20 Hz
b) Class F1B emissions		10 Hz
c) Other classes of emission:		
— power 500 W or less		20
— power above 500 W		10
2. *Land Stations:*		
a) Coast Stations:		20 Hz *1) 16)*
— power 500 W or less	50 *2) 9)*	
— power above 500 W and less than or equal to 5 kW	30 *2) 9)*	
— power above 5 kW	15 *2) 9)*	
b) Aeronautical Stations:		
— power 500 W or less	100 *10)*	100 *10)*
— power above 500 W	50 *10)*	50 *10)*
c) Base Stations:		20 *7)*
— power 500 W or less	100	
— power above 500 W	50	
3. *Mobile Stations:*		
a) Ship Stations:		
1) Class A1A emissions	50 *17) 18)*	10
2) Emissions other than Class A1A	50 *3) 11)*	50 Hz *4) 19)*

AP7-4

1	2	3
b) Survival Craft Stations	200	50
c) Aircraft Stations	100 *10)*	100 *10)*
d) Land Mobile Stations	200	40 *20)*
4. *Broadcasting Stations*	15	10 Hz *15) 21)*
5. *Space Stations*		20
6. *Earth Stations*		20
Band: **29.7 MHz to 100 MHz**		
1. *Fixed Stations:*		
— power 200 W or less	50	
— power above 200 W	30	
— power 50 W or less		30
— power above 50 W		20
2. *Land Stations:*		20
— power 15 W or less	50	
— power above 15 W	20	
3. *Mobile Stations:*		20 *22)*
— power 5 W or less	100	
— power above 5 W	50	
4. *Radiotermination Stations*	200	50
5. *Broadcasting Stations (other than television):*		2 000 Hz *23)*
— power 50 W or less	50	
— power above 50 W	20	

AP7-5

1	2	3
6. *Broadcasting Stations (television sound and vision):*		500 Hz *24) 25)*
— power 50 W or less	100	
— power above 50 W	1 000 Hz	
7. *Space Stations*		20
8. *Earth Stations*		20
***Band:* 100 MHz to 470 MHz**		
1. *Fixed Stations:*		
— power 50 W or less	50	20 *26)*
— power above 50 W	20	10
2. *Land Stations:*		
a) Coast Stations	20 *27)*	10
b) Aeronautical Stations	50	20 *28)*
c) Base Stations:		
— power 5 W or less	50	
— power above 5 W	20	
— in the band 100 - 235 MHz		15 *29)*
— in the band 235 - 401 MHz		7 *29)*
— in the band 401 - 470 MHz		5 *29)*
3. *Mobile Stations:*		
a) Ship Stations and Survival Craft Stations:		
— in the band 156 - 174 MHz	20 *27)*	10
— outside the band 156 - 174 MHz	50 *30) 31)*	50 *31)*
b) Aircraft Stations	50	30 *28)*
c) Land Mobile Stations:		
— power 5 W or less	50	
— power above 5 W	20	

AP7-6

1	2	3
— in the band 100 - 235 MHz		15 *29)*
— in the band 235 - 401 MHz		7 *29) 32)*
— in the band 401 - 470 MHz		5 *29) 32)*
4. *Radiodetermination Stations*	50 *30) 33)*	50 *33)*
5. *Broadcasting Stations (other than television)*	20	2 000 Hz *23)*
6. *Broadcasting Stations (television sound and vision):*		500 Hz *24) 25)*
— power 100 W or less	100	
— power above 100 W	1 000 Hz	
7. *Space Stations*		20
8. *Earth Stations*		20
***Band:* 470 MHz to 2 450 MHz**		
1. *Fixed Stations:*		
— power 100 W or less	300 *34)*	100
— power above 100 W	100 *35)*	50
2. *Land Stations*	300	20 *36)*
3. *Mobile Stations*	300	20 *36)*
4. *Radiodetermination Stations*	500 *33)*	500 *33)*
5. *Broadcasting Stations (other than television)*	100	100
6. *Broadcasting Stations (television sound and vision)* in the band 470 MHz to 960 MHz:		500 Hz *24) 25)*
— power 100 W or less	100	
— power above 100 W	1 000 Hz	
7. *Space Stations*		20
8. *Earth Stations*		20

AP7-7

1	2	3
Band: **2 450 MHz to 10 500 MHz**		
1. *Fixed Stations:*		
— power 100 W or less	300 *34)*	200
— power above 100 W	100 *35)*	50
2. *Land Stations*	300	100
3. *Mobile Stations*	300	100
4. *Radiodetermination Stations*	2 000 *33)*	1 250 *33)*
5. *Space Stations*		50
6. *Earth Stations*		50
Band: **10.5 GHz to 40 GHz**		
1. *Fixed Stations*	500	300
2. *Radiodetermination Stations*	7 500 *33)*	5 000 *33)*
3. *Broadcasting Stations*		100
4. *Space Stations*		100
5. *Earth Stations*		100

Notes in the Table of Transmitter Frequency Tolerances

1) For coast station transmitters used for direct-printing telegraphy or for data transmission, the tolerance is 15 Hz.

2) For coast station transmitters used for direct-printing telegraphy and for data transmission the tolerance is 15 Hz. This tolerance is applicable to equipment installed after 1 January 1976 and to all equipment after 1 January 1985. For equipment installed before 2 January 1976 the tolerance is 40 Hz.

3) For ship station transmitters used for direct-printing telegraphy or for data transmission, the tolerance is 40 Hz. This tolerance is applicable to equipment installed after 1 January 1976 and to all equipment after 1 January 1985. For equipment installed before 2 January 1976 the tolerance is 100 Hz (with a maximum deviation of 40 Hz for short periods of the order of 15 minutes).

4) For ship station transmitters used for direct-printing telegraphy or for data transmission, the tolerance is 40 Hz.

5) If the emergency transmitter is used as the reserve transmitter for the main transmitter, the tolerance for ship station transmitters applies.

6) In countries covered by the North American Regional Broadcasting Agreement (NARBA) the tolerance of 20 Hz may continue to be applied.

7) For single-sideband radiotelephone transmitters the tolerance is:

— in the bands 1 606.5 (1 605 Region 2) - 4 000 kHz and 4 - 29.7 MHz for peak envelope powers of 200 W or less and 500 W or less, respectively, 50 Hz;

— in the bands 1 606.5 (1 605 Region 2) - 4 000 kHz and 4 - 29.7 MHz for peak envelope powers above 200 W and 500 W, respectively, 20 Hz.

8) For radiotelegraphy transmitters with frequency shift keying the tolerance is 10 Hz.

9) For coast station single-sideband radiotelephone transmitters the tolerance is 20 Hz.

10) For single-sideband transmitters operating in the frequency bands 1 606.5 (1 605 Region 2) - 4 000 kHz and 4 - 29.7 MHz which are allocated exclusively to the aeronautical mobile (R) service, the tolerance on the carrier (reference) frequency is:

a) for all aeronautical stations, 10 Hz;

b) for all aircraft stations operating on international services, 20 Hz;

c) for aircraft stations operating exclusively on national services, 50 Hz*.

11) For ship station single-sideband radiotelephone transmitters the tolerance is:

a) in the band 1 606.5 (1 605 Region 2) - 4 000 kHz:

— 100 Hz for transmitters in use or to be installed before 2 January 1982;

— 50 Hz for transmitters installed after 1 January 1982, but before 1 January 1985;

b) in the band 4 000 - 23 000 kHz:

— 100 Hz for transmitters in use before 2 January 1978;

— 50 Hz for transmitters installed after 1 January 1978.

(See also Appendix 17.)

12) For A1A emissions the tolerance is 50 parts in 10^6.

13) For transmitters used for single-sideband radiotelephony or for frequency shift keying radiotelegraphy the tolerance is 40 Hz.

14) For radiobeacon transmitters in the band 1 606.5 (1 605 Region 2) - 1 800 kHz the tolerance is 50 parts in 10^6.

15) For A3E transmitters with carrier power of 10 kW or less the tolerance is 20 parts in 10^6 and 15 parts in 10^6 in the bands 1 606.5 (1 605 Region 2) - 4 000 kHz and 4 - 29.7 MHz respectively.

16) For A1A emissions the tolerance is 10 parts in 10^6.

17) In the A1A Morse working frequency bands, a frequency tolerance of 200 parts in 10^6 may be applicable to existing transmitters, provided that the emissions are contained within the band in question.

18) In the A1A Morse calling frequency bands frequency tolerances of 40 parts in 10^6 in the bands between 4 MHz and 23 MHz and of 30 parts in 10^6 in the 25 MHz band are recommended as far as possible.

19) For ship station transmitters in the band 26 175 - 27 500 kHz, on board small craft, with a carrier power not exceeding 5 W operating in or near coastal waters and utilizing A3E or F3E and G3E emissions, the frequency tolerance is 40 parts in 10^6.

20) The tolerance is 50 Hz for single-sideband radiotelephone transmitters, except for those transmitters operating in the band 26 175 - 27 500 kHz, and not exceeding a peak envelope power of 15 W, for which the basic tolerance of 40 parts in 10^6 applies.

21) It is suggested that administrations avoid carrier frequency differences of a few hertz, which cause degradations similar to periodic fading. This could be avoided if the frequency tolerance were 0.1 Hz, a tolerance which would also be suitable for single-sideband emissions.

22) For non-vehicular mounted portable equipment with a transmitter mean power not exceeding 5 W, the tolerance is 40 parts in 10^6.

23) For transmitters of a mean power of 50 W or less operating at frequencies below 108 MHz a tolerance of 3 000 Hz applies.

24) In the case of television stations of:

— 50 W (vision peak envelope power) or less in the band 29.7 - 100 MHz;

— 100 W (vision peak envelope power) or less in the band 100 - 960 MHz

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* *Note:* ... order to achieve maximum intelligibility, it is suggested that administrations encourage the reduction of this tolerance to 20 Hz.

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and which receive their input from other television stations or which serve small isolated communities, it may not, for operational reasons, be possible to maintain this tolerance. For such stations, the tolerance is 2 000 Hz.

For stations of 1 W (vision peak envelope power) or less this tolerance may be relaxed further to:

— 5 kHz in the band 100 - 470 MHz;

— 10 kHz in the band 470 - 960 MHz.

25) For transmitters for system M (NTSC) the tolerance is 1 000 Hz. However, for low power transmitters using this system note *24)* applies.

26) For multi-hop radio-relay systems employing direct frequency conversion the tolerance is 30 parts in 10^6.

27) For coast and ship station transmitters in the band 156 - 174 MHz put into service after 1 January 1973 a tolerance of 10 parts in 10^6 shall apply. This tolerance is applicable to all transmitters, including survival craft stations, after 1 January 1983.

28) For a channel spacing of 50 kHz the tolerance is 50 parts in 10^6.

29) These tolerances apply to channel spacings equal to or greater than 20 kHz.

30) This tolerance is not applicable to survival craft stations operating on the frequency 243 MHz.

31) For transmitters used by on-board communication stations a tolerance of 5 parts in 10^6 shall apply.

32) For non-vehicular mounted portable equipment with a transmitter mean power not exceeding 5 W the tolerance is 15 parts in 10^6.

33) Where specific frequencies are not assigned to radar stations, the bandwidth occupied by the emissions of such stations shall be maintained wholly within the band allocated to the service and the indicated tolerance does not apply.

34) For transmitters using time-division multiplex the tolerance of 300 may be increased to 500.

35) This tolerance applies only to such emissions for which the necessary bandwidth does not exceed 3 000 kHz; for larger bandwidth emissions a tolerance of 300 applies.

36) In applying this tolerance administrations should be guided by the latest relevant CCIR Recommendations.

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APPENDIX 8

Table of Maximum Permitted Spurious Emission Power Levels

(See Article 5)

1. The following table indicates the maximum permitted levels of spurious emissions, in terms of the mean power level of any spurious component supplied by a transmitter to the antenna transmission line.

2. Spurious emission from any part of the installation other than the antenna and its transmission line shall not have an effect greater than would occur if this antenna system were supplied with the maximum permitted power at that spurious emission frequency.

3. These levels shall not, however, apply to emergency position-indicating radiobeacon (EPIRB) stations, emergency locator transmitters, ships' emergency transmitters, lifeboat transmitters, survival craft stations or maritime transmitters when used in emergency situations.

4. For technical or operational reasons, specific services may demand more stringent levels than those specified in the table. The levels applied to these services shall be those agreed upon by the appropriate world administrative radio conference. More stringent levels may also be fixed by specific agreement between the administrations concerned.

5. For radiodetermination stations, until acceptable methods of measurement exist, the lowest practicable power of spurious emission should be achieved.

Frequency Band Containing the Assignment (lower limit exclusive, upper limit inclusive)	For any spurious component the attenuation (mean power within the necessary bandwidth relative to the mean power of the spurious component concerned) shall be at least that specified in Columns A and B below and the absolute mean power levels given shall not be exceeded (Note 1)	
	A	B
	Levels applicable until 1 January 1994 to transmitters now in use and to those installed before 2 January 1985	Levels applicable to transmitters installed after 1 January 1985 and to all transmitters after 1 January 1994
9 kHz to 30 MHz	40 decibels 50 milliwatts (Notes 2, 3, 4)	40 decibels 50 milliwatts (Notes 4, 7, 8)
30 MHz to 235 MHz		
— mean power above 25 watts	60 decibels 1 milliwatt (Note 5)	60 decibels 1 milliwatt (Note 9)
— mean power 25 watts or less	40 decibels 25 microwatts (Notes 5, 6)	40 decibels 25 microwatts

(continued)

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(continued)

235 MHz to 960 MHz	No level is specified for transmitters operating on assigned frequencies above 235 MHz. For these transmitters the power of spurious emissions shall be as low as practicable.	
— mean power above 25 watts		60 decibels 20 milliwatts (Notes 10, 11)
— mean power 25 watts or less		40 decibels 25 microwatts (Notes 10, 11)
960 MHz to 17.7 GHz		
— mean power above 10 watts		50 decibels 100 milliwatts (Notes 10, 11, 12, 13)
— mean power 10 watts or less		100 microwatts (Notes 10, 11, 12, 13)
Above 17.7 GHz		Due to the diverse nature of technologies employed by services operating above 17.7 GHz, further study by the CCIR is required prior to the specification of levels. To the extent possible, the values to be observed should be those shown in appropriate CCIR Recommendations. Until suitable Recommendations have been adopted, the lowest possible values achievable shall be employed (see Recommendation 66).

Notes in the Table of Maximum Permitted Spurious Emission Power Levels

1) When checking compliance with the provisions of the table, it shall be verified that the bandwidth of the measuring equipment is sufficiently wide to accept all significant components of the spurious emission concerned.

2) For transmitters of mean power exceeding 50 kilowatts and which operate below 30 MHz over a frequency range approaching an octave or more, a reduction below 50 milliwatts is not mandatory, but a minimum attenuation of 60 decibels shall be provided and every effort should be made to comply with the level of 50 milliwatts.

3) For hand-portable equipment of mean power less than 5 watts which operates below 30 MHz, the attenuation shall be at least 30 decibels, but every effort should be made to attain 40 decibels attenuation.

4) For mobile transmitters which operate below 30 MHz any spurious component shall have an attenuation of at least 40 decibels without exceeding the value of 200 milliwatts, but every effort should be made to comply with the level of 50 milliwatts wherever practicable.

5) For frequency modulated maritime mobile radiotelephone equipment which operates above 30 MHz, the mean power of any spurious emission falling in any other international maritime mobile channel, due to products of modulation, shall not exceed a level of 10 microwatts and the mean power of any other spurious emission on any discrete frequency within the international maritime mobile band shall not exceed a level of 2.5 microwatts. Where, exceptionally, transmitters of mean power above 20 watts are employed, these levels may be increased in proportion to the mean power of the transmitter.

6) For transmitters having a mean power of less than 100 milliwatts, it is not mandatory to comply with an attenuation of 40 decibels provided that the mean power level does not exceed 10 microwatts.

7) For transmitters of a mean power exceeding 50 kilowatts which can operate on two or more frequencies covering a frequency range approaching an octave or more, while a reduction below 50 milliwatts is not mandatory, a minimum attenuation of 60 decibels shall be provided.

8) For hand-portable equipment of mean power less than 5 watts, the attenuation shall be 30 decibels, but every practicable effort should be made to attain 40 decibels attenuation.

9) Administrations may adopt a level of 10 milliwatts provided that harmful interference is not caused.

10) Where several transmitters feed a common antenna or closely spaced antennae on neighbouring frequencies, every practicable effort should be made to comply with the levels specified.

11) Since these levels may not provide adequate protection for receiving stations in the radio astronomy and space services, more stringent levels might be considered in each individual case in the light of the geographical position of the stations concerned.

12) These levels are not applicable to systems using digital modulation techniques, but may be used as a guide. Values for these systems may be provided by the relevant CCIR Recommendations, when available (see Recommendation 66).

13) These levels are not applicable to stations in the space services, but the levels of their spurious emissions should be reduced to the lowest possible values compatible with the technical and economic constraints to which the equipment is subject. Values for these systems may be provided by the relevant CCIR Recommendations, when available (see Recommendation 66).

REC5-1

RECOMMENDATION No. 5

Relating to the Means of Reducing the Congestion in Band 7 (3 - 30 MHz) [1]

The World Administrative Radio Conference, Geneva, 1979,

recognizing

a) that there is an urgent need to reduce the pressure on Band 7 of the radio frequency spectrum;

b) that the utilization of modern developments in telecommunication techniques, particularly those involving the use of Band 8 and higher bands, coaxial cables, etc., can contribute to this reduction;

c) that the utilization of these improved and alternative techniques would entail considerable expenditure whereas the continued use of Band 7 techniques would be less expensive and therefore some administrations would find it more difficult to introduce these new techniques than other administrations more favourably placed;

recommends

1. that all administrations take the necessary steps to reduce the pressure on Band 7 by adopting the new techniques to the maximum extent possible;

2. that the international organizations giving aid be requested to give special consideration to the supply of equipment to administrations which are not in a position to procure it themselves due to economic difficulties, for the purpose of enabling these administrations to change over to the alternative means of telecommunication, thus contributing towards greater economy in the use of Band 7.

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[1] Replaces Recommendation No. 10 of the Administrative Radio Conference, Geneva, 1959.

REC69-1

RECOMMENDATION No. 69

Relating to the Frequency Tolerances of Transmitters [1]

The World Administrative Radio Conference, Geneva, 1979,

considering

a) that Appendix 7 to the Radio Regulations specifies the frequency tolerances for transmitters;

b) that the principal objective of Appendix 7 has been the reduction of frequency space required per channel by means of the tightening of frequency tolerances, and that in many cases considerable improvement in spectrum utilization can continue to be obtained by further tightening of frequency tolerances;

c) that for some services an improvement in frequency tolerance to the most stringent value possible in keeping with the state of the technique would be useful in order to increase the signal-to-noise ratio, improve intelligibility and reduce errors;

d) that in certain cases a more stringent frequency tolerance would not in practice increase the number of available channels;

e) that in particular frequency bands the frequency tolerances specified in Appendix 7 may already approach the minimum useful value for certain categories of station when using existing techniques and methods of operation;

f) that it will be of considerable assistance to administrations, in the future planning of services and provision of equipment, to know those frequency tolerances which can be considered to be the ultimate useful minimum value for stations when using existing techniques and methods of operation;

g) that in certain cases the achievement of more stringent frequency tolerances is subject to economic limitations, which should be known and taken into account;

invites the CCIR

1. to continue its study of frequency tolerances with a view to the reduction of the frequency space required for a given channel;

2. to consider whether or not in certain cases it is possible to predict ultimate values of tolerances, which it would not be necessary to make more stringent under currently known conditions of operation, and to state what these tolerance values might be;

3. to report upon the possibility of achieving such ultimate values of tolerances consistent with economic and design requirements and other practical considerations;

4. to indicate which, if any, of the tolerances specified in Appendix 7 have already attained these ultimate values.

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[1] Replaces Recommendation No. 1 of the Administrative Radio Conference, Geneva, 1959.

REC70-1

RECOMMENDATION No. 70

Relating to Studies of the Technical Characteristics of Equipment [1]

The World Administrative Radio Conference, Geneva, 1979,

recognizing

that the available technical information concerning the various types of apparatus used for the reception of the different classes of emission in the several services needs to be more complete and more precise in order to permit the most efficient planning of the use of the radio frequency spectrum;

invites the CCIR

1. to continue to study, and to make Recommendations for the bandwidth, selectivity, sensitivity and stability characteristics of various types of apparatus used for the reception of the different classes of emission in the several services;

2. to continue to study practical methods of achieving the recommended characteristics;

3. to study the minimum practicable spacing between adjacent channels for the different classes of emission for the several services in the various bands;

4. to study other desirable conditions to be fulfilled by the complete systems employed by the different services in order to determine the required technical performance of the equipment, including the station terminal apparatus and the antennae;

5. to study methods for determining whether the equipment satisfies the recommended requirements;

6. to give particular attention to those studies which will assist in the further refinement of the Technical Standards used by the IFRB.

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[1] Replaces Recommendation No. 6 of the Administrative Radio Conference, Geneva, 1959.

REC71-1

RECOMMENDATION No. 71

Relating to the Standardization of the Technical and Operational Characteristics of Radio Equipment

The World Administrative Radio Conference, Geneva, 1979,

considering

a) that administrations are confronted with the necessity of allocating increasing resources to the regulation of radio equipment performance;

b) that administrations, and in particular those in developing countries, often have difficulty in providing such resources;

c) that it would be of advantage to apply, as far as practicable, any mutually agreed standards and associated type approvals;

d) that a number of international bodies including the CCIR, ICAO, IMCO, CISPR and the IEC already provide recommendations and standards for technical and operating characteristics applicable to equipment performance and its measurement;

e) that in this context the specific requirements of developing countries have not always been taken fully into account;

recommends

1. that administrations endeavour to cooperate with a view to establishing international performance specifications and associated measuring methods that could be used as models for domestic standards for radio equipment;

2. that such international performance specifications and associated measuring methods respond to widely representative conditions including specific requirements of developing countries;

3. that, when such international performance specifications for radio equipment exist, administrations, as far as practicable, adopt these specifications as a basis for their national standards;

4. that administrations consider as far as practicable mutual acceptance for the type approval of equipment which conforms to such performance specifications.

REC500-1

RECOMMENDATION No. 500

Relating to the Preparation of the Technical Information Necessary for the World Administrative Radio Conference for HF Broadcasting

The World Administrative Radio Conference, Geneva, 1979,

considering

that a considerable amount of technical information relating to HF broadcasting is already available in CCIR texts; nevertheless there are some subjects needing further studies and, in some cases, the available information requires adaptation to make it suitable for use in planning;

noting in particular

a) that the CCIR has recommended a method of estimating field strength and transmission loss in Band 7 (HF) based on the best information available, and is developing a new computerized method which incorporates the special elements considered necessary for improving the accuracy of these estimations at medium and long distances and in equatorial and high latitude regions;

b) that there is insufficient information relating to propagation predictions in many equatorial areas;

c) that the use of directional antennae is essential for efficient use of the spectrum in Band 7 (HF) and that radiation in directions other than the desired direction may cause interference;

requests the CCIR

1. to complete its work in respect of the improved computerized prediction method (Recommendation 533) paying special attention to medium- and long-distance transequatorial paths and to high latitude regions;

2. to adapt the present method of propagation predictions in order to make it more suitable for use in planning broadcasting and to recommend suitable values of solar indices;

3. to make Recommendations where these do not already exist concerning appropriate protection ratios to be adopted, including cases where the unwanted signals are of a different type, and the appropriate values of channel spacing; and the minimum signal-to-noise ratio required for satisfactory reception;

4. to ensure that the CCIR Book "Antenna Diagrams" includes all principal types of antennae in common use;

5. to prepare and present data on the practical performance of directional antennae in a form suitable for planning purposes;

invites administrations

to participate actively in these studies and to provide the CCIR with available data on the questions listed above and especially on field strength observations in Band 7 (HF) for comparison with predicted values.

REC501-1

RECOMMENDATION No. 501

Relating to Studies for the Introduction of Single-Sideband (SSB) Techniques in the HF Bands Allocated to the Broadcasting Service, in Preparation for the World Administrative Radio Conference for HF Broadcasting

The World Administrative Radio Conference, Geneva, 1979,

considering

a) that the use of SSB leads to a more efficient utilization of the spectrum;

b) that the introduction of these techniques for broadcasting in the HF bands creates both technical and economic problems;

requests the CCIR

to accelerate the appropriate studies regarding the introduction of SSB techniques for broadcasting in the HF bands and the specification of a suitable SSB system, paying particular attention to the economic problems associated with transmitters and receivers;

invites administrations

to provide the CCIR with information on this subject.

REC503-1

RECOMMENDATION No. 503

Relating to HF Broadcasting

The World Administrative Radio Conference, Geneva, 1979,

considering

a) the congestion of the HF broadcasting bands;

b) the extent of adjacent channel interference;

noting

the possibility of improving the situation by implementing pertinent CCIR Recommendations;

recommends that administrations

1. pay special attention to the provisions for "out-of-band spectrum" contained in CCIR Recommendation 328-4;

2. encourage, to the maximum extent possible, manufacturers to design and build HF broadcasting receivers that conform to CCIR Recommendation 332-4 concerning the selectivity of receivers;

invites administrations

to take advantage, to the maximum extent practicable, of synchronized frequency transmitter operation, taking into account CCIR Recommendation 205-1;

invites the CCIR

to carry out further studies in relation to the Recommendations mentioned above, taking into account the requirements of HF broadcasting, with a view to updating these three Recommendations whenever necessary.

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS
ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/7-E
4 February 1987
Original: English

COMMITTEE 5

NOTE BY THE CHAIRMAN OF COMMITTEE 5

At the First Meeting of Committee 5 the Board was requested to provide information on the comparison of Article 17 and the HFBC Planning System. The Board has supplied the following information.

The Board has investigated the possibility of assessing the "quality" of the assignments present in the Tentative Schedules developed under Article 17 of the Radio Regulations, from both practical and technical points of view. In carrying out this investigation, the following elements were considered namely:

a) The notice forms communicated to the Board under Article 17 do not provide all the information which was used in the HFBC Planning System.

b) Some of the information contained in the notice forms submitted to the Board under Article 17, is not readily usable in the context of the HFBC Planning System. In particular the antenna information contained in the notice forms does not necessarily correspond to one of the 25 antenna patterns used be the Planning System.

c) The service areas notified under Article 17 are not always easily transferable into CIRAF zones or quadrants i.e. an administration notifies its own territory as the required service area.

d) Within Article 17, administrations notify frequencies rather than requirements, and it is known that in many instances broadcasters use multiple frequencies (eg: more than three) to ensure service over a given area. In the HFBC System administrations submitted requirements which only in exceptional cases were granted two or three frequencies in a given hour and over a given service area.

In view of the above the Board is of the opinion that a realistic assessment of Article 17 assignments cannot be undertaken due to material reasons i.e. the need to analyse, convert and capture the Article 17 information, and to technical reasons i.e. the quality of the method used for the conversion process, and the technical criteria adopted by the First Session of the Conference.

C.T. NDIONGUE
Chairman of Committee 5

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, January-March 1987

Document DT/8-E
5 February 1987
Original: French

WORKING GROUP 5-A

Note by the Chairman of Working Group 5-A

TERMS OF REFERENCE OF WORKING GROUP 5-A

"To consider, without prejudging the bands in which it will be applied, the Planning Method set out in the Report to the Second Session, having regard to the reports of the IFRB and taking into account the proposals made by administrations, with a view to making the necessary improvements and preparing, in the form of guidelines or flow charts, the decisions and procedures to be incorporated in the Radio Regulations."

J.F. ARNAUD
Chairman of Working Group 5-A

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS
ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/9-E
5 February 1987
Original: English

WORKING GROUP 5-A

Note by the Chairman of Working Group 5-A

PLANNING METHOD: EXTRACT FROM THE REPORT TO THE
SECOND SESSION OF THE CONFERENCE
(FIRST SESSION, GENEVA, 1984)
(pages 70 to 78)

4.2 Planning method

4.2.1 Overview of planning method

After considering the various proposals to the Conference, the first session decided to establish the planning method which is described in Figure 4-1. The detailed description of each step of the planning process is contained in section 4.2.3. The procedures associated with this method will be developed at the second session on the basis of proposals submitted by administrations.

4.2.2 Definition of a broadcasting requirement

A requirement indicated by an administration to provide a broadcasting service at specified periods of time to a specified reception area from a particular transmitting station.

4.2.3 Description of the individual steps of the processing system

4.2.3.1 Step 1 - Requirements file

a) The requirements file will be created on the basis of data relating to operational and projected broadcasting requirements and the associated facilities submitted by administrations over a period of three years.[1]

This file will be updated in accordance with the procedures to be developed at the second session (see section 4.1.2.4).

b) This file shall contain :

Basic characteristics

1) name of the transmitting station

2) geographical coordinates of the transmitting station

3) symbol of the country or geographical area in which the transmitting station is located

4) required service area

5) hours of operation (UTC)

6) range of antenna characteristics

7) transmitter power (dBW)

8) class of emission

Optional supplementary characteristics

1) preferred frequency (in kHz)

2) preferred frequency band (in MHz)

3) equipment limitations

4) ranges of power capabilities

5) possible use of synchronized transmitters

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[1] The second session could change this period, if necessary.

4.2.3.2 Step 2 - Broadcast requirements for the season under consideration

The broadcasting requirements to be used for each season shall be those contained in the requirements file which are to become operational during the season under consideration and which are confirmed and, if necessary, modified by the administration, in accordance with the procedure described in paragraph 4.2.3.1.

4.2.3.3 Step 3 - Propagation analysis and selection of the appropriate frequency band

The propagation prediction method described in paragraph 3.2 (page 9) will be used to calculate for each requirement, for the season and for the different times, the optimum frequency band. The appropriate frequency band(s) for each requirement at the different times will be selected on the basis of the results of the above calculations.

However, if an administration has indicated equipment limitations, they are to be taken into account in the selection of the appropriate frequency band.

If, at any time, the required basic broadcast reliability cannot be achieved with a single frequency band, a second frequency band shall be selected as long as the administration has indicated its ability to operate in two frequency bands simultaneously. (See paragraph 3.8.2, page 59).

4.2.3.4 Step 4 - Rules to be applied to broadcasting requirements in a given run

4.2.3.4.1 Optimization

The system must be optimized to ensure the maximum possible utilization of all available channels.

4.2.3.4.2 Preferred frequency

In accordance with the planning principles and without imposing constraints on planning, the following provisions shall be applied in the seasonal plans :

1) administrations may indicate the preferred frequency;

2) during the planning process, attempts shall be made to include the preferred frequency in the plan;

3) if this is impossible, attempts shall be made to select a frequency which is as close as possible to the preferred frequency in the same band.

Otherwise the automated system shall be used to select the appropriate frequencies in such a way as to accommodate the maximum number of requirements, taking into account the constraints imposed by the technical characteristics of the equipment.

4.2.3.4.3 Equipment constraint

The system shall take into account the technical constraints imposed by the equipment, namely :

4.2.3.4.3.1 Frequency

a) When an administration indicates that its facilities can operate only on a limited number of fixed specified frequencies, the process in steps 5, 6 and 7 shall be applied to one of these frequencies; should the final step result in an incompatibility, the adjustment process (step 10) shall try another of these frequencies. The plan shall contain that frequency among this limited number of frequencies which has the least degree of incompatibility.

b) If two such broadcasting requirements indicate the same frequency which, after analysis, results in an incompatibility, the case is referred to the administration(s) concerned.

4.2.3.4.3.2 Frequency band

a) When an administration indicates that its facilities can operate only in a given frequency band, only frequencies from that band shall be included in the plan.

b) When an administration indicates a preferred frequency band, the system shall attempt to select a frequency from this band. If this is impossible, frequencies from the nearest appropriate band shall be tried. Otherwise the system will select frequencies from the appropriate band, taking into account the equipment constraints referred to in paragraph 4.2.3.4.3.1.

4.2.3.4.3.3 Power

a) When an administration indicates only a single power value due to equipment constraints, it shall be used in the planning process.

b) When an administration indicates several possible power values, the appropriate value shall be used to achieve the basic circuit reliability.

4.2.3.4.3.4 Antenna

When an administration indicates that its antenna can operate only in a given frequency band, only frequencies from that band shall be included in the plan.

4.2.3.4.4 Limitation of frequency change

For the time block indicated for each broadcasting requirement, frequency changes should be essentially limited to those due to propagation factors. Frequency changes due to incompatibilities may also be permitted. In these cases, the number of frequency changes during any contiguous periods of operation shall be limited to the minimum necessary.

4.2.3.4.5 Rules for dealing with incompatible requirements

1. If the processing system cannot satisfy all requirements in a certain band, for a certain CIRAF zone or part of a CIRAF zone in a specific period of time, even after all possibilities of adjustments are exhausted, it shall identify administrations whose requirements cannot be completely satisfied with the agreed overall broadcasting reliability adopted by the Conference.

2. The IFRB will suggest changes which will be useful for the administrations concerned and which would reduce congestion (see paragraph 4.1.1).

3. In so doing, it shall take account of the principle expressed in paragraph 4.1.2.2 and in particular of the way in which administrations' requirements for longer transmission periods, mainly for national broadcasting purposes[1], can best be accommodated.

4. Administrations which fail to reply within a period to be determined by the second session or which refuse any modification shall be deemed to accept any reduction in overall broadcasting reliability that may result from the planning process.

5. The system shall satisfy a minimum number $(n)^2$ of broadcasting requirements of each administration with the overall broadcasting reliability adopted by the Conference.

6. The system shall satisfy all remaining requirements by means of the following approach, without adversely affecting the requirements already satisfied.

6.1 As many as possible of the remaining requirements shall be satisfied with the overall broadcasting reliability of X^3 to be determined.

6.2 The system shall then include in the plan any requirement still remaining with a lower overall broadcasting reliability, as close to X as possible, without adversely affecting the requirements already satisfied.

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1 An HF broadcasting use is considered as being for purposes of national coverage when the transmitting station and its associated required service area are both located within the territory of the same country. (There is a need for this note to appear in the Final Acts of the Conference.)

2 Expressed in terms of number of transmissions in the congested hour. If this fails to accommodate at least one requirement of each concerned administration, n may be expressed in number of frequency hours within a block of three hours centred on the congested hour. The tests shall include a range of values of n to enable a decision on this matter to be taken at the second session.

3 Various values of X are to be tested during the intersessional period and reported to the second session.

7. Administrations unable to agree to the reduced quality of broadcasting may propose improvements or request alternative frequencies in another band or in another time block; their requests must, where possible, be satisfied without adversely affecting the requirements already satisfied in the plan.

8. The system shall take into account the interaction between broadcasting requirements using the same frequency band in different zones.

9. The IFRB will test the above rules and report the results to administrations, for consideration and adoption of the rules at the second session subject to such modifications as may be necessary.

4.2.3.5 Step 5 - Selection of technical characteristics

The system shall be designed in such a way that, in cases where administrations communicate the power and characteristics which may vary in given ranges, the values to be used for these characteristics may be selected within the indicated ranges.

4.2.3.6 Step 6 - Compatibility analysis and frequency selection

The system shall be designed to apply the principles and rules contained in this report, including the technical criteria developed by the Conference.

4.2.3.7 Step 7 - Reliability analysis

The method described in section 3.2.4 shall be used to calculate the overall broadcast reliability.

4.2.3.8 Step 8 - Criteria and requirements met

The broadcasting requirements for the season under consideration will be analyzed to ascertain whether they have been met in conformity with the agreed criteria.

4.2.3.9 Step 9 - Seasonal plan

The timing of publication and the means of securing administrations' comments on seasonal plans will be considered by the second session of the Conference.

4.2.3.10 Step 10 - Adjustment process

The application of steps 3 to 8 indicates adjustments to be applied. These adjustments will be implemented in several loops which will be derived within the software process.

4.2.3.11 Step 11 - Additional procedures

In considering the planning method, the first session concluded that there may be a need for additional procedures to deal with :

a) modifications to the seasonal plan after it has been published;

b) the inclusion of additional requirements in the seasonal plan after it has been published;

c) the situation where, for some reason, certain administrations may be unable to accept the frequency assignments included in the seasonal plan.

The first session is of the view that this is a matter for consideration by the second session.

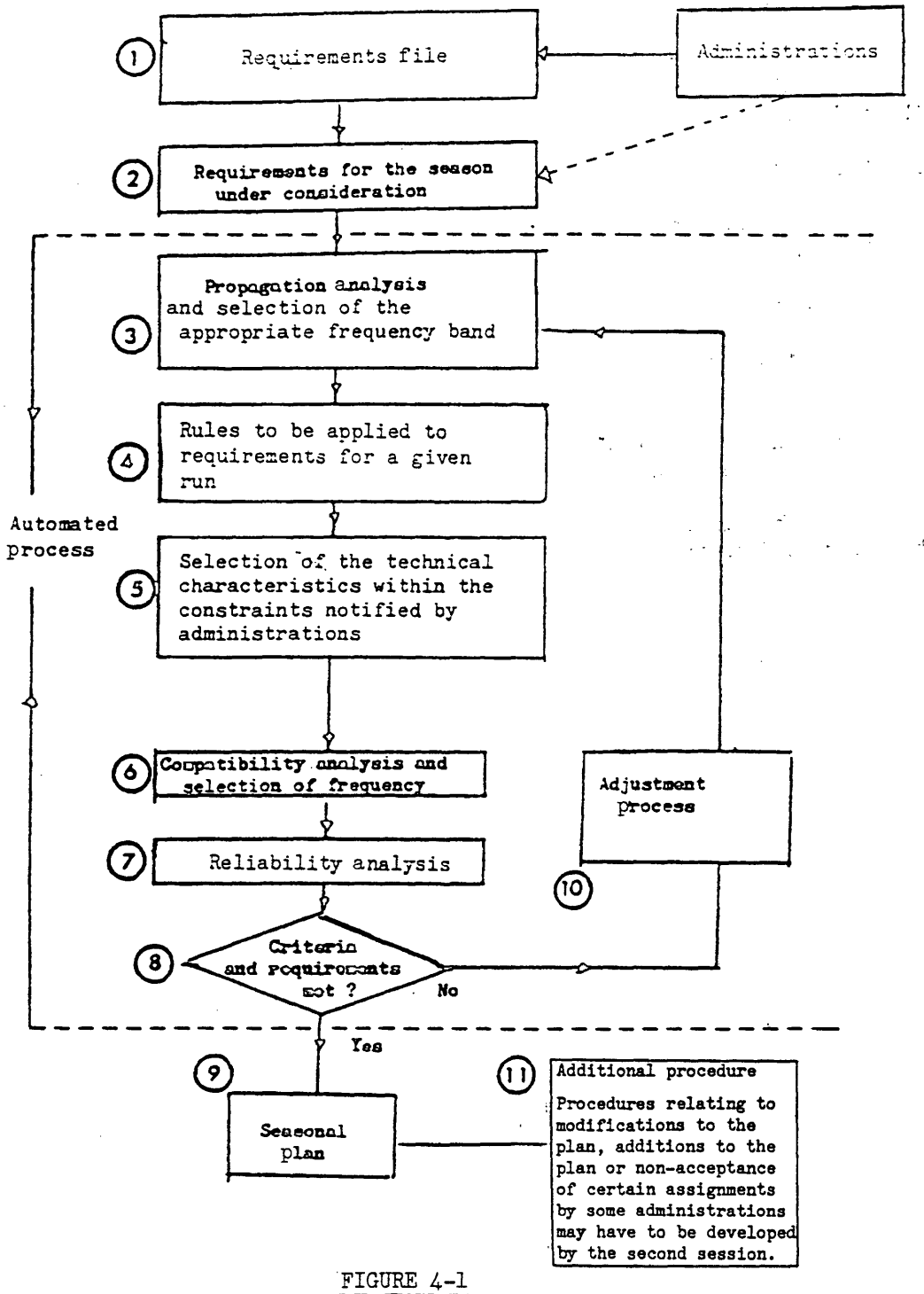

FIGURE 4-1

Flowchart of the automated process

4.2.4 Broadcast reliability for planning purposes

For the purposes of intersessional work, the IFRB will use two reference values for the overall broadcast reliability, namely 80% and 90%[1]. Lower values may be used if appropriate.

For the purposes of intersessional work, the IFRB will use two values of percentile of test points within the required service area when considering broadcast reliabilities (both basic and overall). These values shall be 80% and 90%[1].

4.2.5 Actions relating to harmful interference

In the event of harmful interference to an HF broadcasting service which is using an assignment in accordance with a current seasonal plan, the administration concerned shall have the right to request the prompt assistance of the IFRB in finding another frequency to help restore that service to the level of reliability achieved in the plan. Any new frequency proposed by the IFRB shall not adversely affect the seasonal plan in operation. The central automated system must be able to respond, as far as possible, to such requests from administrations. The cause of a situation of harmful interference shall find its definitive solution in accordance with Article 22 of the Radio Regulations. The original frequency shall be made available for future use once this problem has been solved.

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[1] These values may be reviewed and modified, if necessary, by the second session of the Conference, on the basis of the results obtained by the IFRB during the intersessional period.

J.F. ARNAUD
Chairman of Working Group 5-A

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, **February-March 1987**

Document DT/10-E
5 February 1987
Original: French

WORKING GROUP 5-A

Note by the Chairman of Working Group 5-A

TABLE OF CORRESPONDENCE

Report to the Second Session	Document 8	Proposals
4.2.1		ALG/10/1
4.2.2	Chapter 2, section 3, paragraph 2	
4.2.3.1	Chapter 3, section 2, page 24	F/6/1-6 ALG/10/5 AUT/15/4-13 AUS/16/10 AUS/16/11 B/24/5 ISR/25/1 E/27/2-7 E/27/18 D/30/3 CLM/34/3 (Corr.1) TUN/35/3 MLI/47/2 IND/51/6 IND/51/10 CHN/54/1
4.2.3.4.2	Chapter 5, section 7, page 142	IND/51/12
4.2.3.4.3.1	Chapter 5, section 5, page 137	E/27/16-17
	Chapter 5, section 7, page 141	SEN/12/1 AUS/16/4 AUS/16/5 E/27/15 IND/51/13

Report to the Second Session	Document 8	Proposals
4.2.3.4.3.2	Chapter 4, section 4, page 83	E/27/7 IND/51/11
4.2.3.4.3.3		ISR/37/4/A
4.2.3.4.3.4		ISR/37/4/B
4.2.3.4.4	Chapter 5, section 7, page 143	SEN/12/4 SEN/12/3 AUT/14/2 b) F/29/3 D/30/1-2 TUN/35/1 PRG/41/1 MLI/47/1 IND/51/15/i-ii CHN/54/2
4.2.3.4.5	Chapter 5, section 4, page 130	ALG/10/3-4 AUT/14/2 a) BGD/23/1 F/29/2 TUN/35/2 IND/51/14 IND/51/15/iii-iv IND/51/16
	Chapter 2, section 3, page 15	AUS/16/8
4.2.3.4.5.6	Chapter 5, section 9, page 161	IND/51/16
4.2.4	Chapter 4, section 3, page 70	E/27/11-14 IND/51/17

J.F. ARNAUD
Chairman of Working Group 5-A

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS
ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, January-March 1987

Document DT/11-E
6 February 1987
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COMMITTEE 5

Note by the Chairman of Committee 5

At the Second Meeting of Committee 5 the Board was requested to provide a comparison between the number of frequency hours by frequency band under the Article 17 procedure, and the frequency hours included in the D-85 planning exercises.

The information provided by the IFRB is presented below for three planning exercises corresponding to the D-85 season namely Plan 10 (SSN = 5, preset frequencies included), Plan 11 (SSN = 5, preset frequencies excluded), Plan 50 (SSN = 120, preset frequencies included).

	D-85 SEASON			
BAND (MHz)	ARTICLE 17	PLANNING SYSTEM		
		PLAN 10	PLAN 11	PLAN 50
6	6 943.45	4 419.45	5 027.45	4 104.00
7	3 654.15	2 570.15	2 619.45	2 221.15
9	5 587.15	4 237.00	4 554.45	4 359.00
11	4 316.15	3 388.45	3 468.45	3 515.00
13	---	909.30	875.30	879.45
15	3 313.00	2 613.45	2 677.00	2 762.45
17	1 393.15	1 539.00	1 572.30	1 751.45
21	697.45	761.00	779.45	1 223.15
26	26.00	116.00	115.00	291.15
Total	25 931.30	20 555.00	21 690.45	21 068.00

FREQUENCY HOURS BY BAND FOR ASSIGNMENTS
MADE UNDER ARTICLE 17 OR THE PLANNING EXERCISES

C.T. NDIONGUE
Chairman of Committee 5

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS
ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Addendum 1 to
Document DT/12-E
10 February 1987
Original: English

COMMITTEE 6

Note from the Chairman

Following discussion in Committee 6 and the suggestions made by the delegates, the following texts are added to Document DT/12:

RR 1001, 1001.1 and 1454;

WARC-79 Resolutions Nos. 35 and 641.

These texts are attached herewith.

R. BLOIS
Chairman of Committee 6

1001 *j)* the development of Technical Standards[1] in accordance with Nos. **1454** and **1582** and of Rules of Procedure[1] for internal use by the Board in the exercise of its functions;

1001.1 [1] The Technical Standards and the Rules of Procedure of the IFRB shall be distributed to all Members of the Union and shall be open to comment from any administration. In the event of there being a disagreement which remains unresolved, the procedure to be followed is given in Resolution 35.

1454 § 63. The Technical Standards of the Board shall be based on the relevant provisions of these Regulations and the Appendices thereto, the decisions of administrative conferences of the Union, as appropriate, the Recommendations of the CCIR, the state of the radio art and the development of new transmission techniques, account being taken of exceptional propagation conditions which may prevail in certain regions (for example, particularly pronounced ducting).

RESOLUTION No. 35

Relating to a Procedure for Resolving a Disagreement over the Technical Standards or Rules of Procedure of the International Frequency Registration Board

The World Administrative Radio Conference, Geneva, 1979,

considering

a) that, in accordance with No. **1001.1**, the Technical Standards and Rules of Procedure of the IFRB shall be distributed to all Members of the Union and shall be open to comment from administrations;

b) that an administration may disagree with the substantive contents of these documents;

c) that, in the event of such a disagreement remaining unresolved, there should be a procedure for the resolution of that disagreement;

recognizing

a) that, with respect to the Technical Standards, the CCIR could provide the best source of professional advice;

b) that, with respect to the Rules of Procedure, a world administrative radio conference could provide the best source of interpretation of the Radio Regulations;

resolves

1. that, in the event of an unresolved disagreement over the substantive contents of the Technical Standards of the IFRB, the Board, in agreement with the administration concerned, shall refer the question to the CCIR for international study and the development of a Recommendation thereon by the next Plenary Assembly of the CCIR;

2. that, in the event of the CCIR not having formulated a Recommendation thereon, or in the event of an unresolved disagreement over the substantive contents of the Rules of Procedure of the IFRB, in either case the matter may be referred to the Administrative Council for inclusion in the agenda of the next world administrative radio conference;

3. that, pending resolution of the matter, the Board shall continue to use the particular Technical Standard or Rule of Procedure in dispute but that, following resolution of the matter by a CCIR Recommendation or by a decision of a world administrative radio conference, the Board shall promptly take the consequential action including a review of all relevant findings.

RESOLUTION No. 641

Relating to the Use of the Frequency Band 7 000 - 7 100 kHz [1]

The World Administrative Radio Conference, Geneva, 1979,

considering

a) that the sharing of frequency bands by amateur and broadcasting services is undesirable and should be avoided;

b) that it is desirable to have worldwide exclusive allocations for these services in Band 7;

c) that the band 7 000 - 7 100 kHz is allocated on a worldwide basis exclusively to the amateur service;

resolves

that the broadcasting service shall be prohibited from the band 7 000 - 7 100 kHz and that the broadcasting stations operating on frequencies in this band shall cease such operation.

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, **February-March 1987**

Document DT/12-E
6 February 1987
Original: English

COMMITTEE 6

Note from the Chairman

Under its agenda items 2.1.5 and 2.1.6, the present session of the Conference shall review and, where necessary revise, the relevant provisions of the Radio Regulations and the relevant Resolutions and Recommendations of the WARC-79.

In this respect, the texts of the following provisions of the Radio Regulations and Resolutions/Recommendations

- RR 530, 531, 545, 994, 1214.2, 1350, 1748-1772, 2665, 3603 and 4103
- Annex to Appendix 1 to the Radio Regulations
- Appendix 2 to the Radio Regulations
- WARC-79 Resolution No. 508
- WARC-79 Recommendations Nos. 5, 9, 12 and 30.

are attached.

R. BLOIS
Chairman of Committee 6

1

530 On condition that harmful interference is not caused to the broadcasting service, frequencies in the bands 9 775 – 9 900 kHz, 11 650 – 11 700 kHz and 11 975 – 12 050 kHz may be used by stations in the fixed service communicating only within the boundary of the country in which they are located, each station using a total radiated power not exceeding 24 dBW.

2

531 The bands 9 775 – 9 900 kHz, 11 650 – 11 700 kHz, 11 975 – 12 050 kHz, 13 600 – 13 800 kHz, 15 450 – 15 600 kHz, 17 550 – 17 700 kHz and 21 750 – 21 850 kHz are allocated to the fixed service on a primary basis subject to the procedure described in Resolution 8. The use of these bands by the broadcasting service shall be subject to provisions to be established by the world administrative radio conference for the planning of HF bands allocated to the broadcasting service (see Resolution 508). Within these bands, the date of commencement of operations in the broadcasting service on a planned channel shall not be earlier than the date of completion of satisfactory transfer, according to the procedures described in Resolution 8, of all assignments to stations in the fixed service operating in accordance with the Table and other provisions of the Radio Regulations, which are recorded in the Master Register and which may be affected by broadcasting operations on that channel.

3

545 The band 25 550 — 25 600 kHz is allocated to the fixed and mobile, except aeronautical mobile, service on a primary basis subject to the procedure described in Resolution 8. The use of this band by the radio astronomy service shall be subject to the completion of the satisfactory transfer of all assignments to stations in the fixed and mobile, except aeronautical mobile, services operating in this band and recorded in the Master Register, in accordance with the procedure described in Resolution 8. The band 25 600 — 25 670 kHz is allocated to the broadcasting service on a primary basis, subject to provisions to be established by the world administrative radio conference for the planning of HF bands allocated to the broadcasting service (see Resolution 508). After completion of all the above-mentioned provisions, all emissions capable of causing harmful interference to the radio astronomy service in the band 25 550 — 25 670 kHz shall be avoided. The use of passive sensors by other services will also be authorized.

991 § 2. The functions of the Board shall include:

992 *a)* the processing of frequency assignment notices, including information about any associated orbital locations of geostationary satellites, received from administrations for recording in the Master International Frequency Register;

993 *b)* the processing of information received from administrations in application of the advance publication, coordination and other procedures of the Radio Regulations and the Final Acts of administrative radio conferences; and the provision of assistance to administrations in these matters, at their request;

4

994 *c)* the processing and coordination of seasonal schedules of high frequency broadcasting with a view to accommodating requirements of all administrations for that service;

1214 § 1. (1) Any frequency assignment[4] to a fixed, land, broadcasting[5], radionavigation land, radiolocation land or a standard frequency and time signal station, or to a ground-based station in the meteorological aids service, shall be notified to the International Frequency Registration Board:

1215 *a)* if the use of the frequency concerned is capable of causing harmful interference to any service of another administration[6]; *or*

5

1214.2 [5] With respect to assignments to broadcasting stations in the bands allocated exclusively to the broadcasting service between 5 950 kHz and 26 100 kHz, see Article 17.

Sub-Section IID. Procedure to Be Followed for Broadcasting Stations Operating in the Bands Allocated Exclusively to the Broadcasting Service Between 5 950 kHz and 26 100 kHz

1350 § 28. Frequency assignments to broadcasting stations in the bands allocated exclusively to the broadcasting service between 5 950 kHz and 26 100 kHz shall be dealt with in accordance with the provisions of Article 17 and shall be included only in the annual list referred to in No. 1769, which shall be considered as a supplement to the International Frequency List.

ARTICLE 17

6

Procedure for the Bands Allocated Exclusively to the Broadcasting Service Between 5 950 kHz and 26 100 kHz

Section I. Submission of Seasonal High Frequency Broadcasting Schedules

1748 § 1. Periodically, administrations shall submit to the International Frequency Registration Board the projected seasonal schedules of their broadcasting stations in the bands allocated exclusively to the broadcasting service between 5 950 kHz and 26 100 kHz. These schedules shall cover each of the following seasonal propagation periods and shall be implemented at 0100 UTC on the first Sunday of the period concerned:

March Schedule	– March and April
May Schedule	– May, June, July and August
September Schedule	– September and October
November Schedule	– November, December, January and February.

1749 § 2. The first schedules became effective on 4 September 1960 for the September-October period 1960. The closure dates for the receipt of schedules are set by the Board in order to permit the advance period to be reduced gradually to the minimum found practicable by the Board. Those assignments in a schedule the characteristics of which are not expected to change may be submitted up to a limit of one year in advance. Each such assignment shall be confirmed by the closing date for the submission of the schedules for the respective seasonal periods. The Board shall take appropriate steps to send reminders to administrations in carrying out this procedure.

1750 § 3. Two or more administrations may submit coordinated schedules containing their agreed projected frequency usage.

1751 § 4. The frequencies shown in the schedules shall be frequencies that actually will be used for that particular seasonal period and their

number should be the minimum necessary to provide satisfactory reception of the particular programme in each of the areas for which it is intended. Each administration should prepare its schedule from season to season by using to the maximum extent practicable the same frequencies in each band as were used in previous schedules.

1752 § 5. The schedules shall be submitted in the form prescribed in Appendix 2, which specifies the data to be furnished for each assignment.

1753 § 6. The frequencies included in the schedules shall be in conformity with No. 1240 of these Regulations. To the extent practicable, the frequencies selected should correspond to listings in the Master International Frequency Register. Those administrations not having suitable listings in the Master Register may suggest any frequency considered appropriate, or may, if they so desire, indicate only the frequency band.

Section II. Preliminary Examination and Preparation of the Tentative High Frequency Broadcasting Schedule

1754 § 7. (1) On receipt of the seasonal schedules, including confirmation in appropriate cases of the continuing validity of assignments included in preceding schedules, the Board shall incorporate the proposed frequency usage of all administrations into a combined schedule and make the appropriate preliminary examination required to prepare the "Tentative High Frequency Broadcasting Schedule" (hereafter called the *Tentative Schedule*) for the particular seasonal period. This Tentative Schedule shall include:

1755 *a)* all specific frequency assignments in cases where no alternatives were given by the administration concerned;

1756 *b)* the selections made by the Board in cases where alternatives were given by the administration concerned;

1757 *c)* frequencies suggested by the Board in respect of all services for which no specific frequency was included in the submitted schedule, such suggestions to be made with due overall consideration for No. 1759, for compatibility within the Tentative Schedule, and for possible changes to the projected frequency usage which might be desirable to achieve more equitable satisfaction of administrations' requirements;

1758 *d)* such apparent incompatibilities between frequency assignments which the Board can indicate within the time available.

1759 (2) At the request of administrations, particularly those of countries in need of special assistance and which have no suitable listings in the Master Register, the Board shall give special consideration to the requirements of those administrations in preparing the Tentative Schedule.

1760 (3) The Board shall begin the work outlined in Nos. 1754 to 1758 early enough for the Tentative Schedule to be issued to administrations not later than two months before the date when the particular seasonal period begins.

Section III. Technical Examination and Revision of the Tentative Schedule

1761 § 8. (1) The Board shall continue its technical examination of the Tentative Schedule with a view not only to identifying further incompatibilities between frequency assignments which become apparent in the technical examination and correcting them where possible, but also to improving the technical aspects of the Tentative Schedule by amendments to be agreed upon in consultation with the administrations concerned.

1762 (2) In preparing its recommendations to administrations, the Board shall take into account monitoring observations and all other available data. However, when actual frequency usage is apparently not in conformity with the assignments in a submitted schedule, the Board shall seek from the administration concerned confirmation of this information.

1763 (3) Administrations, having considered the Tentative Schedule together with such recommendations as may have been furnished by the Board, should notify, as soon as possible, preferably before the date of commencement of the seasonal period concerned, any amendments to the Tentative Schedule which are intended for implementation.

1764 (4) Changes in the assignments of broadcasting stations which are implemented after the date on which the seasonal period begins shall be notified to the Board as soon as they can be forecast.

1765 (5) For changes notified in accordance with Nos. **1763** and **1764**, the Board shall apply the same procedure as that specified in Nos. **1759**, **1761** and **1762**. Such revisions to the Tentative Schedule as result from the application of the procedure in this Section shall be published in the IFRB weekly circulars in order that administrations can keep up to date their copies of the Tentative Schedule.

Section IV. Publication of the High Frequency Broadcasting Schedule

1766 § 9. After the end of each seasonal period, the Board shall publish the High Frequency Broadcasting Schedule, which shall reflect the Tentative Schedule as amended by all the changes notified to the Board since the publication of the Tentative Schedule. This High Frequency Broadcasting Schedule shall indicate by appropriate symbols:

1767 *a)* those assignments which administrations found in practice to be unsatisfactory and so notified to the Board;

1768 *b)* those assignments not included in the Tentative Schedule which were taken into account by the Board in the examination under Section III of this Article.

Section V. Annual High Frequency Broadcasting Frequency List

1769 § 10. A High Frequency Broadcasting Frequency List shall be published at the end of the first year of implementation of the procedure prescribed in this Article, including all frequency assignments which appear in the High Frequency Broadcasting Schedules for the year concerned. This list shall be issued as a supplement to the International Frequency List, and in the same general format. It shall also include symbols to indicate those assignments which were notified to the Board as being unsatisfactory in practice, as well as symbols to indicate the seasonal periods during which each assignment was used. A recapitulative list shall be issued annually thereafter.

Section VI. Miscellaneous Provisions

1770 § 11. The technical standards used by the Board when applying the provisions of this Article should be based not only on the factors listed in No. **1454** but also on past experience in broadcasting planning and on the experience gained by the Board in the application of the provision of this Article.

1771 § 12. With a view to the ultimate evolution of compatible technical plans for the frequency bands concerned, the Board shall take all necessary steps to carry out engineering studies on a long-term basis. For this purpose, the Board shall use all information made available to it on frequency usage in the application of the procedure prescribed in this Article. The Board shall also keep administrations informed of the progress and results of such studies at regular intervals.

1772 § 13. In applying the provisions of Article **22** of these Regulations, problems of harmful interference which may arise in frequency usage in the bands concerned shall be resolved by administrations by exercising the utmost goodwill and mutual cooperation and by giving due consideration to all the relevant technical and operational factors involved.

7

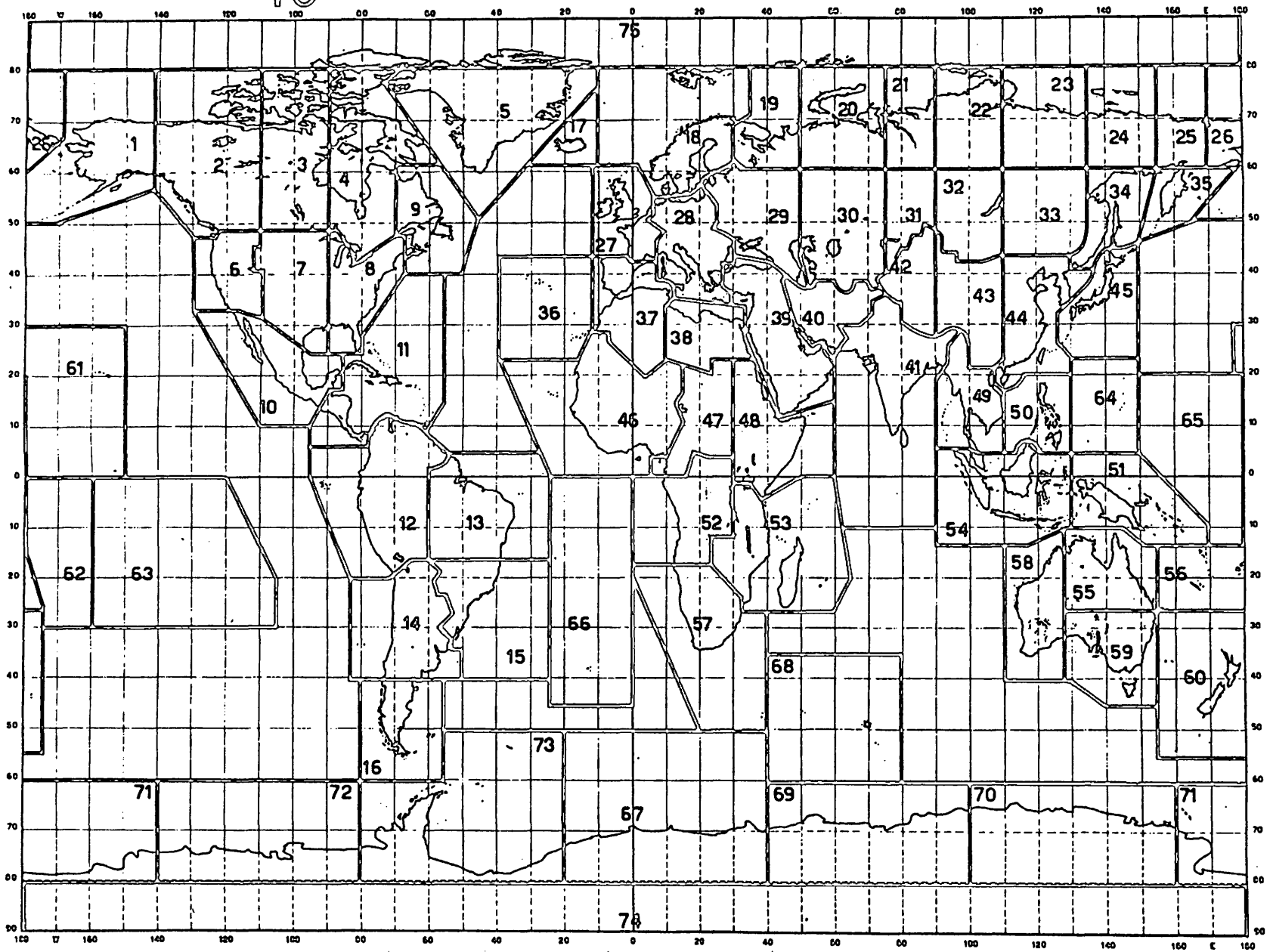
2665 § 1. (1) The establishment and use of broadcasting stations (sound broadcasting and television broadcasting stations) on board ships, aircraft or any other floating or airborne objects outside national territories is prohibited.

8

3603 § 6. The operation of a broadcasting service (see No. **36**) by an aircraft station at sea and over the sea is prohibited (see also No. **2665**).

9

4103 § 6. The operation of a broadcasting service (see No. **36**) by a ship station at sea is prohibited. (See also No. **2665**.)



GEOGRAPHICAL ZONES FOR BROADCASTING

APPENDIX 2
(See Article 17)

Section A. Form of Notice

Form of Notice*
For Use when Submitting to the International Frequency Registration Board a Seasonal High Frequency Broadcasting Schedule or a Change Thereto (see Article 17)

(a) Notifying frequency

BC
6 Class of station

(b) Assignment for the particular season ☐ (c) Change of characteristics of an assignment for the season ☐ (d) Deletion of an assignment for the season ☐ (e) Notice No.: _____ Date: _____

11

1a Assigned frequency kHz | 1b Alternative frequency kHz | 1c Frequency band MHz

2c Date of putting into use in the particular season — Season: MARCH ☐ MAY ☐ SEPT. ☐ NOV. ☐ Year: Other date:

3 Call sign (Identification)

4a Name of transmitting station | 4b Country | 4c Longitude and latitude of the transmitter site

Zone(s) or area(s) of reception 5a	Class of emission and necessary bandwidth 7	Power (kW) 8	Transmitting antenna characteristics: Azimuth of max. radiation 9a	Angular width of radiation main lobe 9b	Antenna gain in dB 9c	Angle of elevation 9d	Type of antenna 9e	Hours of operation (UTC) 10	Other frequencies simultaneously utilized for same programme to the same area(s) 11	Supplementary information

12b _____ Name of postal address
_____ Telegraphic address
} of administration (Article 22)

COORD/ _____
Other information:

* The actual size of the notice is a matter for individual administrations.

Section B. General Instructions

1. A separate notice shall be sent to the IFRB for notifying:

   - each frequency assignment to be put into use for a particular season;
   - any change in the characteristics of a frequency assignment in the High Frequency Broadcasting Schedule, for the season;
   - any deletion of a frequency assignment in the High Frequency Broadcasting Schedule, for the season.

2. Separate entries, in Columns 5a and 8 to 11, should be made for the various characteristics when they do not apply to the assignment as a whole, for instance when the power, antenna characteristics or hours of operation differ according to the zones or areas of reception.

I. General Notes.

II. Notes Concerning Information to Be Entered in the Specific Columns of the Notice

III. Symbols for Type of Antenna

12

RESOLUTION No. 508

Relating to the Convening of a World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service

The World Administrative Radio Conference, Geneva, 1979,

considering

a) that the existing situation in the HF bands allocated exclusively to the broadcasting service is not satisfactory;

b) that it is important to ensure that all countries are guaranteed free and equal rights to the use of these bands;

resolves

1. that the use of the exclusive and shared HF bands allocated to the broadcasting service (excluding those bands reserved for broadcasting in the Tropical Zone) should be the subject of planning by a world administrative radio conference;

2. that the planning be based on DSB (double-sideband) emissions. Consideration should also be given to the manner in which an SSB (single-sideband) system could be introduced progressively without impairing the DSB emissions;

3. that the conference referred to in paragraph 1 should be held in two sessions;

4. that the first session:

4.1 is to establish the technical parameters to be used for planning and the principles governing the use of the HF bands allocated to the broadcasting service and in particular:

4.1.1 the power appropriate to HF broadcasting in conjunction with the other relevant technical factors;

4.1.2 the needs of each country for national and international broadcasting;

4.1.3 the maximum number of frequencies to be used for the broadcasting of the same programme to the same zone;

4.1.4 a specification of an SSB system suitable for future use for HF broadcasting;

4.2 should also decide the planning principles to be used and the method of planning to be adopted by the second session;

5. that, at its second session, to be held not sooner than twelve months nor later than eighteen months after the first session, the conference:

5.1 should carry out the planning according to the principles and the method established at the first session;

5.2 should review and, where necessary, revise the relevant provisions of the Radio Regulations relating to broadcasting in the HF bands;

urges administrations,

until the conference is held, to use no greater transmitter power than that required for satisfactory reception and to ensure that the number of frequencies used is the minimum necessary;

draws the attention of the Administrative Council

to the urgency of this conference;

and invites the Administrative Council

to take all necessary steps for the convening of the conference, the first session of which shall be held as soon as possible after the next CCIR Plenary Assembly and with the least possible delay as defined in Article 58 (No. 303) of the Convention;

requests the IFRB

to carry out the necessary engineering studies and preparations, including those envisaged in No. 1771 of the Radio Regulations;

requests the CCIR

to accelerate the studies described in Recommendations 500 and 501.

13

RECOMMENDATION No. 5

Relating to the Means of Reducing the Congestion in Band 7 (3 - 30 MHz) [1]

The World Administrative Radio Conference, Geneva, 1979,

recognizing

a) that there is an urgent need to reduce the pressure on Band 7 of the radio frequency spectrum;

b) that the utilization of modern developments in telecommunication techniques, particularly those involving the use of Band 8 and higher bands, coaxial cables, etc., can contribute to this reduction;

c) that the utilization of these improved and alternative techniques would entail considerable expenditure whereas the continued use of Band 7 techniques would be less expensive and therefore some administrations would find it more difficult to introduce these new techniques than other administrations more favourably placed;

recommends

1. that all administrations take the necessary steps to reduce the pressure on Band 7 by adopting the new techniques to the maximum extent possible;

2. that the international organizations giving aid be requested to give special consideration to the supply of equipment to administrations which are not in a position to procure it themselves due to economic difficulties, for the purpose of enabling these administrations to change over to the alternative means of telecommunication, thus contributing towards greater economy in the use of Band 7.

---

[1] Replaces Recommendation No. 10 of the Administrative Radio Conference, Geneva, 1959.

14

RECOMMENDATION No. 9

Relating to the Measures to Be Taken to Prevent the Operation of Broadcasting Stations on Board Ships or Aircraft Outside National Territories [1]

The World Administrative Radio Conference, Geneva, 1979,

considering

a) that the operation of broadcasting stations on board ships or aircraft outside national territories is in conflict with the provisions of Nos. **2665** and **3603** of the Radio Regulations;

b) that such operation is contrary to the orderly use of the radio frequency spectrum and may result in chaotic conditions;

c) that the operation of such broadcasting stations may take place outside the jurisdiction of Member countries, thereby making the direct application of national laws difficult;

d) that a particularly difficult legal situation arises when such broadcasting stations are operated on board ships or aircraft not duly registered in any country;

recommends

1. that administrations ask their governments to study possible means, direct or indirect, to prevent or suspend such operations and, where appropriate, take the necessary action;

2. that administrations inform the Secretary-General of the results of these studies and submit any other information which may be of general interest, so that the Secretary-General can inform Members accordingly.

15

RECOMMENDATION No. 12

Relating to the Convening of Future Administrative Radio Conferences to Deal with Specific Services

The World Administrative Radio Conference, Geneva, 1979,

noting

a) that item 2.10 of its terms of reference calls on the Conference to propose to the Administrative Council and to the Plenipotentiary Conference a programme for the convening of future administrative radio conferences to deal with specific services;

b) that several Resolutions and Recommendations of this Conference call for, or refer to, the convening of such future conferences;

considering

a) that, in drawing up a programme of future world administrative radio conferences, account needs to be taken of other conferences involving Members of the Union, including regional and sub-regional conferences, the Plenipotentiary Conference, and the meetings of the CCIR;

b) that conferences need to be spaced out sufficiently to allow adequate time for preparation for each conference by administrations and by the permanent organs of the Union;

c) that a number of individual subjects raised in the Resolutions and Recommendations referred to in *noting b)* should be treated by a competent conference and that it will be for the Administrative Council to take the necessary action at the appropriate time for each matter concerned to be included in the agenda of such a conference;

recommends that the Administrative Council and, as appropriate, the Plenipotentiary Conference

1. include the following world administrative radio conferences in the programme of future conferences:

- world administrative radio conference for the mobile services (see Resolution 202);
- world administrative radio conference for the planning of the HF bands allocated to the broadcasting service (see Resolution 508 and Recommendations 500 and 501);
- world administrative radio conference on the use of the geostationary-satellite orbit and the planning of space services utilizing it (see Resolution 3);

2. include the following regional administrative radio conferences, some of which are already arranged, in the programme of future conferences:

- final session, Region 2, medium frequency broadcasting conference (already arranged for November 1981);
- Region 2 broadcasting-satellite planning conference (already arranged for the second quarter of 1983 – see Resolution **701**);
- planning conference for sound broadcasting in the band 87.5 - 108 MHz for Region 1 and certain countries concerned in Region 3 (see Resolution **510**);
- conference to draw up agreements and associated plans for feeder links to broadcasting satellites operating in the 12 GHz band in Regions 1 and 3 (see Resolution **101**);
- regional administrative radio conference to establish criteria for the shared use of the VHF and UHF bands allocated to fixed, broadcasting and mobile services in Region 3 (see Resolution **702**);
- conference to revise the Plan annexed to the Copenhagen Convention, 1948, for the European Maritime Area – Region 1 (see also Recommendation **300** on this subject);
- conference to review and revise the provisions of the Final Acts of the African VHF/UHF Broadcasting Conference, Geneva, 1963 (see Resolution **509**);
- planning conference for broadcasting in the band 1 605 - 1 705 kHz in Region 2 (see Recommendation **504**);

3. take the necessary steps to convene each of these conferences as soon as practicable after the completion, in each case, of the necessary preparatory work, bearing in mind:

a) the timing of the conferences, as expressed in the Recommendations and Resolutions mentioned in *recommends* 1 and 2;

b) the need for the conferences to be adequately spaced so as to allow administrations and the permanent organs of the Union adequate time for preparation;

c) the programme of planned or foreseen conferences, other than administrative radio conferences, involving Members of the Union;

d) the resources which will need to be devoted by individual administrations and by the Union as a whole to the completion of this programme of conferences.

16

RECOMMENDATION No. 30

Relating to International Monitoring [1]

The World Administrative Radio Conference, Geneva, 1979,

considering

a) the desirability of achieving a more effective use of the radio spectrum in order to assist administrations to satisfy their frequency requirements, and, to that end, the desirability of taking steps to make the International Frequency List reflect more accurately the actual use being made of the radio spectrum;

b) the provisions of the Radio Regulations (Geneva, 1979), under which the International Frequency Registration Board shall review the entries in the Master International Frequency Register with a view to bringing them into conformity, to the maximum extent practicable, with the actual use being made of the radio spectrum;

c) that monitoring information should assist the Board in discharging that function;

recognizing

a) that an international monitoring system cannot be fully effective unless it covers all areas of the world;

b) that, at present, in certain areas of the world, monitoring facilities are either non-existent or insufficient to provide effective coverage;

invites the CCIR

in collaboration with the Board, to study and make technical recommendations concerning the additional facilities required to provide adequate coverage of the world with a view to implementing the Radio Regulations, more especially Articles **10, 11, 12, 13, 14** and **20**;

and invites administrations

1. to make every effort to develop monitoring facilities as envisaged in Article **20** of the Radio Regulations bearing in mind the means which may be made available through the appropriate technical assistance organs of the United Nations;

2. to inform the Board of the extent to which they are prepared to cooperate in such monitoring programmes as may be requested by the Board.

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS
ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, January-March 1987

Document DT/13-E
6 February 1987
Original: English

COMMITTEE 5

Note by the Chairman of Committee 5

At the Second Meeting of Committee 5, the Board was requested to provide the following information.

The table below indicates, in the frequency bands listed, the number of new assignments processed in accordance with Article 12 of the Radio Regulations in the years 1982 to 1986.

Frequency Band (kHz)	1982	1983	1984	1985	1986
5 450 - 5 480	0	8	3	59	0
5 730 - 5 950	10	72	53	104	44
6 765 - 7 000	17	86	136	74	67
7 300 - 8 195	7	241	282	321	280
9 040 - 9 500	2	59	189	121	92
9 775 - 9 900	0	5	0	0	0
9 900 - 9 995	0	2	11	3	15
10 100 - 11 175	3	68	47	73	94
11 400 - 11 650	1	4	15	29	25
11 650 - 11 700	0	0	0	0	0
11 975 - 12 050	0	9	17	13	44
12 050 - 12 230	0	9	17	13	44
13 360 - 13 600	4	16	14	36	29
13 600 - 13 800	0	0	0	0	0
13 800 - 14 000	3	3	10	13	12
14 350 - 14 990	0	5	4	15	34
15 450 - 15 600	0	0	0	0	0
15 600 - 16 360	7	1	12	19	7
17 410 - 17 550	1	5	0	5	10
17 550 - 17 700	0	0	0	0	0
18 030 - 18 068	2	0	1	1	1
18 168 - 18 780	1	3	3	14	5
18 900 - 19 680	0	1	0	1	1
19 800 - 19 990	0	1	0	1	1
20 010 - 21 000	1	0	6	7	14
21 750 - 21 850	0	0	0	0	0
21 850 - 21 870	1	0	0	6	0
22 855 - 24 890	4	0	3	15	51
25 010 - 25 070	0	0	0	0	0
25 210 - 25 550	0	0	1	3	2
26 175 - 28 000	0	0	1	6	44

STATIONS OF THE FIXED SERVICE IN THE MIFR

C.T. NDIONGUE
Chairman of Committee 5

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS
ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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6 February 1987
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WORKING GROUP 5-A

Note by the Chairman of Working Group 5-A

PROPOSALS CONCERNING THE PLANNING METHOD

J.F. ARNAUD
Chairman of Working Group 5-A

Report/4.2.2 Document 8/Chapter 2, section 3, page 12

B/24/5 In accordance with the requirements form developed by the IFRB for submission of requirements for the planning exercises requested by WARC-HFBC(1), Brazil proposes that sectors characterized by two distances and two azimuths shall be permitted as an alternative way to express the required service area of national services, and only of national services. Brazil thinks that another alternative way to express such service areas would be just to indicate the test points involved. This would simplify the processing of requirements. In many instances these are the only ways of correctly indicating the required service area of national services.

ISR/25/1 Specification of required service area

That the Planning System be modified to also permit a more precise specification of the required service area.

This could be effected for instance in the following manner:

- by specifying a sector and a radius (in km) from any of the pre-defined test-points;
- by specifying certain test-points which are to be omitted from the calculations;
- in exceptional cases, by subdivision of a quadrant.

E/27/3 Box 11: Required service area

Provision should be made for the possibility of omitting some test points in certain CIRAF zones or parts of CIRAF zones.

E/27/6 Definition of "reception zone": area made up of adjacent CIRAF zones or adjacent parts of CIRAF zones.

Report/4.2.3.1 Document 8/Chapter 3, section 2, page 24

F/6/1 Conclusion

Administrations ought to be able to enter in box 07 the serial number of a requirement B relating to a season other than that of requirement A.

F/6/2 Conclusion

The IFRB programme could perhaps be slightly modified so that, when the requirement file is read, it is taken for granted that two requirements requested in synchronous operation are in fact synchronous only while they are both transmitting.

F/6/3 Conclusion

It should be possible to enter on the form as many frequency continuity and synchronous operation requirements as necessary.

F/6/4 Conclusion

It seems essential that the form should enable the service area to be defined more precisely, e.g. by indicating the quadrant parts or test points which do not need to be served and providing the option of defining the service area by sector, even for international emissions (i.e. deletion of the words "national uses only" in box 11).

F/6/5 Conclusion

The form should provide space for giving the date and time of changes in the country's legal time, so that these can be taken into account by the IFRB programmes for plan calculations.

F/6/6 Conclusion

Space should be provided in the form for a fuller and more precise description of equipment availability.

ALG/10/5 Modifications which may be made to the file and Plans are restricted to:

a) modifications to broadcasting requirements already recorded in the file which improve the Plans or do not increase interference to the assignments included in the Plans;

b) deletion of an assignment which appears in the Plans;

c) requests formulated by an administration which did not submit any requirements when the file was compiled, provided that interference to assignments included in the Plans is not increased;

d) requests formulated by countries which acceded to independence after the file was compiled.

AUT/15/4 Proposals:
AUT/15/5

1) Delete the "or" between boxes 07 and 08.
2) In each of the two cases (boxes 07 and 08) allow cross-reference to more than one associated requirement.

AUT/15/6 Proposals:

1) The Requirement Form should allow to indicate the request for
- frequency continuity within one requirement
- frequency continuity between time-contiguous requirements
- frequency continuity between similar requirements for consecutive seasons

AUT/15/7

2) Modify the legend for completion of box 07 in such a way, that a request for frequency continuity is not restricted to the use of the same equipment facilities.

AUT/15/8 Proposal: Delete box 09.

AUT/15/9 Proposal: Delete entry "J" in box 10.

AUT/15/10 Proposal: It should be possible to indicate on the Requirement Form an area or areas which should not be included in the calculations e.g. by identifying test-points to be omitted.

AUT/15/11 Proposal: Delete reference to "national uses only"

AUT/15/12 Proposal: It should be possible to indicate more than one preferred frequency band.

AUT/15/13 Proposal: The information concerning the 13 MHz-band should be incorporated between the lines for the 11 MHz- and 15 MHz-band.

E/27/18 Broadcasting requirements which only transmit on certain days of the week shall be planned at a phase subsequent to the assignment of frequencies for broadcasting requirements which operate on all days of the week.

IND/51/10 i) Considering that the use of synchronized transmission is an efficient means of spectrum saving, the requirements with synchronized transmitters should get due encouragement.

ii) Each member of the synchronized requirements directed to overlapping areas should be treated as a separate requirement in any GIR. In a case of congestion, only the member which contributes to the congestion should be suspended.

iii) A synchronized group of transmitters should be entitled to protection against other transmissions not forming part of that synchronized group even if the specified values of self-protection (8 dB or 3 dB as the case may be) within the synchronized group are not reached because, in practice, satisfactory reception can be achieved in the overlapping areas also.

D/30/3 3) The Conference should develop an efficient procedure with which mid-season-changes of the legal clock-time can be taken into account without setting spectrum space aside for times which are not used during a great part of the season concerned.

IND/51/6

i) In a case when no test point is available in a small country or a small service sector, there should be a provision in the form to indicate at least one additional test point by the administration submitting the requirement to facilitate proper evaluation.

ii) Where the administrations may desire to serve only a part of a large quadrant, there should be a provision for indicating the reference number of those test points which do not fall in the required service area and are to be excluded in treatment.

iii) When the radiation patterns of an available antenna correspond to an antenna in the reference set but the gain of available antenna is different, a provision should be made to indicate the actual gain of the available antenna.

iv) There should be a provision for additional information regarding the exclusion to be made from the available antennas indicated in box 15 in the event of some of these antennas being used for other simultaneous requirements emanating from the same station.

v) There should be a provision for indicating preferred bands/frequencies corresponding to different seasons when requirements are submitted for more than one season.

Report/4.2.3.3

E/27/7 Definition of "appropriate band": The appropriate band is the best possible band from the service operational point of view which takes into account operational restrictions such as equipment availability and its limitations, and continuity in the use of a frequency.

IND/51/11 i) Since the overall satisfaction of a requirement is judged by the value of reliability achieved by it, the association of BBR with the selection of appropriate bands is considered appropriate.

ii) Unconditional consideration of the preferred band as the appropriate band may lead to greater congestion. It should not, therefore, be selected as the appropriate band unless a method is developed to evaluate its impact on planning.

iii) Band continuity for a multi-hour requirement might be preferred by administrations with lower values of BBR during a portion of the intended transmission period. Administrations may, therefore, be allowed to indicate in the requirement proforma their willingness to accept a lower value of BBR in case frequency continuity is considered essential.

Report/4.2.3.4.2 Document 8/Chapter 5, section 7, page 142

IND/51/12 i) The IFRB would be initially selecting the preferred band as the appropriate band provided it is one of the usable bands. This is acceptable as long as the band is uncongested. In case congestion is detected, the preference should be disregarded and the requirement should be processed in the normal way.

ii) If the Planning System cannot in the first run assign frequencies to all the requirements including those with preferred frequency indications, such preferences should be ignored in the subsequent runs.

E/27/5 Box 13: Preferred frequency or band

It should be possible to state more than one preferred band or frequency.

Report/4.2.3.4.3.1 Document 8/ Chapter 5, section 7, page 141

SEN/12/1 1. In the event of incompatibilities between requirements for preset frequencies and requirements for non-preset frequencies, the requirement corresponding to equipment on a preset frequency shall take precedence over a frequency or frequency band requirement for a planned or existing transmitter capable of operating on another frequency or in another frequency band.

SEN/12/4 Senegal proposes that this principle be adopted in the light of propagation parameters and constraints associated with existing equipments. The old transmitters operated by administrations in the developing countries use preset frequencies. For requirements for which administrations have not indicated any frequency constraint, on the other hand, the system will be able to determine the optimal band and frequency on the basis of propagation calculations.

IND/51/13 An examination of the HFBC Requirement File indicates that a large number of requirements have been submitted with preset frequency indications. This is likely to cause severe constraints on the Planning System. It is, therefore, suggested that the administrations projecting preset frequency requirements may review such requirements with a view to minimizing them. The Second Session may also consider prescribing a suitable timetable for replacement of equipment with fixed frequency operation by new equipment whose operating capabilities are more flexible. A time period of three years from the date of the Second Session is considered appropriate and may be adopted for phasing out the use of preset frequencies.

Report/4.2.3.4.3.3

ISR/37/4 Principle A - Appropriate power levels

As we see both in the current exploitation of the HF broadcasting spectrum and in the results of the IFRB Planning Exercises, the following situation prevails in relation to transmitter power and field strength values.

a) In many cases the transmitter power used is the maximum available from the equipment without any relation to the minimum field strength which would suffice to service adequately the target area.

b) In many other cases, the lower transmitter powers available from equipment (especially in countries which do not have abundant resources) could provide an acceptable service to the target area. Interference from stronger transmitters however, as described in a) above, beamed to the same target area on adjacent frequencies, or to adjacent or nearby areas on co-channel and adjacent channel frequencies, prevents this from being achieved.

It is clear, therefore, that the universal use of the lowest appropriate power levels as dictated by the propagation conditions from transmitter to target area and other objective considerations would facilitate many frequency allocations which could not otherwise be realized. Moreover, considerable energy savings could be achieved by avoiding the use of excessive transmitter power.

To give practical expression to this principle of appropriate power, the IFRB could be charged with analyzing the suitability of the power data included in the list of requirements, together with relevant equipment flexibility data, and advise the administrations concerned on the appropriate power value to be used.

Report/4.2.3. 4.3.4

ISR/37/4 Principle B - The use of appropriate antennas

Only those antennas recommended for SW broadcasting should be used, e.g. 10 kW or higher. The antennas should beam in the correct direction to cover the required service area and to reduce interference potential outside that area as much as possible.

Exceptions should be made for administrations having limited equipment resources.

Report/4.2.3.4.4 Document 8/Chapter 5, section 7, page 143

AUS/ 16 /4 Proposal

Australia proposes that the HFBC Planning System take account of the requirement of administrations for continuity of frequency assignments to the extent possible in the transition from the present Article 17 notification procedure to the HFBC Planning System regime.

AUS/ 16 /5 Proposal

Australia proposes that the HFBC Planning System take account of the requirement of administrations for the continuity of frequency assignments to the extent possible between seasons planned under the procedures of the HFBC Planning System.

E/27/2 Box 07: Frequency continuity

A minimum BBR value acceptable to each Administration can be indicated to ensure frequency continuity (either throughout the transmission period for a requirement, or from one station to another for the same requirement or from one requirement to another with consecutive operating periods).

E/27/15 The Planning System shall guarantee frequency continuity throughout the longest possible operating period of each requirement, from one station to another, and from one requirement to another with consecutive operating periods, whenever this is requested and the Administration has indicated a minimum BBR value which it would be prepared to accept with a view to ensuring frequency continuity, on the understanding that this would not give any entitlement to additional frequencies.

F/29/3 3.2 For all the reasons stated in 2.2.2 above, frequency continuity must be regarded as essential from the beginning to the end of a requirement. The present planning system plainly takes no account of this and should therefore be modified accordingly.

D/30/1 1) The Conference should establish rules to provide for frequency continuity for the entire duration of a requirement and for consecutive requirements, if requested.

D/30/2 2) The Conference should establish rules to provide for continuity of the assignment of a frequency to a requirement from season to season and during its whole duration ("service continuity").

TUN/35/1 1. Frequency continuity

a) Frequency continuity for a given requirement in the appropriate band has to be regarded as an essential element in planning, and the planning system should allow for the fact.

Constraints due to frequency continuity should have priority over constraints due to preferred frequencies.

PRG/41/1 That the planning method adopted should not make frequent changes of frequency necessary during periods of operation.

MLI/47/1 The criterion of frequency continuity is of fundamental importance.

IND/51/6 vi) If an administration desires to have band/frequency continuity even if the BBR is less than 80% during a part of a multi-hour service, there should be a provision to indicate such a desire. In that event, the administration would not be entitled to the use of additional frequencies.

IND/51/15 i) Frequency continuity within the duration of a requirement should be provided even to a requirement not meeting the specified BBR criterion on a particular frequency if the concerned administration has specifically indicated in the requirement proforma its willingness to accept a lower value of BBR for achieving continuity. However, the requirement in this case should not be considered eligible for additional frequencies.

ii) Frequency continuity from season to season may be considered desirable but comparatively less important.

CHN/54/1 The Administration of the People's Republic of China suggests:

1) that after Box 20 in the Requirement File, Boxes 20A and 20B shall be added to identify, respectively, the equipment using a seasonal fixed frequency and the serial number of the related requirements also using this equipment;

2) during planning by the System, a frequency is at first assigned to the equipment in its working band as an ordinary requirement. Once a frequency has been assigned in a certain band, the same assigned frequency should also be used by this equipment in the given band for other time-blocks or its related requirements.

Report/4.2.3.4.5 Document 8/Chapter 5, section 4, page 130

ALG/10/4 In congested areas, the modifications which have to be made to requirements in order to resolve incompatibilities shall be applied first of all to the requirements of administrations which have submitted a large volume of broadcasting requirements.

AUS/ 16 /10 Proposal

Australia proposes that the HFBC Planning System be modified to permit, during the application of Suspension Rule N1, discrimination between requirements to an area on the basis of differences in language. Australia considers that it is important to ensure that the HFBC Planning System recognises the requirements for the provision of satisfactory shortwave broadcasting services in and to multi- language/multicultural countries. The planning system should permit differentiation between multiple requirements to a given area on the basis of language so as not to hinder the provision of broadcasting services in and to multi-language communities.

BGD/23/1 It is felt that the Second Session might have to consider some alternative solution to resolve congestion if it exists after reduction of protection ratio. The resolution of incompatibility could be attempted on a global basis instead of unit area basis. It is realized that some possibilities of accommodation of suspended requirement could be made.

E/27/16 The application of Rule N4 for the resolution of incompatibilities can only involve the suspension of a requirement in the second or third band assigned to reach the BBR value adopted by the Conference.

E/27/17 Prior to the application of Rule N6, which could give rise to gaps in the total transmission period and in view of the fact that during the congested hour quality criteria could be substantially impaired, the Administrations involved should be invited to propose solutions within a time limit of ( )*weeks, through multiple coordinations or modifications of the time block.

If after this consultation period no acceptable solution has been worked out between administrations or if administrations have not expressed their views, the IFRB shall apply a reduction in the transmission period with a view to preventing service continuity from being interrupted.

F/29/2 3.1 Continuity of service throughout the duration of a requirement is of such importance to listeners that it would seem essential to bear it in mind during the Second Session of the Conference.

Consequently,

- the number of service interruptions during the broadcasting of a requirement should be reduced to a minimum;

- where suspensions are inevitable, Rule N6 should not be applied in its present form since it leads to half-hour interruptions in transmission during the requirement; instead, such suspensions should be concentrated at the beginning or end of the transmission. Rule N6 should produce no more than a reduction in the duration of a programme. Dividing a requirement into too many disjointed time intervals must be avoided at all costs.

TUN/35/2 2. Service continuity

If planning constraints make it necessary to reduce the broadcasting time of a service, that should not mean splitting the time up into a number of separate periods.

Any reduction should, in our opinion, preserve the unity of the broadcast in order to guarantee service continuity.

IND/51/14 i) Application of suspension rules may affect continuity of a service within the duration of a requirement and also from one season to another. The planning method should ensure the continuity of service over successive seasons and also during the entire duration of the transmission period.

ii) The IFRB's proposal for the reduction of protection ratio by removing the allowances for multiple interference and fading before the application of any suspension rule may be adopted.

iii) The criterion for the determination of weight for ordering administrations for the application of suspension rules followed by the IFRB does not appear to follow the spirit behind paragraphs 5 and 6 of section 4.2.3.4.5 of the First Session's Report. It would be more appropriate if the weight "m" is assigned to an administration depending on the total number of requirements of the concerned administration appearing in a maximal GIR. This would incorporate the concept of global interaction.

iv) Suspension Rule N4 should not ordinarily be applied to the basic or primary band of a requirement. Its suspension may in some cases render the service unusable. It may, however, be suspended if the second band yields a BBR value within 10% of the value achieved by the primary band, and is significantly less congested.

v) Rule N5 of IFRB concerning reduction of protection ratio from 27 dB to 17 dB in three steps may be adopted. However, before moving to each step of reduction, protection ratio of only the new entrants to the maximal GIR may be reduced and the process repeated until it is not possible to do so or until the congestion persists.

vi) Application of Rule N6 causes interruption in a service. Therefore, the system should not be allowed to go to Rule N6. If it is absolutely essential, Rule N6 should be applicable only at the beginning or end of the transmission period of a requirement.

vii) The weight for the curtailment of duration of requirements under Rule N6 should be taken as the total number of frequency hours of an administration to the congested service area within a block of three hours centred on the congested hour for the band under consideration. This is in line with paragraph 5, Chapter 2, section 3 of the IFRB's document "HFBC Planning System".

viii) If congestion persists even after the protection ratio is lowered to the floor value of 17 dB, the provision of paragraph 7 of section 4.2.3.4.5 of the First Session's Report may be adopted. This provides for the consideration of an alternative band or time-

IND/51/15

iii) Service interruptions within the duration of a requirement may be avoided.

iv) Service continuity from season to season is considered essential because a service, once initiated, cannot be wholly or partly discontinued.

Report/4.2.3.4.5 Document 8/Chapter 2, section 3, page 15

AUS/ 16 /8 Proposal

Australia proposes that in the development of procedures associated with the planning method described in the Report to the Second Session of the Conference, consideration be given to the mechanisms by which Administrations can consult with the IFRB. It is envisaged that such consultations would take place under the following circumstances:

(a) in the application of suspension rules in the resolution of incompatibilities;

(b) when the draft seasonal plans (tentative seasonal schedules) are published by the Board;

(c) in the application of the modification procedure during the seasonal schedules which could permit the addition of, change to, or deletion of a broadcasting requirement. Additions and changes would be subject to the proviso that existing entries in the seasonal schedules not be adversely affected within the agreed limits;

(d) in the application of a procedure during the seasonal schedules if an assignment associated with a broadcasting requirement is rendered non- operational by harmful interference. Such a procedure shall be implemented provided optimum band sharing arrangements are not compromised;

(e) in the event an assignment or assignments associated with a broadcasting requirement are not utilised (see AUS/16/6);

(f) in the event the broadcasting facilities of an administration are temporarily suspended (see AUS/16/7);

(g) in the application of a procedure to permit Administrations to provide the Board with comments on the effectiveness of assignments during the seasonal schedules.

Report/4.2.3.4.5.6 Document 8/Chapter 5, section 9, page 161

IND/51/16 i) Under suspension Rule N6, reduction of the transmission period of a requirement associated with the least weight in carried out by the planning process in the last stage. Since this requirement has the least eligibility for reduction, it should get first priority in making reinsertions. The opposite is true in the case of a requirement with the highest weight. It is, therefore, proposed that the reinsertion of suspended periods should be carried out in the reverse order in which the periods are suspended at the stage of Rule N6.

ii) It may so happen that a requirement of an administration is suspended under a rule, say Rule N1, while another suspension is made from the requirement of another administration having the same weight as that of the first administration, but under some other rule, say Rule N3. This example shows that the standby files relating to suspension Rules N1, N2, N3 or N4 may be created in parallel. Since these files may not be created in a fixed order, it is obvious that their treatment in reverse order is not possible as proposed by the IFRB. It will be appropriate to consider these files together. It is, therefore, proposed that standby files created by the application of various suspension Rules N1, N2, N3 and N4 should be clubbed together to form a single file related to a particular band and hour.

Similar composite files may be created for other bands also at the same hour. The order in which these band-related files are created depends on the degree of congestion of the concerned bands. The first band-related standby file is created when the most congested band is processed, the second when the next most congested band is processed and so on. It is proposed that the band-related composite standby files created by the application of suspension Rules N1, N2, N3 and N4 should be treated for reinsertion in the reverse order of their creation.

iii) If a requirement of an administration is fully suspended under any of the suspension rules, it may be tried for reinsertion in another time-block (if requested by the administration as per provision in paragraph 7 of section 4.2.3.4.5) for the entire duration of the requirement.

Report/4.2.4 Document 8/Chapter 4, section 3, page 70

AUT/14/2 QUALITY LEVEL TO BE ADOPTED AND QUALITY ASSESSMENT

A) In order to balance the impairments caused by propagation effects with those caused by interference for the calculation of ICR a value of 21 dB for the required co-channel protection ratio (under stable conditions) shall be adopted.

AUT/14/2 B) However in order to allow for proper assessment of the assignments it would be useful to replace the combined OBR assessment (in principle OBR is assessing a requirement and not an assignment) by separate BBR and IBR (broadcast reliability in presence of interference only) assessments. IBR is the value associated with the percentile x of the ranked values of ICR of all test points taken into account in calculating the BBR of the assignment.

In defining the planning-objective, similar reference values for BCR and ICR (representing similar time probabilities), as well as similar BBR- and IBR percentiles (representing similar area percentages) should be adopted by the Conference. Austria would propose to adopt an unique figure of 80 %.

E/27/11 Adoption of a value of 80% for broadcasting reliabilities and the percentile of the test points.

E/27/12 The median value of the signal/noise ratio derived for the required service area is the median value of the signal/noise ratio corresponding to the 80% percentile test point.

E/27/13 Definition of broadcast reliability in the presence of interference only (IBR): value associated with the 80% percentile of the classified ICR values for all test points considered in calculating the BBR.

E/27/14 Use of the parameters BBR (noise only) and IBR (interference only) as service quality indicators instead of the parameter OBR.

IND/51/17 1. Parameters of QI

The following three basic parameters may be used to develop a quality indicator:

- number of frequency changes;
- signal to interference ratios;
- Basic Broadcast Reliabilities.

1.1 Parameter "F" based on number of frequency changes

It is expected from a good Plan that an assignment should be satisfied with a minimum number of frequency changes during its transmission period. Frequency changes should essentially be limited to those necessitated by propagation factors. Therefore, it is proposed that the assignment of the same frequency for at least three hours should be regarded as the normal expectation from planning.

For the purpose of quality assessment, the transmission period of each assignment may be grouped into three-hour blocks. The quality indicator may be worked out separately for each three-hour block. Parameter "F" related to number of frequency changes will have the highest value of "1" if the same frequency is assigned for the entire duration of transmission in a three-hour block. The parameter will be "zero" if the number of frequencies is more than three in a block of three hours. The value of "F" will also be zero when more than two frequencies are assigned to an assignment having a duration less than or equal to two hours within a block of three hours. "F" will have a value of 0.5 if two frequencies are assigned to an assignment having a duration of two hours or less, where one of the frequencies is assigned continuously for at least one hour. "F" will also have a value of 0.5 if three frequencies are assigned to an assignment having a duration of more than two hours within a block of three hours, provided one of the frequencies is assigned for a minimum continuous operation of two hours or more. The following table illustrates the "F" parameter:

Considering the excessively large requirement-hours submitted by the administrations, the Planning System will be faced with the very difficult task of assigning satisfactory frequencies to each requirement. The available spectrum for HF broadcasting is extremely limited and even the WARC-1979 could not agree to enlarging it by more than 30% over the existing capacity. Use of SSB instead of DSB will almost double the capacity of the HF bands and will probably be the only answer to the growing utilization of the allocated HF spectrum.

Priority order

AUS/16/11 Proposal

Australia proposes that requirements to a particular unit of service area during a given time block be notified to the IFRB in descending order of priority at the discretion of the country concerned. In the event that the Suspension Rules are applied in the process of incompatibility resolution, it is proposed that the requirements attributed the highest priority be retained.

TUN/35/3 3. Equitable treatment of requirements

In order to give all countries equitable access to the HF bands, all administrations should be given priority for requirements below a certain limit of x frequency-hours, as compared with other requirements.

All an administration's requirements below the x limit will be entered in the plan directly and will enjoy the necessary protection adopted by the Conference. The value of x could be fixed by the Second Session of the Conference.

CLM/34/3 - Insert a classification in the requirements file, containing "Priority requirements" corresponding to stations in operation which are to be dealt with as a matter of priority without any modification of their transmission parameters.

MLI/47/2 The "minimum requirements" of countries with modest demands must be safeguarded on a priority basis.

HFBC (2) INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, January-March 1987

Document DT/15-E
7 February 1987
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WORKING GROUP 4-A

RECEPTION ZONES AND TEST POINTS

Following discussion in Working Group 4-A, the following revisions are proposed.

1. Replace the wording of paragraph 3.7 of the Report to the Second Session by the following:

"3.7 Reception zones and test points

3.7.1 Reception zones

In specifying the reception area, reference shall be made to a combination of

- CIRAF zones,
- quadrants of CIRAF zones,
- individual test points from the set of points contained in the IFRB Technical Standards, where a part of the reception area does not cover the whole of a CIRAF zone or quadrant.

In exceptional cases where it is necessary to specify a reception area which is smaller than an entire zone or quadrant, this may be done by specifying the boundaries of the area as two azimuths and two ranges from the transmitter location.

3.7.2 Test points

For the purposes of the technical examination the IFRB shall determine an adequate number of test points distributed throughout each CIRAF zone and, where appropriate, subdivisions of CIRAF zones. These test points shall form part of the IFRB Technical Standards and will be distributed for comment by administrations (Nos. 1001 and 1001.1 of the Radio Regulations)."

2. Map of CIRAF zones

The map of CIRAF zones given in the annex to Appendix 1 of the Radio Regulations should be replaced by the map presented by the IFRB in Document 8, Annex 2 to Chapter 3, section 3 (page 50), omitting the footnotes.

L.W. BARCLAY
Chairman of Working Group 4-A

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS
ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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7 February 1987
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WORKING GROUP 4-A

FIELD STRENGTH PREDICTION METHOD

Following discussions in Working Group 4-A, the following two draft Recommendations are proposed.

DRAFT RECOMMENDATION

Further Improvements to the Propagation Prediction Method

The World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service, Geneva, 1987,

considering

a) that the First Session of the Conference adopted a method for the prediction of HF field strength which was based upon studies by the CCIR;

b) that during the intersessional period the CCIR undertook further studies in accordance with Recommendation COM5/1 of the First Session of the Conference;

c) that recent additional studies by administrations have indicated that further improvements in the method are required;

d) but that the possibility of further improvement will depend, in part, on the collection and analysis of additional data of field strength measurements,

requests the CCIR

1. to undertake further studies of the method of prediction of HF field strength appropriate for the planning of HF broadcasting [with a view to making it more simple to use and more responsive to the needs of the HF broadcasting service];

2. to recommend a method for use in the future,

invites administrations

1. to undertake measurement programmes of HF field strength;

2. to contribute data, in a form suitable for study, to the CCIR.

DRAFT RECOMMENDATION

Use by the IFRB of the Propagation Prediction Method to be used for the Planning of the HF Broadcasting Service

The World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service, Geneva, 1987,

considering

a) that a method for the prediction of HF field strength was adopted by the First Session of the Conference;

b) that improvements were recommended by the CCIR during the intersessional period in pursuance to Recommendation COM5/1 of the First Session of the Conference;

c) that the method, incorporating the improvements, has been used by the IFRB during the intersessional period;

d) but that the method is capable of further improvement,

recommends that the IFRB

1. use the HF field strength prediction method adopted by the First Session of the Conference, incorporating the improvements recommended during the intersessional period as a technical standard for the purposes of HF broadcasting until an improved method becomes available;

2. distribute the technical standard in accordance with No. 1001.1 of the Radio Regulations;

3. whenever possible, improve the technical standard in accordance with No. 1454 of the Radio Regulations,

requests the Director of the CCIR

whenever the present prediction method is modified and approved by the Plenary Assembly of the CCIR, to inform the IFRB of the specific modifications which have been adopted,

instructs the IFRB

to communicate the information received from the Director of the CCIR to all administrations by a circular-letter.

L.W. BARCLAY
Chairman of Working Group 4-A

HFBC (2)

UNION INTERNATIONALE DES TÉLÉCOMMUNICATIONS
CAMR POUR LA PLANIFICATION DES BANDES D'ONDES DÉCAMÉTRIQUES ATTRIBUÉES AU SERVICE DE RADIODIFFUSION
SECONDE SESSION, GENÈVE, Février-Mars 1987

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7 février 1987
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GROUPE DE TRAVAIL 5A
WORKING GROUP 5A
GRUPO DE TRABAJO 5A

Note du Président du Groupe de travail 5A

DEFINITION DES TYPES DE CONTINUITE DE FREQUENCE

Continuité de type A =

Continuité d'utilisation par un besoin d'une même fréquence à l'intérieur d'une heure ou d'une heure à l'autre.

Continuité de type B =

Continuité d'utilisation d'une même fréquence dans la même saison en passant d'un besoin à l'autre, ou d'une tranche horaire à l'autre. (Cette continuité n'est pas assurée à deux besoins desservant des zones différentes pendant des tranches horaires non consécutives).

Continuité de type C =

Continuité d'utilisation d'une même fréquence par le même besoin dans la même saison de deux années consécutives.

Continuité de type D =

Continuité d'utilisation d'une même fréquence par le même besoin dans deux saisons consécutives.

Note from the Chairman of Working Group 5A

DEFINITION OF TYPES OF FREQUENCY CONTINUITY

Type A continuity =

Continuity of use by a requirement of the same frequency within an hour or from one hour to another.

Type B continuity =

Continuity of use of the same frequency in the same season when passing from one requirement to another or one time-block to another. (This continuity is not ensured for two requirements serving different zones during non-consecutive time-blocks).

Type C continuity =

Continuity of use of the same frequency by the same requirement in the same season of two consecutive years.

Type D continuity =

Continuity of use of the same frequency by the same requirement in two consecutive seasons.

Nota del Presidente del Grupo de trabajo 5A

DEFINICION DE TIPOS DE CONTINUIDAD DE FRECUENCIA

Continuidad de tipo A =

Continuidad de utilización por una necesidad de una misma frecuencia dentro de una hora o de una hora a otra.

Continuidad de tipo B =

Continuidad de utilización de una misma frecuencia en la misma estación pasando de una necesidad a otra o de un bloque horario a otro. (Esta continuidad no se garantiza a dos necesidades que sirvan zonas diferentes durante bloques horarios no consecutivos).

Continuidad de tipo C =

Continuidad de utilización de una misma frecuencia por la misma necesidad en la misma estación de dos años consecutivos.

Continuidad de tipo D =

Continuidad de utilización de una misma frecuencia por la misma necesidad en dos estaciones consecutivas.

J.F. ARNAUD
Président du Groupe de travail 5A
Chairman of Working Group 5A
Presidente del Grupo de trabajo 5A

HFBC (2)

UNION INTERNATIONALE DES TÉLÉCOMMUNICATIONS
CAMR POUR LA PLANIFICATION DES BANDES D'ONDES DÉCAMÉTRIQUES ATTRIBUÉES AU SERVICE DE RADIODIFFUSION
SECONDE SESSION, GENÈVE, Février-Mars 1987

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Groupe de travail 5A
Working Group 5A
Grupo de trabajo 5A

Note du Président du Groupe de travail 5A

Pour permettre de tenir compte des propositions de ALG et IND, et d'appliquer l'approche relative aux GIR, il est proposé de remanier comme suit les alinéas 1 à 5 du paragraphe 4.2.3.4.5 du Rapport à l'intention de la seconde session.

1. Le système doit tout d'abord identifier, pour une zone donnée, pendant une tranche horaire déterminée et dans une bande donnée, les besoins qui sont incompatibles et ne peuvent être satisfaits.

2. En vue de résoudre l'encombrement on commencera par consulter les administrations en vue de l'ajustement de leurs besoins. Lors de l'examen d'une zone surchargée déterminée, les ajustements des besoins pour résoudre les incompatibilités seront tout d'abord apportés aux besoins des administrations qui ont le plus grand nombre de besoins en ce qui concerne la Zone A ou tout autre zone B et qui contribuent à l'encombrement dans la zone A considérée pendant une heure et dans une bande données.

3. L'IFRB suggérera des modifications qui seront utiles aux administrations concernées et qui permettront de réduire l'encombrement (voir le paragraphe 4.1.1).

4. Ce faisant, il tiendra compte du principe énoncé au paragraphe 4.1.2.2 et, en particulier, de la façon de répondre au mieux aux besoins de périodes d'émission plus longues, présentées par les administrations principalement à des fins de radiodiffusion nationales.

5. Les administrations qui ne répondront pas dans un délai que devra déterminer la seconde session ou qui refusent toute modification seront réputées accepter toute réduction de la fiabilité globale de radiodiffusion qui pourrait résulter du processus de planification.

6. Si le système de planification ne peut satisfaire tous les besoins, même après avoir épuisé toutes les possibilités d'ajustement, il commencera par l'administration ayant le plus grand nombre de besoins dans lesquels figurent la zone A ou la zone B susmentionnées, il suspendra l'un des besoins de cette administration et vérifiera si l'encombrement est résolu. Si tel n'est pas le cas, le processus sera répété afin de satisfaire un nombre minimal (N) de besoins de radiodiffusion pour chaque administration, compte tenu des critères de fiabilité de radiodiffusion globale adoptés par la Conférence.

Note from the Chairman of Working Group 5A

To accomodate the proposals from ALG and IND and to introduce the GIR approach, the following restructuring of Section 4.2.3.4.5, para. 1 to 5 of the Report to the Second Session is proposed.

1. The system shall first identify for a given area, during a specific time block and in a given band, the requirements that are incompatible and that cannot be satisfied.

2. A first attempt to resolve the congestion shall consist in consulting the administrations to adjust their requirements. When a given congested area A is considered, the adjustments which have to be made to requirements in order to resolve incompatibilities shall be applied first of all to the requirements of administrations which have the largest number of requirements to area A or to any other area B and which contribute to the congestion in the area A under consideration, at a given hour and in a given band.

3. The IFRB will suggest changes which will be useful for the administrations concerned and which would reduce congestion (see paragraph 4.1.1).

4. In so doing, it shall take account of the principle expressed in paragraph 4.1.2.2 and in particular of the way in which administrations' requirements for longer transmission periods, mainly for national broadcasting purposes, can best be accomodated.

5. Administrations which fail to reply within a period to be determined by the Second Session or which refuse any modification shall be deemed to accept any reduction in overall braodcasting reliability that may result from the planning process.

6. If the planning system cannot satisfy all the requirements even if all possibilities of adjustment are exhausted, it shall start with the administration having the greatest number of requirements where the areas A or B above appears, shall suspend one of its requirements and shall verify if the congestion is resolved. If it is not the case, the process shall be repeated with the view to satisfy a minimum number (N) of broadcasting requirements of each administration with the overall broadcasting reliability adopted by the Conference.

Nota del Presidente del Grupo de Trabajo 5A

Para dar cabida a las propuestas de ALG e IND e introducir el concepto de GIR, se propone la siguiente restructuración de los párrafos 1 a 5 del punto 4.2.3.4.5 del Informe a la Segunda Reunión.

1. El sistema comenzará por identificar para una zona dada, durante un bloque horario específico y en una banda determinada, las necesidades que son incompatibles y que no es posible satisfacer.

2. Un primer intento de resolver la congestión consistirá en consultar a las administraciones para que modifiquen sus necesidades. Si se considera una zona congestionada determinada A, los ajustes que será preciso introducir en una necesidad para resolver las incompatibilidades se aplicarán en primer lugar a las necesidades de las administraciones que tienen le mayor número de necesidades en la zona A o en cualquier otra zona B y que contribuyen a la congestión en la zona A que se considera, en una hora determinada y en una banda determinada.

3. La IFRB propondrá cambios que serán útiles para las administraciones interesadas y podrían reducir la congestión (véase el punto 4.1.1).

4. Al obrar de esa suerte, tendrá en cuenta el principio enunciado en el punto 4.1.2.2 y, en particular, la forma más idónea de acomodar las necesidades de las administraciones referentes a periodos de transmisión más largos, principalmente con fines de radiodifusión nacional.

5. Se considerará que las administraciones que no respondan en el plazo que determine la Segunda Reunión o que rechacen toda modificación, aceptan cualquier reducción de la fiabilidad global de radiodifusión que resulte del proceso de planificación.

6. Si el sistema de planificación no puede satisfacer todas las necesidades después de agotadas todas las posibilidades de ajuste, comenzará con la administración que tiene el mayor número de necesidades donde aparecen las zonas A o B a que se hace referencia más arriba, y suspenderá una de sus necesidades y comprobará si se resuelve la congestión. En caso negativo, el proceso se repetirá a fin de satisfacer un número mínimo (N) de necesidades de radidifusión de cada administración con la fiabilidad global de radiodifusión adoptada por la Conferencia.

J.F. ARNAUD
Presidente del Grupo de Trabajo 5A

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, **February-March 1987**

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WORKING GROUP 4-A

Draft structure of appendix

TECHNICAL CRITERIA FOR HFBC

1. Definitions

See paragraphs 2.6 to 2.11 of the Report to the Second Session and Document 27.

2. DSB system specifications

See paragraph 3.1.

3. Propagation

See Document DT/16.

4. Solar index values

See paragraph 3.2.5.

5. Minimum usable field strength

See paragraphs 3.4 and 3.2.2.

6. Signal fading

See paragraph 3.2.3.

7. Reliability

Dependent on ad hoc 4-A-2.

8. RF protection ratios

Awaiting advice from Committee 5.

9. Antennas

Dependent on ad hoc 4-A-1

10. Power

See paragraph 3.5.2.

11. Synchronized transmitters

Dependent on ad hoc 4-A-3.

12. Reception zones and test points

See Document DT/15.

13. Maximum number of frequencies

See paragraph 3.8 and ad hoc 4-A-2.

[14. SSB

Within the terms of reference of Working Group 4-B].

L.W. BARCLAY
Chairman of Working Group 4-A

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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WORKING GROUP 5-A

DRAFT

4.2.3.4.3.3 Power

a) For each requirement, the Planning Method shall determine the power needed to achieve the basic broadcast reliability.

b) When the transmitter power is less than or equal to [100 kW] and the administration indicates only a single power value due to equipment constraints, that value shall be used in the planning process.

c) In the case of power values above [100 kW], when the requirement file indicates that the transmitter power is greater than that determined by the Planning Method, the Board shall advise the administration that it must not exceed the power value thus determined.

J.F. ARNAUD
Chairman of Working Group 5-A

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, **February-March 1987**

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WORKING GROUP 4-B

Note by the Chairman of Working Group 4-B

The annex contains, for consideration by the Working Group, a possible draft of an appendix to the Radio Regulations covering system planning parameters and equipment characteristics for single-sideband working in the HF bands allocated to the broadcasting service.

E.GEORGE
Chairman of Working Group 4-B

Annex: 1

ANNEX

DRAFT

APPENDIX COM4/...

System planning parameters and equipment characteristics for single-sideband working in the HF bands allocated to the broadcasting service

1. System planning parameters

1.1 Channel spacing

During the transition period (see Resolution COM4/...), the channel spacing shall be 10 kHz. In the interest of spectrum conservation, during the transition period, it is also permissible to interleave SSB emissions midway between two adjacent DSB channels, i.e., with 5 kHz separation between carrier frequencies, provided that the interleaved emission is not to the same geographical area as either of the emissions between which it is interleaved; in this case the channel spacing remains 10 kHz.

After the end of the transition period the channel spacing and carrier frequency separation shall be 5 kHz.

1.2 Equivalent sideband power

An equivalent SSB emission is one giving the same [loudness level/audio signal-to-noise ratio at the receiver output] as the corresponding DSB emission, when it is received by a DSB receiver with envelope detection. This is achieved when the sideband power of the SSB emission is 3 dB larger than the total sideband power of the DSB emission. (The peak envelope power of the equivalent SSB emission as well as the carrier power are the same as that of the DSB emission.)

[After the end of the transition period, the equivalent sideband power can be reduced by 3 dB.]

1.3 RF protection ratio

For RF protection ratios to be applied for all possible combinations of wanted and unwanted (interfering) double- and single-sideband emissions see Resolution COM4/....

2. Transmitter characteristics

The transmitter shall meet the following characteristics.

2.1 Nominal carrier frequencies

Nominal carrier frequencies shall be integral multiples of 5 kHz.

2.2 Frequency tolerance

The carrier frequencies shall be maintained within a tolerance of ±10 Hz.

Note - This frequency tolerance is acceptable only under the assumption that SSB receivers will be equipped with a device locking the locally re-inserted carrier for synchronous demodulation to the carrier of the SSB emission, as specified in section 3.2.

2.3 Audio-frequency band

The upper limit of the audio-frequency band of the transmitter shall not exceed 4.5 kHz with a further slope of attenuation of 35 dB/kHz and the lower limit shall be 150 Hz with lower frequencies attenuated at a slope of 6 dB per octave.

2.4 Modulation processing

The audio-frequency signal shall be processed so that the modulating signal retains a dynamic range of not less than 20 dB. Excessive amplitude compression, together with improper peak limitation, leads to excessive out-of-band emissions and thus to adjacent channel interference, and is therefore to be avoided.

2.5 Necessary bandwidth

The necessary bandwidth shall not exceed 4.5 kHz.

2.6 Carrier reduction (relative to peak envelope power)

During the transition period the carrier reduction shall be 6 dB, to allow SSB emissions to be received by conventional DSB receivers with envelope detection without significant deterioration of the reception quality.

At the end of the transition period the carrier reduction shall be 12 dB.

2.7 Sideband to be emitted

Only the upper sideband shall be used.

2.8 Suppression of the unwanted sideband

[With respect to the relative RF protection ratio,] the [degree of] suppression of the unwanted sideband (lower sideband) and of intermodulation products in that part of the transmitter spectrum shall be at least 35 dB relative to the wanted sideband signal level. Because of the large difference of signal amplitudes in adjacent channels in practice, however, a greater suppression is recommended [(e.g. 50 dB in the exciter producing the SSB signal at low power level and 40 dB suppression of unwanted intermodulation products in the RF power amplifier of the transmitter)].

3. Receiver characteristics

[It is recommended that the receiver meets/The receiver shall meet] the following characteristics.

3.1 Overall selectivity of the receiver

The reference receiver [shall/should] have an overall bandwidth (-3 dB) of 4 kHz, with a slope of attenuation of 35 dB/kHz.

Note - Other combinations of bandwidth and slope of attenuation as given below are possible and will give the same relative RF protection ratio of about -27 dB at 5 kHz carrier difference.

Slope of attenuation	SSB receiver [audio-frequency/overall (-3 dB)] bandwidth
25 dB/kHz	3 300 Hz
15 dB/kHz	2 700 Hz

3.2 Demodulator and carrier acquisition

The receiver [shall/should] be equipped with a synchronous demodulator, using for the carrier acquisition a method whereby a carrier is regenerated by means of a suitable control loop which pulls the receiver to the incoming carrier. Such receivers [must/should] work equally well with conventional DSB emissions and with SSB emissions having a carrier reduced to 6 or 12 dB below peak envelope power.

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
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WORKING GROUP 4-A

PROGRESS ON DISCUSSION OF TECHNICAL CRITERIA

Chapter 2 - Definitions

Section 2.6: Terms relating to propagation

Not proposed for inclusion in the Radio Regulations.

Section 2.7: Terms relating to reliability

Decision deferred awaiting output from Sub-Working Group 4-A-2.

Section 2.8: Terms relating to field strength

Decision on E_{ref} deferred awaiting outcome of deliberations on section 3.5.2. Definitions required in Radio Regulations for E_{min} and E_u.

Section 2.9: Terms relating to the ratio of wanted and unwanted signals

Decision deferred awaiting discussions in Committee 5.

Section 2.10: Terms relating to service area

Discussion deferred awaiting presentation of Document 27.

Section 2.11: Term relating to planning

Inappropriate for discussion by Committee 4.

Chapter 3 - Technical criteria

Section 3.1: DSB system specifications

Section 3.1.1: Transmission characteristics

Section 3.1.1.1: Audio-frequency bandwidth

Material proposed to be included in the Radio Regulations.

Section 3.1.1.2: Necessary bandwidth

Material proposed to be included in the Radio Regulations.

Section 3.1.1.3: Characteristics of modulation processing

Material proposed to be included in the Radio Regulations.

Section 3.1.2: Channel spacing

Draft text:

"The nominal spacing for double sideband (DSB) shall be 10 kHz. However, for requirements serving different service areas the interleaved channel with a separation of 5 kHz may be used in accordance with the relative protection criteria."

Section 3.1.3: Nominal carrier frequencies

Material proposed to be included in the Radio Regulations.

Section 3.1.4: Receiver characteristics

Decision deferred as to need to include material in the Radio Regulations.

Section 3.2: Propagation, radio noise and solar index

Section 3.2.1: Propagation method

To be discussed with Document DT/16.

Section 3.2.2: Atmospheric and man-made noise data

Section 3.2.2.1: Atmospheric radio noise data

Need to draft appropriate text ensuring that the IFRB Technical Standards contain the material intended for use in the Planning Method.

Section 3.2.2.2: Man-made radio noise

Likely to be unwanted, but may need to be reconsidered if Committee 5 were to recommend lower values for E_{min}.

Section 3.2.2.3: Combination of atmospheric and man-made noise

See section 3.2.2.2 above.

Section 3.2.3: Signal fading

All material proposed for inclusion in the IFRB Technical Standards.

Section 3.2.4: Reliability

Sections 3.2.4.1 to 3.2.4.5

Awaiting output of Sub-Working Group 4-A-2.

Section 3.2.4.6: Proportionally reduced protection

Awaiting outcome of discussion in Committee 5.

Section 3.2.5: Values of appropriate solar index and the seasonal periods on which planning shall be based

Section 3.2.5.1: Seasonal divisions of the year and representative months

Awaiting outcome of discussion in Committee 5.

Section 3.2.5.2: Solar index values

A statement will be included in the Radio Regulations stating that planning shall be based on the 12-month running mean sunspot number R_{12}.

Section 3.3: RF protection ratios and

Section 3.3.1: Co-channel protection ratios and frequency tolerances

Awaiting outcome of discussion in Committee 5.

Section 3.3.2: Relative values of protection ratio as a function of carrier frequency separation

Values to be incorporated into the IFRB Technical Standards.

Section 3.4: Values of minimum usable and reference usable field strength

Section 3.4.1: Minimum usable field strength

Awaiting outcome of discussions in Committee 5.

Section 3.4.2: Reference usable field strength

See section 3.5.2.

Section 3.5: Antennas and power

Section 3.5.1: Antenna characteristics

Awaiting output from Sub-Working Group 4-A-1. Discouragement of rhombic antennas to be included in the draft Recommendation.

Section 3.5.2: Transmitter power and e.i.r.p.

Discussion deferred.

Section 3.6: Synchronized transmitters

Awaiting output from Sub-Working Group 4-A-3.

Section 3.7: Reception zone and test points

Awaiting discussion of Document DT/15.

Section 3.8: Maximum number of frequencies

Being discussed in Sub-Working Group 4-A-2.

Section 3.10: Theoretical capacity

Not proposed for inclusion in the Radio Regulations.

Section 3.11: Minimum values

Awaiting discussion in Committee 5.

L.W. BARCLAY
Chairman of Working Group 4-A

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, **February-March 1987**

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COMMITTEE 6

TERMS OF REFERENCE OF WORKING GROUP 6 AD HOC 1

1. To review the relevant provisions of the Radio Regulations, Resolutions and Recommendations of the WARC-79, where action can be taken within the mandate of Committee 6, without waiting for the conclusions of Committee 4 or Committee 5.

2. To recommend to Committee 6 the action to be taken in each case.

R. BLOIS
Chairman of Committee 6

HFBC (2) INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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WORKING GROUP 5-A

DRAFT TEXT ON PRESET FREQUENCIES FROM DRAFTING GROUP 5-A-2

The draft Working Group 5-A-2 held another meeting on 11 February 1987 from 1400 to 1700 hours. The Group agreed that the following two alternative texts might be presented to Working Group 5-A for a decision in the matter:

Alternative A

The Group recognized that the planned use of the HF bands presupposes the need for change of frequency from one season to another, if necessary, in order to optimize the System. It was, therefore, considered necessary to phase out equipment capable of working on only preset frequencies. [However, it was noted that periodic changes in frequency are incompatible with national usages in many countries where a fixed frequency or a set of fixed frequencies is employed by each of the licensees and any change in frequency would involve complex administrative procedures. This aspect may, therefore, be considered as a basic difference between national and international uses in such countries. In all such cases of national usage, the preset frequencies may have to be continued without stipulating any time limit for phasing out. The necessity to replace such equipment as early as possible may be reiterated.]

[Insofar as the international uses are concerned,] the Group agreed that the Conference should adopt appropriate provisions for phasing out the preset frequencies within a period of [three or four] years after the date of entry into force of the Final Acts of the Conference.

Note - The first set of square brackets have been introduced in the text, pending a decision on national and international services.

Alternative B

The Group recognized that the planned use of the HF bands presupposes the need for change of frequency from one season to another, if necessary, in order to optimize the System. It was, therefore, considered necessary to phase out equipment capable of working on only preset frequencies. The Group agreed that the Conference should adopt appropriate provisions for phasing out the preset frequencies within a period of [three or four] years after the date of entry into force of the Final Acts of the Conference. The Group also agreed that any low-power transmitter with a carrier power of [25 kW] or lower and employing an antenna which has a main lobe at an elevation angle of [15°] or higher, may continue to operate on the basis of one or more preset frequencies even after the date mentioned above. However, the necessity to replace such equipment as early as possible is reiterated.

Note - The square brackets have been introduced as the figures inside the brackets may require confirmation.

M.K. RAO
Drafting Group Coordinator 5-A-2

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/24-E
10 February 1987
Original: English

WORKING GROUP 5-A

DRAFT TEXT ON PRESET FREQUENCIES

The Drafting Group on preset frequencies met on 9 February 1987 at 1715 hours. The Delegations of China, Brazil, Canada, the Netherlands, Mexico, Japan, Luxembourg, Senegal, Colombia and India participated in the Group along with the IFRB.

The Group recognized that the planned use of the HF bands presupposes the need for change of frequency from one season to another, if necessary, in order to optimize the system. It was, therefore, considered necessary to phase out equipment capable of working on only preset frequencies. However, it was noted that periodic changes in frequency are incompatible with national usages in many countries where a fixed frequency or a set of fixed frequencies is employed by each of the licensees and any change in frequency would involve complex administrative procedures. This aspect may, therefore, be considered as a basic difference between national and international uses in such countries. In all such cases of national usage, the preset frequencies may have to be continued without stipulating any time limit for phasing out. The necessity to replace such equipment as early as possible may be reiterated.

Insofar as the international uses are concerned, the Group agreed that the Conference should adopt appropriate provisions for phasing out the preset frequencies within a period of [three or four] years after this Conference.

M.K. RAO
Drafting Group Coordinator 5-A-2

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Corrigendum 1 to
Document DT/25(Rev.1)-E
13 February 1987
Original: English

WORKING GROUP 4-A

DRAFT REPORT FROM WORKING GROUP 4-A AD HOC 1 ON REFERENCE ANTENNAS FOR HF BROADCASTING

1. In section "I. Antenna characteristics to be notified for HFBC planning", replace the text starting "For all types of antennas:" up to the end of the section, with the following text:

"For all types of antennas:

1. Type

(When appropriate, reference should be made to the corresponding antenna type appearing in the set of antenna patterns in the IFRB Technical Standards.)

2. Azimuth of maximum radiation

In degrees from true North in clockwise direction.

3. Maximum gain (isotropic G_i*, dB)

(If different from that associated with the relevant pattern in the reference antenna set.)

4. Covered frequency band(s), in MHz

In addition to the above parameters for horizontal dipole arrays:

5. Type of radiator (end-fed or centre-fed dipole elements)

6. Type of reflector (tuned dipoles or aperiodic screen)

In addition to the above parameters for multiband horizontal dipole arrays:

7. Design frequency, in MHz

(If not indicated, the design frequency will be assumed as the arithmetic mean of the centre frequencies of the lowest and highest frequency bands covered by the antenna.)

In addition to the above parameters, for slewed horizontal dipole arrays:

8. Azimuth of the normal to the plane of the radiating elements

In degrees from true North in clockwise direction."

---

* $G_i = G_d + 2.2$ dB

2. In section "II. Modifications of the set of reference antenna patterns in the IFRB Technical Standards":

2.1 in the last line, replace the word "absolute" with "maximum";

2.2 in the second paragraph, first line, after the word "modifications", insert "and additions".

3. Add at the end of section II the following new paragraph:

"It is suggested that the information indicated in sections I and II be transmitted to Committee 6 for further consideration."

4. In section "III. Antenna designation", delete the sentence starting with "It is finally suggested ....".

L. FROTA
Chairman of Working Group 4-A ad hoc 1

HFBC (2) INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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WORKING GROUP 4-A

DRAFT REPORT FROM DRAFTING GROUP 4-A-1 ON REFERENCE ANTENNAS FOR HF BROADCASTING

According to the results of discussions in Working Group 4-A, Drafting Group 4-A-1 held three meetings and considered the following documents: DT/6, 4 + Add.1, 32, 51, 79, 85 and the Report to the Second Session of WARC-HFBC (section 3.5.1).

The conclusions of Drafting Group 4-A-1 are shown in the draft Resolution on "Antennas to be used for HFBC" included in Annex 1.

According to the provisions of the draft Resolution, the Final Acts will not include any reference antenna patterns, but the IFRB Technical Standards will include a set of reference antenna patterns on which calculation will be based. This set will be based on the existing CCIR Book of Antenna Diagrams, the Report to the Second Session of HFBC (section 3.5.1), Document 4 + Add.1, and on supplementary information related to other types of antennas that will be supplied by administrations. This provision takes into account the proposals expressed in Documents 32, 79 and 85.

I. Antenna characteristics to be notified for HFBC planning

In considering Documents 32, 51, 79 and 85 as well as Document 4 + Add.1 and the Report to the Second Session, Drafting Group 4-A-1 felt it appropriate that the following information concerning antenna characteristics should be provided by administrations when submitting requirements.

For all type of antennas:

1. Type

(When appropriate, reference should be made to the corresponding antenna type appearing in the CCIR Book of Antenna Diagrams.)

2. Azimuth in degrees E of N normal to the plane of the radiator elements

3. Azimuth in degrees E of N of the nominal deviation of maximum radiation

Note - If it is the same as 2, the antenna is unslewed. If it is different from 2, the antenna is being operated in the slewed mode. This procedure provides unambiguous notification of the sign of the slew angle and the unwanted sidelobe radiation.

4. Maximum gain (Gi, dB) (when it differs from that associated with the relevant pattern in the reference antenna set), and in addition for multiband antennas.

5. Operating frequency band, in MHz.

6. Type of radiator (end-fed or centre-fed dipole elements).

7. Type of reflector (tuned dipoles or aperiodic screen).

8. Lowest and highest operating frequency bands, in MHz.

9. Design frequency (if not the arithmetic mean of the centre frequency of the lowest and highest frequency bands covered by the antenna), in MHz.

II. Modification of the set of reference antenna patterns in the IFRB Technical Standards

According to the annexed draft Resolution, when an administration wishes to use a type of antenna not included in the reference set, a suitable procedure for submitting the relevant information to the IFRB and CCIR should be developed. It is suggested that any new type of antenna pattern should be submitted by the administration wishing to use it under the form of tabulated values describing the full pattern. These relative gain values should be given at 5 degrees azimuth intervals (from 0 to 355 degrees) and at 3 degrees elevation intervals (value at 8 degrees included) (from 0 to 90 degrees). A suitable entry for the absolute gain should also be provided.

According to the annexed draft Resolution, modifications to the reference antenna set in the IFRB Technical Standards will also be implemented by the Board according to the updates of the Book of HF Antenna Diagrams as provided by CCIR.

III. Antenna designations

The antenna type desciption will, wherever possible, be standardized in conformity with those adopted by the CCIR.

Consequently, it is proposed to delete Appendix 2, section III of the Radio Regulations (reproduced in pages 1 and 2 of Document DT/6).

It is finally suggested that the above information should be transmitted to Committee 6 for further consideration.

L. FROTA
Chairman of ad hoc Group 4-A-1

Annex: 1

ANNEX 1

DRAFT RESOLUTION

Antennas to be Used for HFBC

The World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service, Geneva, 1987,

considering

a) No. 1001 of the Radio Regulations and its footnote concerning the development of the Technical Standards of the IFRB;

b) that the IFRB Technical Standards shall be developed according to No. 1454 of the Radio Regulations;

c) that the CCIR has published the Book of Antenna Diagrams (ed. 1984) and made available computer programs for HF antenna calculations;

d) that administrations are developing improved antennas to be used in HFBC;

e) that administrations may wish to use antenna types not included in the above-mentioned CCIR Publication,

resolves

1. that administrations should use the most appropriate type of antenna for the required service;

2. that administrations should avoid the use of antennas having a large number and size of side-lobes like rhombic antennas,

invites administrations

1. wishing to use antenna types different from those included in the IFRB Technical Standards and in the CCIR Book of HF Antenna Diagrams to provide the relevant data to the IFRB and to the CCIR,

invites the CCIR

1. to continue to update the Book of HF Antenna Diagrams,

requests the IFRB

1. to base its Technical Standards for reference antenna types on the CCIR Book of Antenna Diagrams and information supplied by administrations;

2. to publish and maintain in its Technical Standards the set of antenna characteristics to be used for HFBC.

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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10 February 1987
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WORKING GROUP 4-A

REFERENCE ANTENNAS FOR HFBC

CHAIRMAN'S REPORT

According to the results of discussions in Working Group 4-A, ad hoc Group 4-A-1 held two meetings and considered the following documents: DT/6, 4 + Add.1, 32, 51, 79 and the Report to the Second Session of HFBC (section 3.5.1).

The conclusions of Drafting Group 4-A-1 are shown in the draft Resolution on "Antennas to be used for HFBC" included in Annex 1.

According to the provisions of the draft Resolution, the Final Acts will not include any reference antenna pattern, but the IFRB Technical Standards will include a set of reference antennas on which calculation will be based. This set will be based on the existing CCIR Book of Antenna Diagrams, the Report to the Second Session of HFBC (section 3.5.1), Document 4 + Add.1, and on supplementary information related to other types of antennas that will be supplied by administrations. This provision takes into account the proposals expressed in Documents 32 and 79.

Consequently, it is proposed to delete Appendix 2, section III of the Radio Regulations (reproduced in pages 1 and 2 of Document DT/6) that limits the type and the number of the HF antennas that can be notified to the IFRB.

In considering Documents 32, 51 and 79 as well as Document 4 + Add.1 and the Report to the Second Session, Drafting Group 4-A-1 felt it appropriate that the following information concerning antenna characteristics should be provided by administrations when submitting requirements.

a) Type of antenna already in the reference set

1) Single band antenna

(When possible, reference should be made to the corresponding antenna type appearing in the CCIR Book of Antenna Diagrams)

2) Multiband antenna

2.1 Lowest and highest operating frequency bands

2.2 Design frequency (if not arithmetic mean of the lowest and highest operating frequency)

2.3 Slew angle relative to the plane normal to the dipole

2.4 Type of reflector (tuned-dipole or aperiodic screen)

2.5 Type of feeding (end-fed or centre-fed) (in case of slewed dual-band antennas with tuned-dipole reflector)

3) Absolute gain

(This value should be entered when it differs from that associated with the relevant pattern in the reference antenna set)

b) Type of antenna not included in the reference set

In this case it is proposed that a specific entry in the requirement form should be provided as well as a suitable procedure for submitting the relevant information to the IFRB and CCIR as defined. It is suggested that any new type of antenna pattern should be submitted by the administration wishing to use it under the form of tabulated values describing the full pattern. These relative gain values should be given at 5 degrees azimuth intervals (from 0 to 355 degrees) and at 3 degrees elevation intervals (value at 8 degrees included) (from 0 to 90 degrees). A suitable entry for the absolute gain should also be provided.

It is finally suggested that the above information should be transmitted to Committee 6 for further consideration and proper inclusion in the requirements form.

L. FROTA
Chairman of ad hoc Group 4-A-1

Annex: 1

ANNEX 1

DRAFT RESOLUTION

Antennas to be Used for HFBC

The World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service, Geneva, 1987,

considering

a) No. 1001 of the Radio Regulations and its footnote concerning the development of the Technical Standards of the IFRB;

b) that the IFRB Technical Standards shall be developed according to No. 1454 of the Radio Regulations;

c) that the CCIR has published the Book of Antenna Diagrams (ed. 1984) and made available computer programs for HF antenna calculations;

d) that administrations are developing improved antennas to be used in HFBC;

e) that administrations may wish to use antenna types not included in the above-mentioned CCIR Publication,

resolves

1. that administrations should use the most appropriate type of antenna for the required service;

2. that administrations should avoid the use of antennas having a large number and size of side-lobes like rhombic antennas,

invites administrations

1. wishing to use antenna types different from those included in the IFRB Technical Standards and in the CCIR Book of HF Antenna Diagrams to provide the relevant data to the IFRB and to the CCIR,

invites the CCIR

1. to continue to update the Book of HF Antenna Diagrams,

requests the IFRB

1. to base its Technical Standards for reference antenna types on the CCIR Book of Antenna Diagrams and information supplied by administrations;

2. to publish and maintain in its Technical Standards the set of antenna characteristics to be used for HFBC.

HFBC (2) INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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WORKING GROUP 4-B

Note by the Chairman of Working Group 4-B

The annex contains, for consideration by the Working Group, a possible draft of a Resolution relating to relative RF protection ratio values for the use of single-sideband systems in the HF bands allocated to the broadcasting service based on discussions in the Working Group and decisions already taken.

E. GEORGE
Chairman of Working Group 4-B

ANNEX

DRAFT

RESOLUTION [COM4/1]

Relative RF Protection Ratio Values for the Use of Single-Sideband Systems in the HF Bands Allocated to the Broadcasting Service

The World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service, Geneva, 1987,

considering

[a) that this Conference has adopted a method for the planning of HF bands allocated to the broadcasting service;]

b) that this method is based on the use of double-sideband emissions;

c) that the RF co-channel protection ratio is one of the basic planning parameters;

d) that this Conference has adopted a final date on which all double-sideband emissions shall cease and shall be replaced by single-sideband emissions (see Resolution COM4/X);

e) that during the transition period single-sideband emissions are permitted under specified conditions;

f) that the single-sideband system specification for HF broadcasting is contained in appendix (Document 84) to the Radio Regulations;

g) that, however, due to their provisional character, values for the RF protection ratio to be applied for all relevant combinations of wanted and unwanted double- and single-sideband emissions have not been included in the appendix mentioned in f) above;

h) that preliminary studies have shown that for the same reception quality assessment grade, single-sideband emissions may require a lower RF co-channel protection ratio,

recommends

that, subject to resolves, the values of relative RF protection ratio given in the annex to this Resolution be used whenever single-sideband systems are involved in the planning of the HF bands allocated to the broadcasting service,

requests the CCIR

to continue to study values of relative RF protection ratio for the different cases and frequency separations covered in the annex to this Resolution,

invites administrations

to participate actively in these studies,

resolves

that in applying the annex to this Resolution in conformity with recommends, those values of relative RF protection ratio not in conformity with the most recent relevant CCIR Recommendations shall be substituted by those from the most recent relevant CCIR Recommendations,

instructs the Secretary-General of the ITU

to communicate to all Members of the Union, immediately following each Plenary Assembly of the CCIR, all relevant information in the application of resolves above.

Annex

(to Resolution [COM4/1])

Relative values of RF protection ratio

1. The values of relative RF protection ratio given in the table should be used whenever single-sideband systems as specified in appendix (Document) to the Radio Regulations are involved in the planning of the HF bands allocated to the broadcasting service.

2. The values given are referred to the case of co-channel double-sideband wanted and unwanted signals for the same reception quality assessment grade (reference co-channel protection ratio).

3. For the reception of double-sideband and single-sideband (6 dB carrier reduction relative to peak envelope power) wanted signals, a conventional double-sideband receiver with envelope detection designed for a channel spacing of 10 kHz is assumed.

4. For the reception of a single-sideband (12 dB carrier reduction relative to peak envelope power) wanted signal a receiver as specified in appendix (Document), section 3, to the Radio Regulations is assumed.

5. Single-sideband signals with 6 dB carrier reduction relative to peak envelope power assume equivalent sideband power as specified in appendix (Document), section 1.2, to the Radio Regulations.

6. The figures for case 3 in the table below relate to a situation where the centre frequency of the intermediate frequency pass-band of the double-sideband receiver is tuned to the carrier frequency of the wanted single-sideband signal. If this is not the case the value for +5 kHz may increase to -1 dB.

Table of values of relative RF protection ratio (dB)

	Wanted signal	Unwanted signal	Carrier frequency separation, Δf (kHz)								
			-20	-15	-10	-5	0	+5	+10	+15	+20
1	Double-sideband	Single-sideband (6 dB carrier reduction rel. to p.e.p.)	-51	-46	-32	+1	[3]	-2	-32	-46	-51
2	Single-sideband (6 dB carrier reduction rel. to p.e.p.)	Double-sideband	-54	-49	-35	-3	0	-3	-35	-49	-54
3	Single-sideband (6 dB carrier reduction rel. to p.e.p.)	Single-sideband (6 dB carrier reduction rel. to p.e.p.)	-51	-46	-32	+1	[0]	-2	-32	-46	-51
4	Single-sideband (12 dB carrier reduction rel. to p.e.p.)	Single-sideband (12 dB carrier reduction rel. to p.e.p.)	-57	-57	-57	-45	0	-20	-47	-52	-57

HFBC (2) INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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WORKING GROUP 4-B

Note by the Chairman of Working Group 4-B

The following text is suggested to replace section 3 in Document 84:

"3. Characteristics of the reference receiver

It is recommended that for planning purposes the reference receiver should have the characteristics given below. For more detailed characteristics see the relevant CCIR Recommendations.

3.1 Noise limited sensitivity

The value of the noise limited sensitivity should be equal to or less than 40 dB relative to 1 μV/m.

3.2 Demodulator and carrier acquisition

The reference should be equipped with a synchronous demodulator, using for the carrier acquisition a method whereby a carrier is regenerated by means of a suitable control loop which pulls the receiver to the incoming carrier. The reference receivers should work equally well with conventional DSB emissions and with SSB emissions having a carrier reduced to 6 or 12 dB below peak envelope power.

3.3 (As given in Document 84, section 3.3.)"

E. GEORGE
Chairman of Working Group 4-B

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, **February-March 1987**

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WORKING GROUP 4-A

DRAFT RECOMMENDATION (COM4/C)

Planning Parameters and Equipment Characteristics for Double-Sideband Emissions in the HF Bands Allocated to the Broadcasting Service

The World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service, Geneva, 1987,

considering

a) that some planning parameter and equipment characteristics are specified in Appendix COM4/...;

b) that other parameters and characteristics are likely to be improved in the future following further study;

c) that an agreed set of parameters and characteristics is required for use up to the time when the results of further study will become available;

d) that provision is made in [Resolution ...] for the incorporation of improvements;

e) that Resolution ... determines the antennas to be used,

recommends

1. that the IFRB shall prepare and publish a set of Technical Standards based on the material in Appendix COM4/... and on the references given in the annex to this Recommendation;

2. that these Technical Standards shall be used for the planning of the HF bands allocated to the broadcasting service until such time when the provisions of [Resolution ...] will be applicable.

Annex: 1

ANNEX

1. The method to be used to determine the sky-wave field strength for HF broadcast planning purposes

The method to be used shall be that given in the Report to the Second Session of the Conference, paragraph 3.2.1, together with the amended values given in CCIR Recommendation 621.

2. Seasonal divisions of the year and representative months

The year shall be sub-divided into four seasons for propagation prediction purposes. These seasons are listed in Table 3-14. When predictions are made for a single month to represent a season, the month selected shall be as indicated in the second column of the table.

TABLE 3-14

Season	Representative month
November-February	January
March-April	April
May-August	July
September-October	October

3. Solar index values

The 12-month running mean sunspot number R_{12} shall be the solar index to be used for planning.

The seasonal plan shall be prepared in accordance with the values of R_{12} predicted for the period. The lowest value of R_{12} predicted for any of the months in that season shall be used.

4. Atmospheric radio noise data

The hourly median values of atmospheric noise intensity shall be as contained in CCIR Report 322-2. This is in accordance with CCIR Recommendation 372-4.

5. Signal fading

5.1 Short-term (within the hour) fading

The upper-decile amplitude deviation from the median of a single signal is to be taken as 5 dB and the lower-decile deviation is to be taken as -8 dB.

5.2 Long-term (day-to-day) fading

The magnitude of the long-term fading, as determined by the ratio of the operating frequency to the basis MUF, is given in Table 3-6 of the Report to the Second Session of the Conference.

6. Reliability

[To be developed.]

7. The protection ratio for synchronized transmissions

[To be developed.]

8. Test points

The set of 911 test points listed in the Report of the IFRB to the Second Session of the Conference (Annex 1 to Chapter 3, section 3) shall be used to represent the CIRAF zones and quadrants for planning purposes.

Where a reception area is defined as set out in paragraph 3.7.1.2, and where such an area does not include a test point, the IFRB shall generate a new test point and include it within the Technical Standards. Such additions to the Technical Standards will be distributed to administrations (Nos. 1001 and 1001.1 of the Radio Regulations).

L.W. BARCLAY
Chairman of Working Group 4-A

HFBC (2) INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
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WORKING GROUP 4-A

DRAFT APPENDIX ... TO THE RADIO REGULATIONS

PLANNING PARAMETERS AND EQUIPMENT CHARACTERISTICS FOR DOUBLE-SIDEBAND EMISSIONS IN THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE

1. System planning parameters

1.1 Channel spacing

The nominal spacing for double sideband (DSB) shall be 10 kHz. However, for requirements serving different service areas the interleaved channel with a separation of 5 kHz may be used in accordance with the relative protection criteria.

1.2 RF protection ratios

1.2.1 The co-channel protection ratio shall be [to be developed].

1.2.2 The protection ratios for adjacent frequencies, relative to that for the co-channel case, shall be:

± 5 kHz	-3 dB
± 10 kHz	-35 dB
± 15 kHz	-49 dB
± 20 kHz	-54 dB

1.3 Minimum usable field strength

The minimum usable field strength shall be determined by adding 34 dB to the greater of:

- the field strength due to atmospheric radio noise as set out in the Technical Standards of the IFRB;
- 3.5 dB (μV/m), which is the intrinsic receiver noise level.

1.4 Reception zones

1.4.1 In specifying the reception area, reference shall be made to a combination of:

- CIRAF zones,
- quadrants of CIRAF zones,
- a part of a quadrant specified by the set of test points contained within that part.

1.4.2 Where it is necessary to specify a reception area which is smaller than an entire zone or quadrant, this may be done by specifying the boundaries of the area as two azimuths and two ranges from the transmitter location.

2. Transmission characteristics

2.1 Nominal carrier frequencies

Carrier frequencies shall be integral multiples of 5 kHz.

2.2 Audio-frequency band

The upper limit of the audio-frequency band (-3 dB) of the transmitter shall not exceed 4.5 kHz and the lower limit shall be 150 Hz, with an attenuation of 6 dB per octave for frequencies lower than 150 Hz.

2.3 Modulation processing

If audio-frequency signal processing is used, the modulating signal shall retain a dynamic range of not less than 20 dB.

2.4 Necessary bandwidth

The necessary bandwidth shall not exceed 9 kHz.

[2.5 Transmitter power]

L.W. BARCLAY
Chairman of Working Group 4-A

HFBC (2) INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
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SUB-WORKING GROUP 5A-4

NOTE FROM THE CHAIRMAN OF SUB-WORKING GROUP 5A4

As a result of the discussions in Committee 5, it is recalled that, when in a given step of the Planning Procedure a requirement is suspended, this does not mean that the requirement is eliminated, it means that the requirement is put aside temporarily for re-insertion in a following step.

T. BOE
Chairman of Sub-Working Group 5A4

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS
ALLOCATED TO THE BROADCASTING SERVICE
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WORKING GROUP 5-A

DRAFT REPORT FROM DRAFTING GROUP 5-A-3

1. Limitation of frequency change

1.1 Introduction

Continuity in the use of a frequency is an important matter for both the broadcaster and the listener, it is a characteristic inherent in the broadcasting of a programme. In addition, limitations imposed by the technical characteristics of the means of transmission available to some administrations will impose mandatory requirements for frequency continuity. The desirable aim is that changes in frequency should be limited to those necessitated by changes in propagation conditions. The rules for applying frequency continuity are given in paragraph 4 below.

2. Definitions

2.1 Intra-seasonal

2.1.1 Type 1 continuity

Continuity of use of the same frequency within an hour or from one hour to another consecutive hour within a requirement.

2.1.2 Type 2 continuity

Continuity of use of the same frequency in the same season when passing from one requirement to another or one time block to another.

2.2 Inter-seasonal

2.2.1 Type 3 continuity

Continuity of use of the same frequency by the same requirement in two consecutive seasons.

2.2.2 Type 4 continuity

Continuity of use of the same frequency by the same requirement in two consecutive equinox seasons.

2.2.3 Type 5 continuity

Continuity of use of the same frequency by the same requirement in the same season of two consecutive years.

3. Relationship between frequency continuity and appropriate band(s)

3.1 For the case where a single frequency is sufficient to provide BBR equal to or greater than the agreed reference value, the appropriate band is to be established by the [proposed] HFBC Planning System by taking account, amongst other things, of the rules set out in section 4 regarding the maintenance of the maximum frequency continuity within the limits of the agreed reference value for BBR [80]%.

However, an administration may choose extended frequency continuity at the expense of BBR and shall indicate the lower value of BBR to be used in this event. As, in this portion of the requirement, the BBR falls below the above-mentioned reference value the second and/or third frequencies are afforded only when the application of frequency continuity would not result in a number of additional frequencies greater than would be necessary with operation in the appropriate bands.

3.2 In the case where BBR obtainable by use of a single frequency is less than 80% continuity of use of the first frequency or the single operating frequency will be provided within the lower limits of BBR indicated by the administration.

When the administration indicates that it has the capability to operate on more than one frequency the use of this lower value of BBR shall not lead to the use of a third frequency unless it is not possible to operate with two frequencies in any other combination of bands.

3.3 When the requirement under consideration is eligible to use a second or third frequency according to the procedures established in section 3.8.2 of the Report of the First Session, frequency continuity shall also be applied to the second (and third) frequency in the same manner as for the first frequency.

4. Application of continuity

Continuity of types 1 and 2 is to be applied under the conditions set out in section 3 above.

4.1 Type 1 continuity shall be applied automatically to all requirements.

4.2 Type 2 continuity shall be applied at the request of the administration. Provision of type 2 continuity will be mandatory if requested by the administration [and that administration advises the constraints that necessitate the frequency continuity].

4.3 Type 3 continuity shall be applied to the extent possible within the HFBC System when requested by the administration.

4.4 Type 4 continuity shall be applied to the extent possible within the HFBC System when requested by the administration.

4.5 Type 5 continuity shall be applied to the extent possible within the HFBC System when requested by the administration.

K.G. MALCOLM
Drafting Group Coordinator 5-A-3

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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13 February 1987
Original: English

WORKING GROUP 5-A

DRAFT REPORT FROM DRAFTING GROUP 5-A-3

1. Limitation of frequency change

1.1 Introduction

Continuity in the use of a frequency is an important matter for both the broadcaster and the listener, it is a characteristic inherent in the broadcasting of a programme. In addition, limitations imposed by the technical characteristics of the means of transmission available to some administrations will impose mandatory requirements for frequency continuity. The desirable aim is that changes in frequency should be limited only to those necessitated by changes in propagation conditions. The rules for applying frequency continuity are given in paragraph 4 below.

2. Definitions

2.1 Intra-seasonal

2.1.1 Type 1 continuity

Continuity of use of the same frequency within an hour or from one hour to another consecutive hour within a requirement.

2.1.2 Type 2 continuity

Continuity of use of the same frequency in the same season when passing from one requirement to another or one time block to another.

2.2 Inter-seasonal

2.2.1 Type 3 continuity

Continuity of use of the same frequency by the same requirement in two consecutive seasons.

2.2.2 Type 4 continuity

Continuity of use of the same frequency by the same requirement in two consecutive equinox seasons.

2.2.3 Type 5 continuity

Continuity of use of the same frequency by the same requirement in the same season of two consecutive years.

3. Relationship between frequency continuity and appropriate band(s)

3.1 The frequency assigned to a requirement is dependent on the band determined to be the "appropriate band". For the case where a single frequency is sufficient to provide BBR equal to or greater than the agreed reference value, the appropriate band is to be established within the proposed HFBC Planning System by taking account, amongst other things, of the rules set out in section 4 regarding the maintenance of the maximum frequency continuity within the limits of the agreed reference value for BBR (at present BBR = 80%).

3.2 In the case where BBR obtainable by use of a single frequency is less than 80% and multiple frequencies are available to a requirement (as determined by application of the provisions of 3.8.2 of the Report of the First Session) then a simple relationship between appropriate band and frequency continuity does not exist. Continuity of use of the first assigned frequency will be provided within the limits of BBR $\geqslant$[X]%.

3.3 In cases where propagation conditions are changing to the extent that would result in changes to the appropriate band during a requirement, then an administration may choose extended frequency continuity at the expense of BBR. The extended frequency continuity shall be provided only if BBR does not fall below a value of [Y]%. This value shall be nominated by the administration. As, in this case, the BBR falls below the reference value used in 3.8.2 of the First Session Report, the second and/or third frequencies are afforded only when the application of frequency continuity would not result in a number of additional frequencies greater than would be necessary with operation in the appropriate bands.

3.4 When the requirement under consideration is eligible to use a second or third frequency according to the procedures established in section 3.8.2 of the Report of the First Session, frequency continuity shall also be applied to the second (and third) frequency in the same manner as for the first frequency.

4. Application of continuity

Continuity of types 1 and 2 is to be applied under the conditions set out in section 3 above.

4.1 Type 1 continuity shall be applied automatically to all requirements.

4.2 Type 2 continuity shall be applied at the request of the administration. Provision of type 2 continuity will be mandatory if requested by the administration and that administration advises the constraints that necessitate the frequency continuity.

4.3 Type 3 continuity shall be applied to the extent possible within the HFBC System when requested by the administration.

4.4 Type 4 continuity shall be applied to the extent possible within the HFBC System when requested by the administration.

4.5 Type 5 continuity shall be applied to the extent possible within the HFBC System when requested by the administration.

K.G. MALCOLM
Drafting Group Coordinator 5-A-3

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
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WORKING GROUP 5-A

DRAFT REPORT FROM DRAFTING GROUP 5-A-3

1. Limitation of frequency change

1.1 Continuity in the use of a frequency is an important matter for both the broadcaster and the listener, it is a characteristic inherent in the broadcasting of a programme. In addition, limitations imposed by the technical characteristics of the means of transmission available to some administrations will impose mandatory requirements for frequency continuity.

1.2 The desirable aim is that changes in frequency should be limited only to those necessitated by changes in propagation conditions. Frequency changes due to incompatibilities may also be permitted. In these cases, the number of frequency changes during any contiguous periods of operation shall be limited to the minimum necessary.

2. Definitions

2.1 Intra-seasonal

2.1.1 Type 1 continuity

Continuity of use of the same frequency within an hour or from one hour to another consecutive hour within a requirement.

2.1.2 Type 2 continuity

Continuity of use of the same frequency in the same season when passing from one requirement to another or one time block to another.

2.2 Inter-seasonal

2.2.1 Type 3 continuity

Continuity of use of the same frequency by the same requirement in two consecutive seasons.

2.2.2 Type 4 continuity

Continuity of use of the same frequency by the same requirement in two consecutive equinox seasons.

2.2.3 Type 5 continuity

Continuity of use of the same frequency by the same requirement in the same season of two consecutive years.

3. Relationship between frequency continuity and appropriate band(s)

3.1 The frequency assigned to a requirement is dependent on the band determined to be the "appropriate band". The appropriate band is established within the HFBC System by taking account, amongst other things, of the desirability of maintaining maximum frequency continuity within the limits of the agreed reference value for BBR (at present BBR = 80%).

3.2 In cases where propagation conditions are changing rapidly to the extent that would result in changes to the appropriate band then an administration may elect to choose extended frequency continuity at the expense of BBR. If in this case the BBR falls below the reference value, the second and/or third frequencies are afforded only when the application of frequency continuity would not result in a number of additional frequencies greater than would be necessary with operation in the appropriate bands.

3.3 When the requirement under consideration is eligible to use a second or third frequency according to the procedures established in section 3.8.2 of the report of the First Session, the frequency continuity conditions applicable to the first frequency should also be applied to the second (and third) frequency.

4. Application of continuity

Continuity of all types is to be applied under the conditions set out in section 3 above.

4.1 Type 1 continuity shall be applied automatically to all requirements.

4.2 Type 2 continuity shall be applied at the request of the administration. Provision of type 2 continuity will be mandatory if requested by the administration and that administration advises the constraints that necessitate the frequency continuity.

4.3 Type 3 continuity shall be applied to the extent possible within the HFBC System when requested by the administration.

4.4 Type 4 continuity shall be applied to the extent possible within the HFBC System when requested by the administration.

4.5 Type 5 continuity shall be applied to the extent possible within the HFBC System when requested by the administration.

K.G. MALCOLM
Drafting Group Coordinator 5-A-3

HFBC (2) INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
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WORKING GROUP 5-A

DRAFT TEXT ON THE REQUIREMENTS FILE BY EDITORIAL GROUP 5-A-1

1. For the purposes of this Article, a Requirements File shall be established, containing the existing and expected requirements for HF broadcasting. Each requirement listed in the File shall give the characteristics listed in Appendix 2 and indicate the season(s) in which the requirement will be used.

2. For the purposes [of the HFBC Planning System], a requirement shall be defined as follows:

"A requirement indicated by an administration to provide a broadcasting service at specified periods of time to a specified reception area from a particular transmitting station".

3. For the purposes of [Article 17], a requirement shall be defined as above with indication of the assigned frequency. In the application of [Article 17], when a requirement does not give the assigned frequency or the preferred band, the frequency to be assigned shall be recommended by the Board under No. [ ] of the Radio Regulations.

4. The Board shall take the necessary steps to establish the File far enough in advance during the period preceding the entry into force of the Final Acts so that it can be used for the first seasonal [plans or schedules]. It shall be limited to the first [n] seasons after the entry into force of the Final Acts.

5. Any administration may at any time notify the Board of any additions, modifications or deletions it wishes to make in its requirements in the Requirements File. However, information specific to a particular season as indicated in Appendix 2 must reach the Board not more than [x] months or less than [y] months[1] before the beginning of the season in question.

6. The Board shall verify that the information provided is complete and, in consultation with the administration concerned, shall endeavour to make any necessary corrections. If, by the date for the start of processing of a particular season, the information for a requirement is still incomplete despite the action taken by the Board, it shall be left out of account for the season in question.

7. The Board shall attempt so far as possible to identify incompatible requirements in advance and shall request the administrations concerned to take the necessary steps to eliminate them.

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[1] [The period may vary depending on whether the information is to be used for the HFBC Planning System or for Article 17.]

8. For each [season] [half-year] [year], the Board shall fix the date[s] on which it will start processing the requirements for the season[s] concerned and give administrations [prior] notification thereof. The requirements appearing in the Requirements File on the above-mentioned date[s] shall be used in drawing up the seasonal [plans] [schedules] without any priority being conferred by the date of revision of the Requirements File.

9. The processing of urgent additions or modifications notified to the IFRB after the date[s] given in [8] shall be considered under the [HFBC Planning System] and [Article 17] procedures.

10. Committee 5 might consider the desirability of recording the history of the use of each assignment in the Requirements File.

D. SAUVET-GOICHON
Chairman of Editorial Group 5-A-1

APPENDIX 2

Information relating to the broadcasting service in the exclusive HFBC bands (see Article(s) ....)

PART A: General instructions

A separate notice, or requirement form shall be sent to the IFRB for:

- each frequency assignment, or requirement to be put into use for a particular season;
- any change in the characteristics of a frequency assignment or requirement;
- any deletion of a frequency assignment or requirement.

PART B: Permanent Basic characteristics

1 - name of the transmitting station;

2 - geographical coordinates of the transmitting station;

3 - symbol of the country or geographical area in which the transmitting station is located;

4 - required service area;

5 - hours of operation (UTC) [legal clock time changes];

6 - class of emission.

PART C: Basic seasonal characteristics relative to the HFBC Planning System

1 - range of antenna characteristics;

2 - range of power capabilities;

3 - preset frequencies;

4 - number of frequencies that can be used simultaneously;

[5 - nature of requirement (national or international).]

[**PART D: Basic seasonal characteristics relative to Article 17**

1 - assigned frequency (kHz);

2 - alternative frequency (kHz);

3 - frequency band (MHz);

4 - power (kW);

5 - transmitting antenna characteristics;

6 - other frequencies simultaneously utilized for same programme to the same area(s).]

PART E: Optional Supplementary characteristics relative to the HFBC Planning System

1 - preferred frequencies or preferred bands;

2 - request for frequency continuity between two requirements in the same season;

3 - request for frequency continuity between two requirements in different seasons;

4 - request for synchronous operations between two requirements;

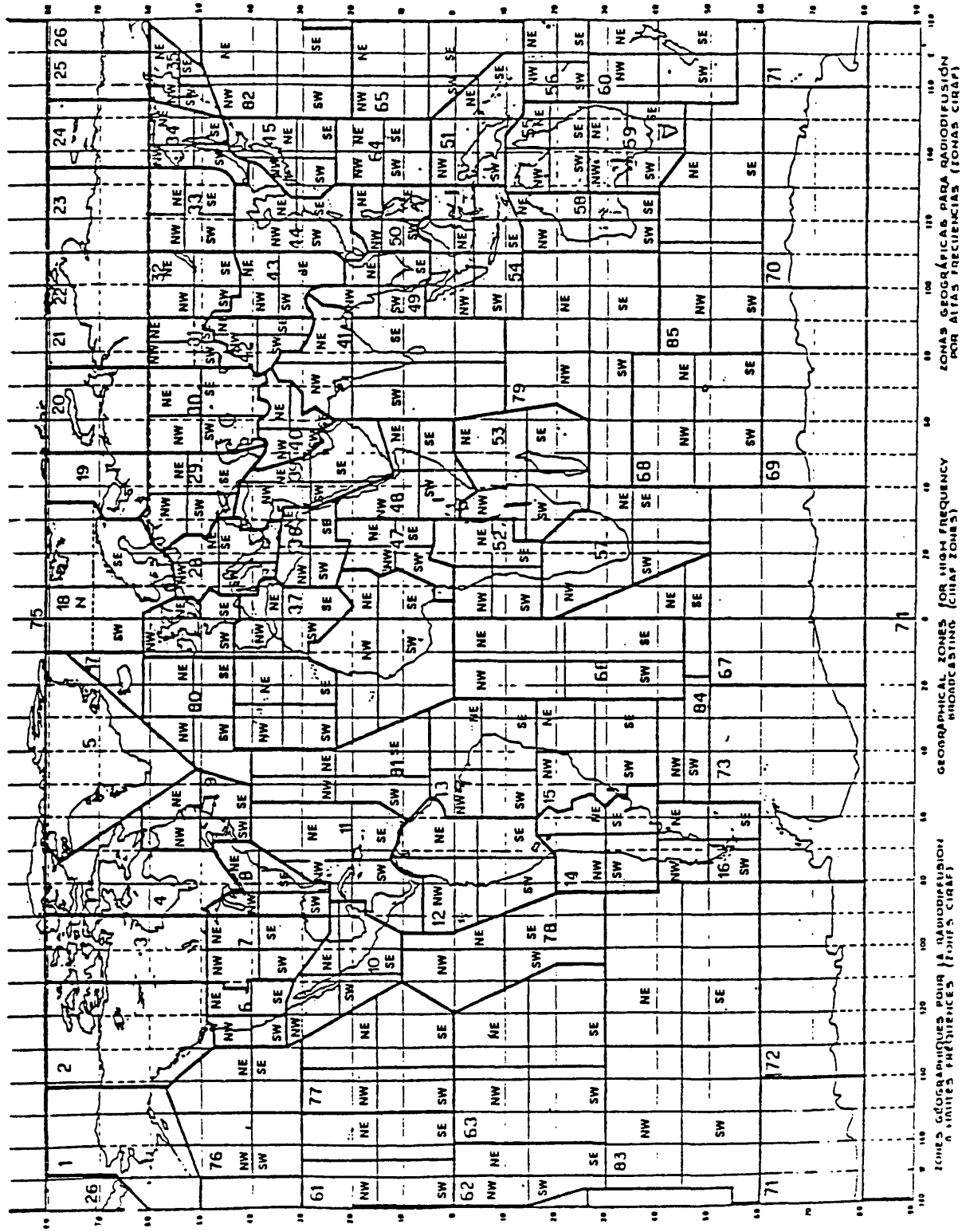
[5 - request for a seasonal fixed frequency for one or more requirements;]

6 - other equipment limitations;

[7 - lowest value of BBR to be used for the requirements of ... (see Document DT/31).]

ANNEX TO APPENDIX 2

GEOGRAPHICAL ZONES FOR BROADCASTING



HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
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COMMITTEE 6

Note from the Chairman of Working Group 6 ad hoc 2

DRAFT RESOLUTION [COM 6/1]

Procedure to Maintain the Flexibility of the Technical Criteria and the Planning Method Used for the Planning of the HF Broadcasting Service

The World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service, Geneva, 1987,

considering

a) that it has considered in detail the technical criteria and the planning method relating to the HF Broadcasting Service operating with double sideband modulation technique;

b) that the planning exercises carried out by the IFRB in the period between the two sessions of the Conference indicated that an improvement of some of the technical criteria such as the field strength prediction method and others may need to be implemented with some flexibility depending on the continuing actual implementation of seasonal plans and the results of technical studies by the CCIR;

c) that in accordance with RR 1001, among the functions of the Board is the development of its Technical Standards;

d) that in accordance with the provisions of RR 1454 the Technical Standards of the Board shall be based on the relevant provisions of the Radio Regulations and the Appendices thereto, the decisions of administrative conferences of the Union, as appropriate, the Recommendations of the CCIR, the state of the radio art and the development of new transmission techniques, account being taken of exceptional propagation conditions which may prevail in certain regions (for example, particularly pronounced ducting);

e) that in accordance with [RR 1770], the IFRB Technical Standards shall be based on the above as well as on the experience gained by the Board in applying the periodical planning process;

f) that, with respect to the Technical Standards, the CCIR could provide the best source of professional advice,

resolves

1. that following the meeting of the CCIR Plenary Assembly the IFRB shall review its Technical Standards relating to the planning of HF Broadcasting Services in the light of the new CCIR Recommendations or modifications to existing Recommendations and shall circulate to all administrations the results of its review indicating when necessary the reasons for not having including in its Technical Standards all or part of the CCIR results;

2. that if as a result of the implementation of the HFBC planning method the Board finds it appropriate to improve the details of this implementation without departing from the provisions of [ ] it shall inform administrations of these improvements indicating the reasons therefor;

3. that administrations shall be requested to give their comments within [ ] and the Board shall take them into account [to the extent practicable];

4. [that where the Board finds it necessary or if a reasonable number of Administrations so request] the Board shall organize an information meeting on the subject referred to in resolves 1 and 2 above to which all administrations shall be invited;

5. that if following consultation in the information meeting the Technical Standards are not modified, the IFRB shall prepare a contribution to the CCIR indicating the parts of the CCIR recommendation that were not included in the IFRB Technical Standards together with any information necessary for the recommendation of the matter;

6. that after a second reconsideration of these parts by a CCIR plenary, if its conclusions are unanimously adopted, they shall be included in the IFRB Technical Standards.

E.D. DuCHARME
Chairman of Working Group 6 ad hoc 2

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
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WORKING GROUP 4-A

LIST OF SYSTEM PLANNING AND TECHNICAL PARAMETERS

1. System planning parameters

1.1 Channel spacing

The nominal spacing for double sideband (DSB) shall be 10 kHz. However the interleaved channels with a separation of 5 kHz may be used in accordance with the relative protection criteria.

1.2 RF protection ratios

[1.2.1 The co-channel protection ratio shall be [to be developed].]

1.2.2 The relative rf protection ratios (α) for carrier frequency separations*, with reference to that for the co-channel case, shall be:

Δf	α
$\pm$5 kHz	-3 dB
$\pm$10 kHz	-35 dB
$\pm$15 kHz	-49 dB
$\pm$20 kHz	-54 dB

1.2.3 Proportionally Reduced Protection (PRP)

PRP is a margin (M) by which the RF protection ratio to be applied at a test point is reduced under the following specified conditions:

1) the BBR < 80%, and

2) only one frequency band is given by the planning system, and

3) at the test point considered the field strength E_w is less than E_{min} and greater than or equal to E_{min} - Z[1)].

In these conditions M is determined as: $M = E_{min} - E_w$.

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* Frequency separations, Δf < -20 kHz, as well as Δf > +20 kHz, need not be considered in planning.

1) Z is defined in section [...].

In such cases the proportionally reduced protection ratio is used in the evaluation of S/I at the test point considered. For all the remaining points within the required service area, full protection as determined by the relevant protection ratio is given when $E_w \geqslant E_{min}$ and no protection is given when $E < E_{min} - Z$.

In cases where PRP is not applicable, full protection as determined by the relevant protection ratio is afforded when $E_w \geqslant E_{min}$ and no protection is afforded when $E_w < E_{min}$.

1.3 Minimum usable field strength

The minimum usable field strength shall be determined by adding 34 dB to the greater of:

- the field strength due to atmospheric radio noise as contained in CCIR Report 322-2;

- 3.5 dB (μV/m), which is the intrinsic receiver noise level.

1.4 Required service areas and test points

1.4.1 In specifying the required service area reference shall be made to a combination of:

- CIRAF zones,

- quadrants of CIRAF zones,

- a part of a quadrant specified by the set of test points contained within that part.

1.4.2 Where it is necessary to specify a required service area which is smaller than an entire zone or quadrant, this may be done by specifying the boundaries of the area as two azimuths and two ranges from the transmitter location.

1.4.3 The set of 911 test points listed in [the Report of the IFRB to the Second Session of the Conference (Annex 1 to Chapter 3, section 3)] shall be used to represent the CIRAF zones and quadrants for planning purposes.

Where a required service area is defined as set out in paragraph 1.4.2, and where such an area does not include a test point, the IFRB shall generate a new test point and include it within the Technical Standards. Such additions to the Technical Standards will be distributed to administrations (Nos. 1001 and 1001.1 of the Radio Regulations).

1.5 The method to be used to determine the sky-wave field strength for HF broadcast planning purposes

[1.5.1 To be developed.]

1.5.2 Seasonal divisions of the year and representative months

The year shall be sub-divided into four seasons for propagation prediction purposes. These seasons are listed in Table 3-14. When predictions are made for a single month to represent a season, the month selected shall be as indicated in the second column of the table.

TABLE 3-14

Season	Representative month
November-February	January
March-April	April
May-August	July
September-October	October

1.5.3 Solar index values

The 12-month running mean sunspot number R_{12} shall be the solar index to be used for planning.

The [seasonal] plan shall be prepared in accordance with the values of R_{12} predicted for the period. The lowest value of R_{12} predicted for any of the months in that [season] shall be used.

1.6 Signal fading

1.6.1 Short-term (within the hour) fading

The upper-decile amplitude deviation from the median of a single signal is to be taken as 5 dB and the lower-decile deviation is to be taken as -8 dB.

1.6.2 Long-term (day-to-day) fading

The magnitude of the long-term fading, as determined by the ratio of the operating frequency to the basis MUF, is given in Table 3-6 of the Report to the Second Session of the Conference.

1.7 Reliability

[To be developed: Note Document 117.]

1.8 The use of additional frequencies

[To be developed: Note Document 116.]

1.9 The protection ratio for synchronized transmissions

The co-channel protection ratio between synchronized transmissions in the same network shall be:

Distance L between synchronized transmitters: km	Protection ratio dB
$L \leqslant 700$	0
$700 < L \leqslant 2{,}500$	4
$2{,}500 < L$	8

[1.10 The minimum values of technical parameters]

2. Transmission characteristics

2.1 Nominal carrier frequencies

Carrier frequencies shall be integral multiples of 5 kHz.

2.2 Audio-frequency band

The upper limit of the audio-frequency band (-3 dB) of the transmitter shall not exceed 4.5 kHz and the lower limit shall be 150 Hz, with an attenuation of 6 dB per octave for frequencies lower than 150 Hz.

2.3 Modulation processing

If audio-frequency signal processing is used, the modulating signal shall retain a dynamic range of not less than 20 dB.

2.4 Necessary bandwidth

The necessary bandwidth shall not exceed 9 kHz.

[2.5 Transmitter power]

L.W. BARCLAY
Chairman of Working Group 4-A

Note to Committee 5: As regards proportionally reduced protection, during the intersessional work the IFRB has used a value of 5 dB for Z, but there are proposals for a value of 5 or 10 dB to be used. The decision as to the appropriate value of Z is not a technical matter.

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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12 February 1987
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WORKING GROUP 4-A

DRAFT RECOMMENDATION [COM4/C]

Double-Sideband System Specification for the HF Bands Allocated to the Broadcasting Service

The World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service, Geneva, 1987,

considering

a) that some planning parameter and equipment characteristics are likely to be improved in the future following further study;

b) that an agreed set of parameters and characteristics is required for use up to the time when the results of further study will become available;

c) that provision is made in [Resolution ...] for the incorporation of improvements;

[d) that Resolution ... determines the antennas to be used,]

recommends

1. that the IFRB shall prepare and publish a set of Technical Standards based on the references given in the annex to this Recommendation;

2. that these Technical Standards shall be used for the planning of the HF bands allocated to the broadcasting service until such time when the provisions of [Resolution ...] will be applicable.

Annex: 1

ANNEX

1. System planning parameters

1.1 Channel spacing

The nominal spacing for double sideband (DSB) shall be 10 kHz. However the interleaved channels with a separation of 5 kHz may be used in accordance with the relative protection criteria.

1.2 RF protection ratios

1.2.1 The co-channel protection ratio shall be [to be developed].

1.2.2 The relative rf protection ratios for carrier frequency separations, with reference to that for the co-channel case, shall be:

±5 kHz -3 dB

±10 kHz -35 dB

±15 kHz -49 dB

±20 kHz -54 dB

[1.2.3 Proportionally reduced protection]

1.3 Minimum usable field strength

The minimum usable field strength shall be determined by adding 34 dB to the greater of:

- the field strength due to atmospheric radio noise as contained in CCIR Report 322-2;

- 3.5 dB (μV/m), which is the intrinsic receiver noise level.

1.4 [Reception zones] and test points

1.4.1 In specifying the [reception area,] reference shall be made to a combination of:

- CIRAF zones,

- quadrants of CIRAF zones,

- a part of a quadrant specified by the set of test points contained within that part.

1.4.2 Where it is necessary to specify a [reception area] which is smaller than an entire zone or quadrant, this may be done by specifying the boundaries of the area as two azimuths and two ranges from the transmitter location.

1.4.3 The set of 911 test points listed in the Report of the IFRB to the Second Session of the Conference (Annex 1 to Chapter 3, section 3) shall be used to represent the CIRAF zones and quadrants for planning purposes.

Where a [reception area] is defined as set out in paragraph 3.7.1.2, and where such an area does not include a test point, the IFRB shall generate a new test point and include it within the Technical Standards. Such additions to the Technical Standards will be distributed to administrations (Nos. 1001 and 1001.1 of the Radio Regulations).

1.5 The method to be used to determine the sky-wave field strength for HF broadcast planning purposes

1.5.1 The method to be used shall be that given in the Report to the Second Session of the Conference, paragraph 3.2.1, together with the amended values given in CCIR Recommendation 621.

1.5.2 Seasonal divisions of the year and representative months

The year shall be sub-divided into four seasons for propagation prediction purposes. These seasons are listed in Table 3-14. When predictions are made for a single month to represent a season, the month selected shall be as indicated in the second column of the table.

TABLE 3-14

Season	Representative month
November-February	January
March-April	April
May-August	July
September-October	October

1.5.3 Solar index values

The 12-month running mean sunspot number R_{12} shall be the solar index to be used for planning.

The seasonal plan shall be prepared in accordance with the values of R_{12} predicted for the period. The lowest value of R_{12} predicted for any of the months in that season shall be used.

1.6 Signal fading

1.6.1 Short-term (within the hour) fading

The upper-decile amplitude deviation from the median of a single signal is to be taken as 5 dB and the lower-decile deviation is to be taken as -8 dB.

1.6.2 Long-term (day-to-day) fading

The magnitude of the long-term fading, as determined by the ratio of the operating frequency to the basis MUF, is given in Table 3-6 of the Report to the Second Session of the Conference.

1.7 Reliability

[To be developed.]

1.8 The protection ratio for synchronized transmissions

The co-channel protection ratio between synchronized transmissions in the same network shall be:

Distance L between synchronized transmitters: km	Protection ratio dB
$L \leq 700$	0
$700 < L \leq 2,500$	4
$2,500 < L$	8

[1.9 The minimum values of technical parameters]

2. Transmission characteristics

2.1 Nominal carrier frequencies

Carrier frequencies shall be integral multiples of 5 kHz.

2.2 Audio-frequency band

The upper limit of the audio-frequency band (-3 dB) of the transmitter shall not exceed 4.5 kHz and the lower limit shall be 150 Hz, with an attenuation of 6 dB per octave for frequencies lower than 150 Hz.

2.3 Modulation processing

If audio-frequency signal processing is used, the modulating signal shall retain a dynamic range of not less than 20 dB.

2.4 Necessary bandwidth

The necessary bandwidth shall not exceed 9 kHz.

[2.5 Transmitter power]

L.W. BARCLAY
Chairman of Working Group 4-A

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS
ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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WORKING GROUP 4-A

DRAFT RECOMMENDATION [COM4/D]

Use of Synchronized Transmitters in the HF Bands Allocated to the Broadcasting Service

The World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service, Geneva, 1987,

considering

a) that the use of synchronized transmitters, where appropriate, is an efficient means of economizing frequency spectrum;

b) Recommendation No. 503;

c) that, where the path location is unfavourable, a Doppler frequency difference greater than 0.1 Hz may occur at certain hours of the day;

d) the content of CCIR Recommendation 205,

recognizing

that further studies on the use of synchronized transmitters in HF bands are needed,

invites the CCIR

to accelerate the studies defined in the CCIR Study Programme 44L/10 with the view that comprehensive CCIR Recommendations on this subject could be made.

L.W. BARCLAY
Chairman of Working Group 4-A

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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12 February 1987
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WORKING GROUP 4-A

Note by the Secretary-General

At the request of the Chairman of the IFRB, I have the honour to transmit herewith a copy of a note established to the intention of the Conference in response to a question posed at the 8th Meeting of Working Group 4-A.

R.E. BUTLER

Secretary-General

Annex: 1

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NOTE BY THE IFRB IN RESPONSE TO A QUESTION POSED AT THE 8th MEETING OF WORKING GROUP 4A

The IFRB established a series of test plans during the intersessional period. With the exception of 3 plans (Nos. 55, 56 and 58) the frequency assignment procedure was carried out for a 10 kHz channel spacing. In plans No. 55, 56 and 58 the frequency assignment was carried out for a 5 kHz channel spacing.

In all plans where preset frequencies were considered as mandatory (i.e. in all plans except plan No. 11), preset frequencies were assigned which were multiples of 5 kHz, as specified by the Administrations concerned in their requirement forms.

In the planning algorithm:

- the calculation of the GIR's was based on either a 10 kHz spacing (all plans except Nos. 55, 56, 58) or a 5 kHz spacing (plans 55, 56, 58);

- the frequency assignment process was based on either a 10 kHz channel spacing (all plans except Nos. 55, 56, 58) or a 5 kHz spacing (plans 55, 56, 58).

In all plans (except No. 11) the relevant relative protection ratios for 0, 5, 10, 15 and 20 kHz adjacent channel spacing were used to define incompatibilities and to determine minimum frequency separations necessary to avoid interference.

With respect to interleaved transmissions at 5 kHz separation the following may be said: the frequency assignment process is designed in such a way that, in the first instance, it is not possible to assign frequencies which are separated by only 5 kHz to adjacent zones.

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS
ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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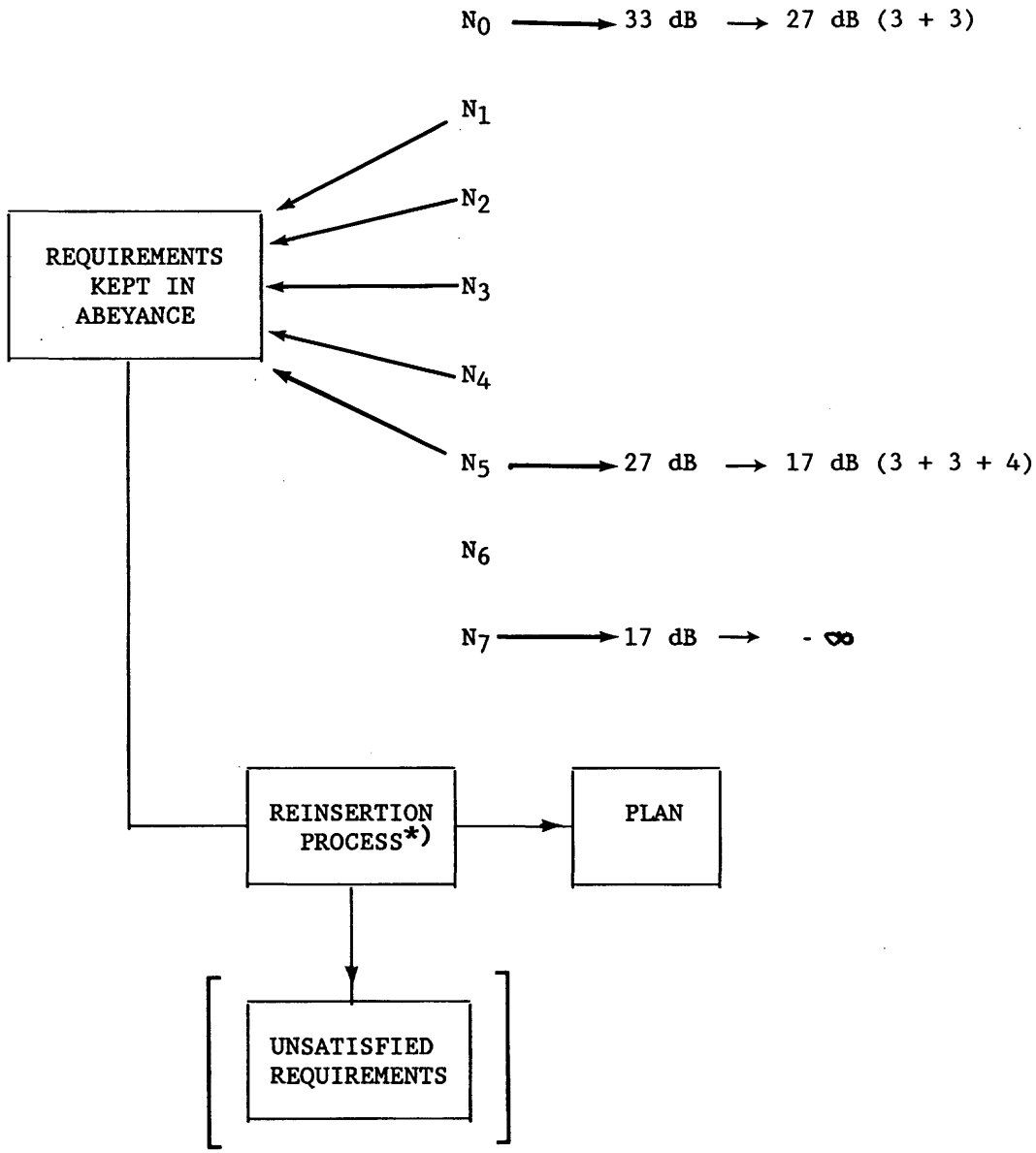
12 February 1987
Original: English

SUB-WORKING GROUP 5A-4

NOTE FROM THE CHAIRMAN OF SUB-WORKING GROUP 5A4

The material taken from Document DT/4 and pages 69 and 70 of the Report to the Second Session is attached to facilitate discussions.

T. BOE
Chairman of Sub-Working Group 5A4



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*) Without "adversely" affecting the requirements already satisfied.

REDUCTION OF PROTECTION RATIO

FOR INTERSESSIONAL WORK THE FOLLOWING HAS BEEN USED

PROTECTION RATIO	27 DB
FADING MARGIN (80%)	3 DB (10)
MULTIPLE INTERFERENCE MARGIN	3 DB (6)
TOTAL (TPR)	33 DB (43)

AS A FIRST STEP IN REDUCING CONGESTION

A) THE FADING MARGIN IS IGNORED (TPR) = 30

B) THE MULTIPLE INTERFERENCE MARGIN IS IGNORED (TPR) = 27

THESE REDUCTIONS IN PROTECTION RATIO ARE CARRIED OUT FOR MEMBERS OF GIR ONLY.

EXAMPLE:

TPR	33	30	27
RNC	100	79	67

REDUCTION OF THE NUMBER OF REQUIREMENTS

1. BREAK ALL SERVICE AREAS INTO QUADRANTS

2. RANK UTILISATION OF QUADRANTS BY ADMINISTRATION

3. DETERMINE DEFICIT d (> 0)

   d = RNC - ANC (1s in GIR)

4. MAKE d + 1 SUSPENSIONS:

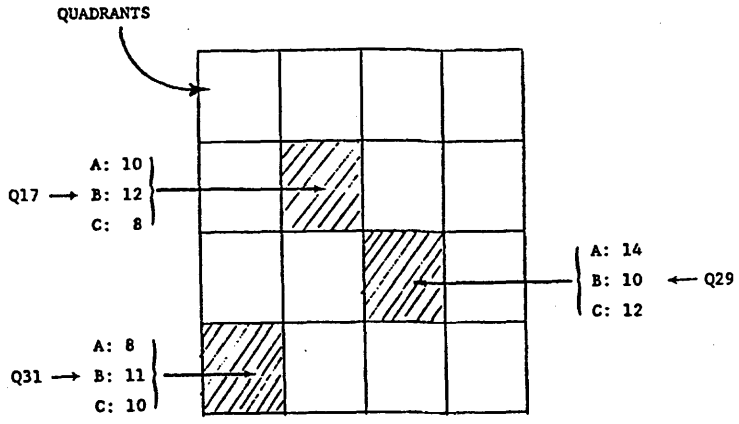
   - DETERMINE CANDIDATES FOR SUSPENSION FROM AMONGST REQS. CONTAINED IN THE MAXGIR USING THE RULES N_1, N_2, N_3

   - FOR A GIVEN ADMINISTRATION/QUADRANT, EXHAUST RULE N_i BEFORE PASSING TO RULE N_i+1

5. RE-EVALUATE GIR

RANK UTILIZATION OF QUADRANTS BY ADMINISTRATION

MEMBERS OF GIR: A1, A2, ..., A17
B1, B2, ..., B20
C1, C2, ..., C16



START SUSPENSIONS WITH REQUIREMENTS OF ADMINISTRATION A, Q29

SUSPENSION RULES

RULE N1: IDENTICAL SERVICE AREAS, SAME BAND

RULE N2: COMMON UNIT OF SERVICE AREA, SAME BAND

RULE N3: COMMON UNIT OF SERVICE AREA, DIFFERENT BANDS

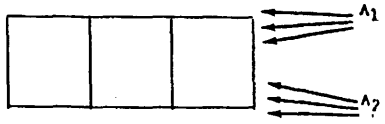
RULE N4: REQUIREMENT NECESSITATING 2 OR 3 FREQUENCIES SIMULTANEOUSLY

RULE N5: LOWER PROTECTION RATIO

RULE N6: REDUCE TRANSMISSION TIME

RULE N1

EXAMPLE:

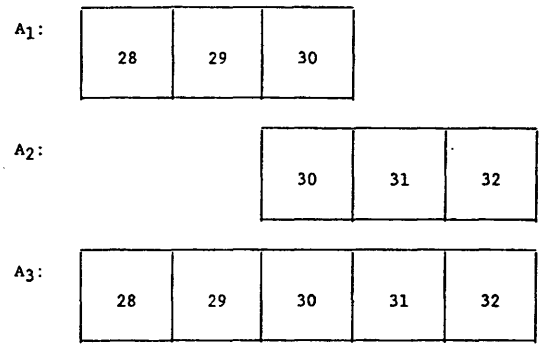


IDENTICAL AREAS

A_1: 28, 29, 30 ← THIS
A_2: 28, 29, 30 ← OR THIS

RULE N2

EXAMPLE:



A_1 OR A_2 (OR BOTH) COULD BE SUSPENDED

RULE N3

BAND 6 (UNDER CONSIDERATION)

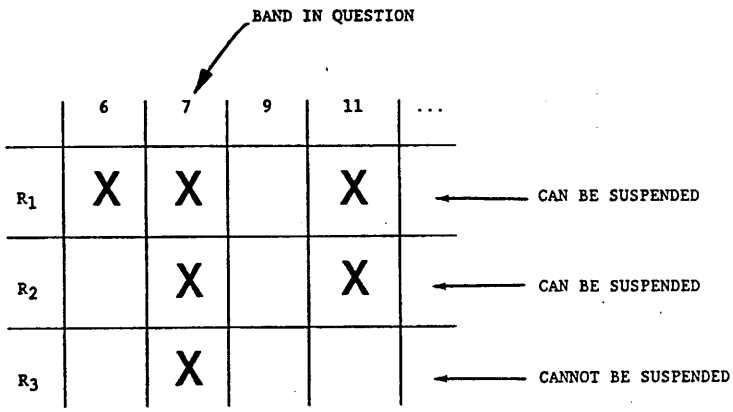
B_{10}: 28, 29, 30, 31
B_{14}: 26, 27, 28
B_{17}: 25, 26, 28

EXAMPLE

BAND 7 B_{28}: 27, 31, 32
→ B_{14} CAN BE SUSPENDED
→ B_{17} CANNOT BE SUSPENDED

RULE N4

SUSPEND REQUIREMENT FROM THE BAND UNDER CONSIDERATION IF THE REQUIREMENT IS PRESENT IN 2 OR 3 BANDS



RULE N5

REDUCE PROTECTION RATIO IN STEPS OF 3 DB (RETAIN OVERALL PR OF 17 DB)

THIS REDUCTION IS CARRIED OUT SIMILARLY TO THAT EFFECTED BEFORE EVOKING RULE N_1.

THESE REDUCTIONS IN PROTECTION RATIO ARE CARRIED OUT FOR MEMBERS OF GIR ONLY.

EXAMPLE:

TPR	27	24	21
RNC	52	52	48

CHAPTER 4

PLANNING PRINCIPLES AND METHOD

Having considered the proposals of administrations on planning principles and method, the first session of the Conference concluded that the planning of the high frequency broadcasting service shall be based on four seasonal plans to be prepared annually or semi-annually using broadcasting requirements submitted periodically by the administrations. The seasonal plans shall be prepared on the basis of the following principles and planning method.

4.1 Planning principles

4.1.1 In accordance with the International Telecommunication Convention and with the Radio Regulations annexed thereto, the planning of the high frequency bands allocated to the broadcasting service shall be based on the principle of equal rights of all countries, large or small, to equitable access to these bands and to utilize them in accordance with the decisions taken by this Conference. In planning, an attempt shall also be made to achieve an efficient utilization of these frequency bands, account being taken of the technical and economical constraints that may exist in certain cases.

4.1.2 On the basis of the foregoing, the following planning principles shall be applied.

4.1.2.1 All the broadcasting requirements, current or future, formulated by the administrations, shall be taken into account and be treated on an equitable basis, so as to guarantee the equality of rights referred to in paragraph 4.1.1 above and to enable each administration to provide a satisfactory service.

4.1.2.2 All the broadcasting requirements, national[1] and international, shall be treated on an equal basis, with due consideration of the differences between these two kinds of broadcasting requirements.

4.1.2.3 In the planning procedure, an attempt shall be made to ensure, as far as practicable, the continuity of the utilization of a frequency or of a frequency band. However, such continuity should not prevent equal and technically optimum treatment of all broadcasting requirements.

4.1.2.4 The periodical planning process shall be based solely on the broadcasting requirements to become operational during the planning period. It shall furthermore be flexible to take into account new broadcasting requirements and modifications to the existing broadcasting requirements, in accordance with the modification procedures to be adopted by the Conference.

---

[1] An HF broadcasting use is considered as being for purposes of national coverage when the transmitting station and its associated required service area are both located within the territory of the same country. (There is a need for this note to appear in the Final Acts of the Conference.)

4.1.2.5 The planning procedure shall be based on DSB transmissions. SSB transmissions which administrations might wish to make may, however, be permitted in lieu of planned DSB transmissions, provided that the level of interference caused to DSB transmissions appearing in the Plan is not increased.

4.1.2.6 For efficient spectrum utilization, whenever possible, only one frequency should be used to meet a given broadcasting requirement in a given required service area and in any case the number of frequencies used should be the minimum necessary to provide satisfactory reception.

4.1.2.7 Those broadcasting requirements for which, through lack of the requisite technical facilities, the agreed minimum usable field strength is not ensured at any point of the required service area, could obtain proportionally reduced protection against interference as indicated in paragraph 3.2.4.6 (page 36).

4.1.2.8 In a first stage of the equitable application of the planning procedure, an attempt will be made to include the highest possible number of the submitted requirements so as to achieve the desired quality level. The remaining requirements would be processed on the understanding that lower quality levels would be acceptable.

4.1.2.9 The planning method shall satisfy on an equal basis a minimum of the broadcasting requirements submitted by administrations with the level of overall broadcasting reliability adopted by the Conference. Special consideration shall be given to administrations which, in the first instance, are unable to achieve the overall broadcasting reliability.

HFBC (2)

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SECOND SESSION, GENEVA, February-March 1987

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WORKING GROUP 4-B

Note by the Chairman of Working Group 4-B ad hoc 3

Based on the decisions taken in Working Group 4-B ad hoc 3, the annexed draft Resolution relating to the transition from double-sideband to single-sideband emissions in the HF bands allocated to the broadcasting service has been developed for consideration in Working Group 4-B.

G.S. SPELLS
Chairman of Working Group 4-B ad hoc 3

Annex: 1

ANNEX

Draft text for inclusion in the Final Acts

DRAFT

RESOLUTION [COM4/2]

Transition from Double-Sideband Emissions to Single-Sideband Emissions in the HF Bands Allocated to the Broadcasting Service

The World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service, Geneva, 1987,

considering

a) that the HF bands allocated to the broadcasting service are severely congested;

b) that the level of congestion within these HF bands is increasing;

c) that the use of single-sideband techniques will provide a much more efficient utilization of the frequency spectrum than double-sideband techniques;

d) that single-sideband has the capability of improving the quality of reception;

e) that the lifetime of a transmitter is estimated at twenty years;

f) that the lifetime of a receiver is in the order of ten years;

g) that it is economically unattractive to convert existing conventional DSB transmitters to SSB operation;

h) appendix (Document 84(Rev.1)) to the Radio Regulations concerning the single-sideband system specification for the HF bands allocated to the broadcasting service;

i) that the First Session of the World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service, Geneva, 1984, in the Report to the Second Session addressed the progressive introduction of SSB emissions;

j) Recommendation No. 501 of the World Administrative Radio Conference, 1979 relating to studies for the introduction of SSB techniques,

resolves

1. that the transitional procedure in the annex to this Resolution shall be used for the purpose of ensuring an orderly implementation of the changeover from double-sideband to single-sideband emissions in the HF bands allocated to the broadcasting service;

2. that the final date for the cessation of double-sideband emissions specified in the annex to this Resolution shall be subject to periodic review by future competent WARCs in the light of the latest available complete statistics on the world-wide distribution of SSB transmitter and receiver availability and that the first such review shall be undertaken prior to the year 2000,

requests the Administrative Council of the ITU

to place, as an extraordinary item, on the agendae of future WARCs the matter referred to in and in conformity with resolves 2 above,

requests the CCIR

to compile and maintain the statistics referred to in resolves 2 above,

invites administrations

to assist the CCIR in its task mentioned above by providing the relevant statistical data.

ANNEX TO RESOLUTION [COM4/2]

Transitional Procedure for the Changeover from Double-Sideband to Single-Sideband Emissions in the HF Bands Allocated to the Broadcasting Service

1. The use of single-sideband emissions is permitted as from [entry into force of the Final Acts, 0100 UTC].

2. All double-sideband emissions shall cease on [31 December 2015, 2359 UTC] (see also resolves 2 in the main body of the Resolution).

3. Single-sideband emissions shall be in conformity with the characteristics specified in appendix (Document 84(Rev.1)) to the Radio Regulations.

4. In the period between [entry into force of the Final Acts, 0100 UTC] and [31 December 2015, 2359 UTC] single-sideband emissions shall use carrier reduction of 6 dB relative to peak envelope power.

5. After [31 December 2015, 2359 UTC] only single-sideband emissions with a carrier reduction of 12 dB relative to peak envelope power shall be used.

o

6. In the period between 1 January 1991, 0100 UTC and [31 December 2015, 2359 UTC] whenever an administration uses a single-sideband frequency assignment to replace its double-sideband frequency assignment on which planning has been based, shall use a single-sideband carrier power 3 dB below the carrier power of the double-sideband emission it is going to replace, i.e. equivalent sideband power (see appendix (Document 84(Rev.1)) to the Radio Regulations, section 1.2) shall not be used in order to avoid an increase in the interference potential of the single-sideband emission relative to the double-sideband emission it is to replace.

HFBC (2)

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SECOND SESSION, GENEVA, February-March 1987

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WORKING GROUP 4-A

Draft report of Working Group 4-A ad hoc 2

RELIABILITY AND QUALITY ASSESSMENT

MODIFICATIONS TO THE REPORT TO THE SECOND SESSION (SECTIONS 2.7, 3.2.4 TO 3.2.4.5, AND 3.8 OF THE REPORT TO THE SECOND SESSION)

The following table summarizes the proposals of Working Group 4-A ad hoc 2 concerning these sections. Details of the proposed modifications and new material are given in the annex.

Section	Title	Proposal
2.7	Terms relating to reliability	Retain
3.2.4	Reliability	Retain
3.2.4.1	Calculation of basic circuit reliability (BCR)	Retain
Table 3-8	Parameters used to compute basic circuit reliability	Modify
Figure 3-4	Parameters used to compute basic circuit reliability	Retain
3.2.4.2	Calculation of overall circuit reliability (OCR)	Retain
Table 3-9	Parameters used to compute overall circuit reliability	Modify
Figure 3-5	Parameters used to compute overall circuit reliability	Retain

Section	Title	Proposal
3.2.4.3	Basic reception reliability (BRR)	Retain
3.2.4.4	Overall reception reliability (ORR)	Retain
Table 3-10	Basic reception reliability	Modify
Table 3-11	Overall reception reliability	Modify
3.2.4.5	Basic and overall broadcast reliability	Modify
Table 3-12	Basic broadcast reliability	Retain
3.8	Maximum number of frequencies required for broadcasting the same programme to the same zone	Retain
3.8.1	Introduction	Modify
3.8.2	Use of additional frequencies	Modify
3.8.3	Determination of additional frequency bands	New
[ ]	Assessment of an assignment	New

D.B. ROSS
Chairman of Working Group 4-A ad hoc 2

Annex: 1

ANNEX

TABLE 3-8

Parameters used to compute basic circuit reliability

STEP	PARAMETER	DESCRIPTION	SOURCE
(1)	$E_W(50)$ dB (μV/m)	Median field strength of wanted signal[1]	Prediction method (section 3.2.1)
(2)	$D_U(S)$ dB	Upper decile of slow fading signal (day-to-day)	(section 3.2.3.2, Table 3-6)
(3)	$D_L(S)$ dB	Lower decile of slow fading signal (day-to-day)	(section 3.2.3.2, Table 3-6)
(4)	$D_U(F)$ dB	Upper decile of fast fading signal (within the hour)	5 dB (section 3.2.3.1)
(5)	$D_L(F)$ dB	Lower decile of fast fading signal (within the hour)	-8 dB (section 3.2.3.1)
(6)	$D_U(E_W)$ dB	Upper decile of wanted signal	$\sqrt{D_U(S)^2 + D_U(F)^2}$ 6 5
(7)	$D_L(E_W)$ dB	Lower decile of wanted signal	$\sqrt{D_L(S)^2 + D_L(F)^2}$ -8 -8
(8)	$E_W(10)$ dB (μV/m)	Wanted signal exceeded 10% of the time	$E_W + D_U(E_W)$
(9)	$E_W(90)$ dB (μV/m)	Wanted signal exceeded 90% of the time	$E_W - D_L(E_W)$
(10)	E_{min} dB (μV/m)	Minimum usable field strength	section 3.4
(11)	BCR	Basic circuit reliability	Figure 3-4

Note 1 - In the calculation of BCR at the test points within the required service areas of synchronized transmitters, the field strength value to be used is calculated by the method of root sum square of the contributing field strengths in volts/metre.

TABLE 3-9

Parameters used to compute overall circuit reliability

STEP	PARAMETER	DESCRIPTION	SOURCE
1	E_W dB (μV/m)	Median field strength of wanted signal	Prediction method (section 3.2.1)
2	E_i dB (μV/m)	Median field strength of interfering signals E_1, E_2,...E_i	Prediction method (section 3.2.1)
3	I dB (μV/m)	Resultant field strength of interference (see text)	$I=20 \log_{10}\sqrt{\sum_{1}^{i}\left(10^{\frac{E_i}{20}}\right)^2}$
4	SIR(50)dB	Median signal to interference ratio	$E_W - I$
5	D_U(SIR)dB	10% fading allowance	10 dB(<60°), 14 dB(≥60°)[1,2,3]
6	D_L(SIR)dB	90% fading allowance	10 dB(<60°), 14 dB(≥60°)[1,2,3]
7	SIR(10)dB	Subjective signal-to-interference ratio exceeded 10% of the time	SIR(50) + D_U(SIR)
8	SIR(90)dB	Subjective signal-to-interference ratio exceeded 90% of the time	SIR(50) - D_L(SIR)
9	RSI dB	Required RF protection ratio	(section 3.3.1)
10	ICR	Circuit reliability in presence of interference only (without noise)	See figure 3-5
11	BCR	Basic circuit reliability	See figure 3-4
12	OCR	Overall circuit reliability	Min(ICR, BCR)

Note 1 - If any point on that part of the great circle which passes through the transmitter and the receiver and which lies between control points located 1,000 km from each end of the path reaches a corrected geomagnetic latitude of 60° or more, the values for ≥ 60° have to be used. The relationship of corrected geomagnetic latitude to the geographical coordinates is shown in figures 3-2 and 3-3 of paragraph 3.2.3.2.

Note 2 - These values apply for overall circuit reliabilities not exceeding 80%.

Note 3 - i) These values relate to the wanted signal only.

ii) For synchronized transmissions, the fading allowance associated with the predominant signal is to be used. For those conditions where the contributing field strengths are equal and Note 1 applies, the value of 14 dB is to be used for D_U(SIR) and D_L(SIR).

TABLE 3-10

Basic reception reliability

The following parameters are involved :

Single-frequency operation

Step	Parameter	Description	Source
(1)	BCR (F_1) %	Basic circuit reliability for frequency F_1	step 11, Table 3-8
(2)	BRR (F_1) %	Basic reception reliability	BCR (F_1)

Two-frequency operation [1]

(3)	BCR (F_2) %	Basic circuit reliability for frequency F_2	step 11, Table 3-8
(4)	BRR (F_1) (F_2) %	Basic reception reliability	$\left[\dfrac{1-\prod_{n=F_1}^{F_2} (1-BCR(n))}{\text{Maximum value of } \{BCR(F1),\ BCR(F2)\}} \right]$

[1] The two frequencies F_1 and F_2 shall be situated in different frequency bands allocated to the HF broadcasting service.

TABLE 3-10 (continued)

Basic reception reliability

Three-frequency operation [1]

Step	Parameter	Description	Source
(5)	BCR (F_3) %	Basic circuit reliability for frequency F_3	Step 11, Table 3-8
(6)	BRR (F_1)(F_2)(F_3) %	Basic reception reliability	$\dfrac{1-\prod_{n=F_1}^{F_3}(1-BCR(n))}{\text{Maximum value of } \{BCR(F_1), BCR(F_2), BCR(F_3)\}}$

[1] The three frequencies F_1, F_2 and F_3 shall be situated in different frequency bands allocated to the HF broadcasting service.

TABLE 3-11

Overall reception reliability

The following parameters are involved :

Single-frequency operation

Step	Parameter	Description	Source
(1)	OCR (F_1) %	Overall circuit reliability for frequency F_1	Step 12, Table 3-9
(2)	ORR (F_1) %	Overall reception reliability	OCR (F_1)

Two-frequency operation [1]

(3)	OCR (F_2) %	Overall circuit reliability for frequency F_2	Step 12, Table 3-9
(4)	ORR (F_1) (F_2) %	Overall reception reliability	$1-\prod_{n=F_1}^{F_2}(1-OCR(n))$ / Maximum value of $\{OCR(F_1), OCR(F_2)\}$

[1] The two frequencies F_1 and F_2 shall be situated in different frequency bands allocated to the HF broadcasting service.

TABLE 3-11 (continued)

Overall reception reliability

Three-frequency operation [1]

Step	Parameter	Description	Source
(5)	OCR (F_3) %	Overall circuit reliability for frequency F_3	Step 12, Table 3-9
(6)	ORR (F_1) (F_2) (F_3) %	Overall reception reliability	$1-\prod_{n=F_1}^{F_3}(1-OCR(n))$ / Maximum value of $\{OCR(F1), OCR(F_2), OCR(F_3)$

[1] The three frequencies F_1, F_2 and F_3 shall be situated in different frequency bands allocated to the HF broadcasting service.

3.2.4.5 Basic and overall broadcast reliability

The determination of basic broadcast reliability involves the use of test points within the required service area. The basic broadcast reliability is an extension of the basic reception reliability concept to an area instead of a single reception point. The method for computing basic broadcast reliability is outlined in Table 3-12. In step (1), the basic reception reliabilities BRR (L_1), BRR (L_2), --- BRR (L_N) are computed as described in Table 3-10 at each test point L_1, L_2 ---L_N. These values are ranked in step (2) and the basic broadcast reliability is the value associated with a percentile X specified in paragraph 4.2.4 (page 78).

In a similar way, the overall broadcast reliability is computed as described in Table 3-13 and it is the value associated with a percentile X specified in 4.2.4.

Note that the test points used in determining broadcast reliability must be specified, e.g. see section 3.8 for the use of BBR in choosing additional frequency bands and section [A] for the use of BBR [and OBR] in assessing the quality of an assignment.

Broadcast reliability is associated with the expected performance of a broadcast service at a given hour. For periods longer than an hour, computation at one-hour intervals is required.

3.8 Maximum number of frequencies required for broadcasting the same programme to the same zone

3.8.1 Introduction

Wherever possible, only one frequency should be used to broadcast a particular programme to a given reception area. In certain special circumstances, it may be found necessary to use more than one frequency per programme, i.e.:

- over certain paths, e.g. very long paths, those passing through the auroral zone, or paths over which the MUF is changing rapidly;

- areas where the depth of the area extending outwards from the transmitter is too great to be served by a single frequency;

- when highly directional antennas are used to maintain satisfactory signal-to-noise ratios, thereby limiting the geographical area covered by the station concerned.

The decision to use more than one frequency per programme should be made on the merits of the particular case concerned.

Use of synchronized transmitters should be encouraged whenever possible with a view to minimizing the need for additional frequencies.

3.8.2 Use of additional frequencies

The number of frequencies needed to achieve the specified level of basic broadcast reliability shall be determined by the method given below. If the calculated basic broadcast reliability for a single frequency does not reach the adopted value, it is necessary to consider whether coverage could be improved by additional frequencies in separate bands and whether the improvement would justify the use of additional frequencies.

3.8.3 Determination of additional frequency bands

In cases where the BBR[1] for the first band, based on all test points in the required service area, is between 50% and 80%, an additional band shall be tested as follows.

Those test points whose basic circuit reliability BCR is less than the BBR are identified and only these points are used to determine the second band. For each band, the minimum value of BCR (BCR_{min}) at these points is determined and that band having the highest BCR_{min} value is selected. The two-band BBR for all test points in the required service area is then computed and if it exceeds [P]%[2] then the second band may be used. Additionally, if this BBR is less than [R]%[2] then a third band shall be tested as follows.

Those test points whose basic reception reliability (BRR) for the two bands (section 3.2.4.3) is less than the two-band BBR are identified and these points are used for the calculation of the BCRs for the remaining bands. The minimum value of BCR (BCR_{min}) at these points is determined and that band having the highest BCR_{min} value is selected as the third band and may be used if the BBR for all test points exceeds [Y]%[2].

---

1 For calculation of the basic broadcast reliability, see paragraph 3.2.4.5.

2 P, R and Y are percentage values used in determining the application of additional frequency bands. In the Report to the Second Session R = 80% (page 59) and P and Y are specified in Figure 3-14.

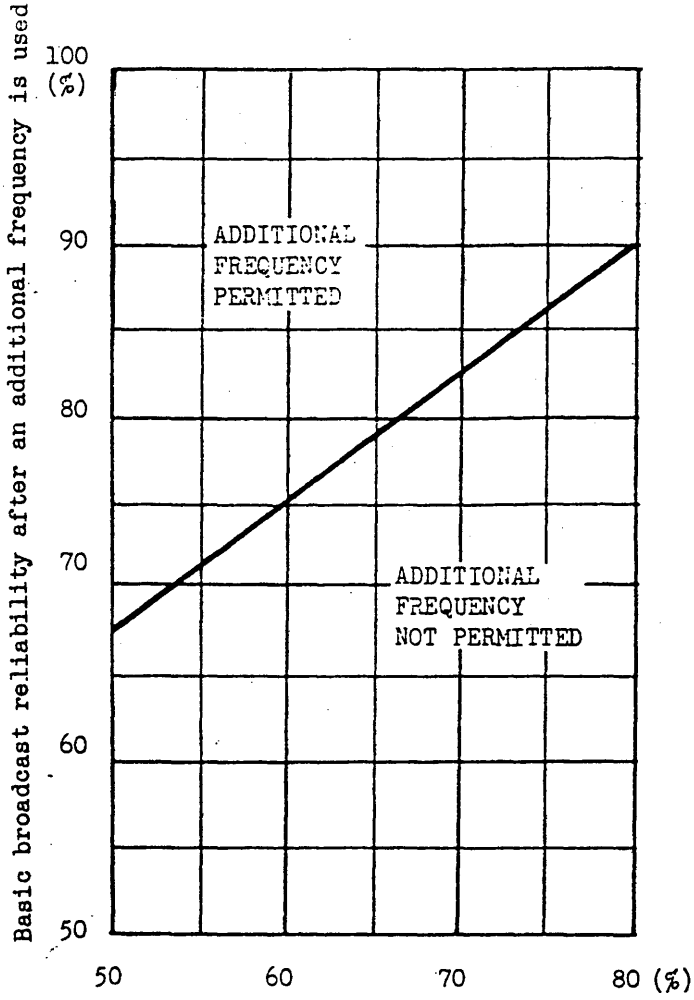

FIGURE 3-14

Limits for use of an additional frequency

[ ] ASSESSMENT OF AN ASSIGNMENT

In order to assess satisfactorily the quality of a plan, for a requirement or an assignment, the following values should be given per transmission hour or for the duration of the requirement:

1) BBR - basic broadcast reliability at [X%] percentile of all test points;

1a) percentage of test points where field strength is equal to or exceeds [E_{min}];

2) OBR* - overall broadcast reliability at [X%] percentile of all test points;

3) S/I i) signal-to-interference value at [X%] percentile of test points. The test points used in determining the S/I value must be specified,

ii) percentage of test points where both the field strength is $\geq$ [E_{min}] and the S/I value $\geq$ [a specified value];

4) F - number of frequency changes associated with an [assignment] [requirement];

5) Sp - extent of suspended periods associated with an [assignment] [requirement].

A combination of these values may be considered appropriate for this assessment.

[* The majority agreed that OBR is not required, however, the consequences of its deletion will need to be followed through within the Report.]

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
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SECOND SESSION, GENEVA, February-March 1987

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COMMITTEE 6

TERMS OF REFERENCE OF WORKING GROUP 6 AD HOC 2

To draw up a Resolution describing the procedure to be applied in case of the changes that may be made, in future, in the technical parameters adopted by this Conference and included in its Final Acts.

R. BLOIS
Chairman of Committee 6

HFBC (2) INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/41-E
16 February 1987
Original: French

COMMITTEE 5

NOTE BY THE CHAIRMAN OF COMMITTEE 5

A. PRELIMINARY REMARKS

Since my appointment as Chairman of Committee 5, I have endeavoured to consult as many delegations as possible in order to decide what line to follow in my activities. These consultations have led me to the conclusion that the solution to the problem probably does not lie in the adoption of any single one of the positions suggested to the exclusion of the others. The solution will necessarily have to consist in a compromise between the different approaches. My understanding is that all the delegations consulted would be in favour of a compromise solution. The question is what this compromise should be.

Moreover, the first meetings of Committee 5 have shown that this compromise could only assume the form of a package covering the many points of concern to delegations, the main ones being:

- the need to improve the HFBC Planning System;
- the need to widen the bands allocated to HF broadcasting;
- the need to find an appropriate solution for both national and international uses;
- the need to guarantee all countries a minimum service with satisfactory protection;
- the need to improve Article 17;
- the need to allow countries to continue operating their existing systems without disruption;
- the need to take all the requisite precautions to ensure the successful implementation of the HFBC Planning System.

B. PROPOSALS

In the light of all these considerations, the main elements of the compromise might be the following:

1) apply the improved HFBC Planning System and Article 17, on the basis of arrangements to be decided;

2) request the next competent WARC to widen the HF bands allocated for broadcasting;

3) taking into account the HFBC System and the different characteristics of the two types of requirements, consider how to

deal with both national and international requirements without giving priority to either;

4) decide on the procedure (strategy and programme) for future work up to the introduction of the plan(s).

In order to give substance to these four main elements of the compromise, I propose the Agenda (Document C5/5).

C.T. NDIONGUE
Chairman of Committee 5

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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WORKING GROUP 4-A

DRAFT REPORT FROM WORKING GROUP 4-A AD HOC 4

The following was agreed to be included under item 1.2.3 of Document DT/34:

"1.2.3 Proportionally Reduced Protection (PRP)

PRP is a margin (M)[1] by which the RF protection ratio to be applied at a test point is reduced under specified conditions.

These conditions are:

1) the requirement is satisfied with a single frequency band, and

2) the BBR < 80%, and

3) at the test point considered the field strength E_w is less than E_{min} and greater than or equal to E_{min} - Z[2].

In such cases the proportionally reduced protection ratio is used in the evaluation of S/I at the test point considered. For all the remaining points within the required service area, full protection as determined by the relevant protection ratio is given when $E_w \geq E_{min}$ and no protection is given when $E < E_{min} - Z$.

In cases where PRP is not applicable, full protection as determined by the relevant protection ratio is afforded when $E_w \geq E_{min}$ and no protection is afforded when $E_w < E_{min}$.

For the intersessional work, the IFRB has used a value of 5 dB for Z but there are proposals for a value of 10 dB to be used.

---

1) M is evaluated as:

$M = E_{min} - E_w$ at the test points where $E_{min} > E_w \geq E_{min} - Z$.

2) Z is defined in section [A].".

I.E. DAVEY
Chairman of Working Group 4-A ad hoc 4

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
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WORKING GROUP 4-A

PERFORMANCE ASSESSMENT

In order to assess the performance of a requirement, the following values should be given for each 15 minute period, each hour, or for the duration of the requirement, as appropriate:

1) BBR - basic broadcast reliability at [X%] percentile of all test points;

2) percentage of test points where field strength is equal to or exceeds E_{min} or (E_{min} - Z) where proportionally reduced protection applies;

[3) OBR* - overall broadcast reliability at [X%] percentile of all test points;]

4) SIR i) signal-to-interference value at [X%] percentile of test points where the field strength is equal to or exceeds E_{min} or (E_{min} - Z) where proportionally reduced protection applies. The test points which have been used in determining the S/I value should be indicated where possible**,

ii) percentage of test points where both the field strength is equal to or exceeds E_{min} or (E_{min} - Z) where proportionally reduced protection applies, and the S/I value is equal to or exceeds [a specified value];

[5) F - number of frequency changes for each frequency band, associated with a requirement;]

6) Sp - extent of suspended periods associated with a requirement.

A combination of these values may be considered appropriate for this assessment.

L.W. BARCLAY
Chairman of Working Group 4-A

[* The majority agreed that OBR is not required, however, the consequences of its deletion will need to be followed through within the Report.]

** The IFRB pointed out that the requirement to indicate the test points may add significantly to the computer memory required.

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
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SECOND SESSION, GENEVA, February-March 1987

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WORKING GROUP 4-A

FURTHER DISCUSSION OF DOCUMENT 117, TABLE 3-9

1. Amend step 3:

3	I dB (μV/m)	Resultant field strength of interference	$I=20\log_{10}\sqrt{\sum_{i=1}^{n}\left(\left(\frac{E_i+\alpha}{20}\right)_{10}\right)^2}$ [1)]

2. Amend step 9:

9	RSI dB	Required RF protection ratio

[see Document DT/34, section 1.2.1]

3. Note 1

Alternative A

Note 1 - α is the relative protection ratio taken from [section 1.2.2 of Document DT/34].

Alternative B

Note 1 - α is the appropriate relative protection ratio corresponding to the carrier frequency separation between the wanted and each unwanted signal. For carrier frequency separations of zero kHz, α equals zero. For separations ≥ 5 kHz and < 20 kHz, α is given by [Document DT/34, section 1.2.2] or [Table, Document 99].

Alternative C

Note 1 should be as in Alternative B, but delete sentence 2. In addition, add to the table in DT/34 section 1.2.2.

"0 kHz 0dB"

4. Note 2

[i) If any point on that part of the great circle which passes through the transmitter and the receiver and which lies between control points located 1,000 km from each end of the path reaches a corrected geomagnetic latitude of 60° or more, the values for $\geq 60°$ have to be used. The relationship of corrected geomagnetic latitude to the geographical coordinates is shown in [Figures 3-2 and 3-3 of paragraph 3.2.3.2.]]

ii) These values apply for overall circuit reliabilities not exceeding 80%.

iii) These values relate to the path of the wanted signal only.

iv) For synchronized transmissions, the fading allowance associated with the predominant wanted signal is to be used. For those conditions where the contributing wanted field strengths are equal and Note 2 i) applies to at least one of the paths, the value of 14 dB is to be used for D_U(SIR) and D_L(SIR).

L.W. BARCLAY
Chairman of Working Group 4-A

HFBC (2) INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
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SUB-WORKING GROUP 5A-4

Note by the Chairman of Sub-Working Group 5A-4

Following the discussions which took place at the third meeting of Sub-Working Group 5A-4, I have asked the IFRB, to prepare a note regarding the implementation of the decisions taken so far. The following answer was provided by the Board.

The Board considered the results of discussions which took place in Sub-Working Group 5A-4 and concluded that due to the complexity of the system it would be appropriate at this stage to analyze these results and interpret them in the form of a flowchart that may assist the group in the understanding of the system. Sub-Working Group 5A-4 is requested to endorse or correct these interpretations.

1. Flowchart A indicates the rules*) that are applied in a first run following which two types of requirements are identified:

a) requirements that could "survive" the application of the rules with a protection ratio $\geq$ [9 dB]. These requirements will be entered in a file called "File of Resolved Requirements";

b) requirements that were either suspended or that have a protection ratio lower than [9 dB]. These requirements are included in a "file of requirements to be reviewed" via a consultation process.

2. At the end of this first run, the administrations having a requirement in the "file of requirements to be reviewed" shall be consulted with a request to review their requirements for a possible:

- suppression, or
- reduction of their period of transmission, or
- reduction of their power, or
- reduction of their service area.

No other modifications would need to be requested because they may lead to a drastic change of the planning configurations.

Administrations shall be informed that their modified requirements will be processed as indicated in flowchart B.

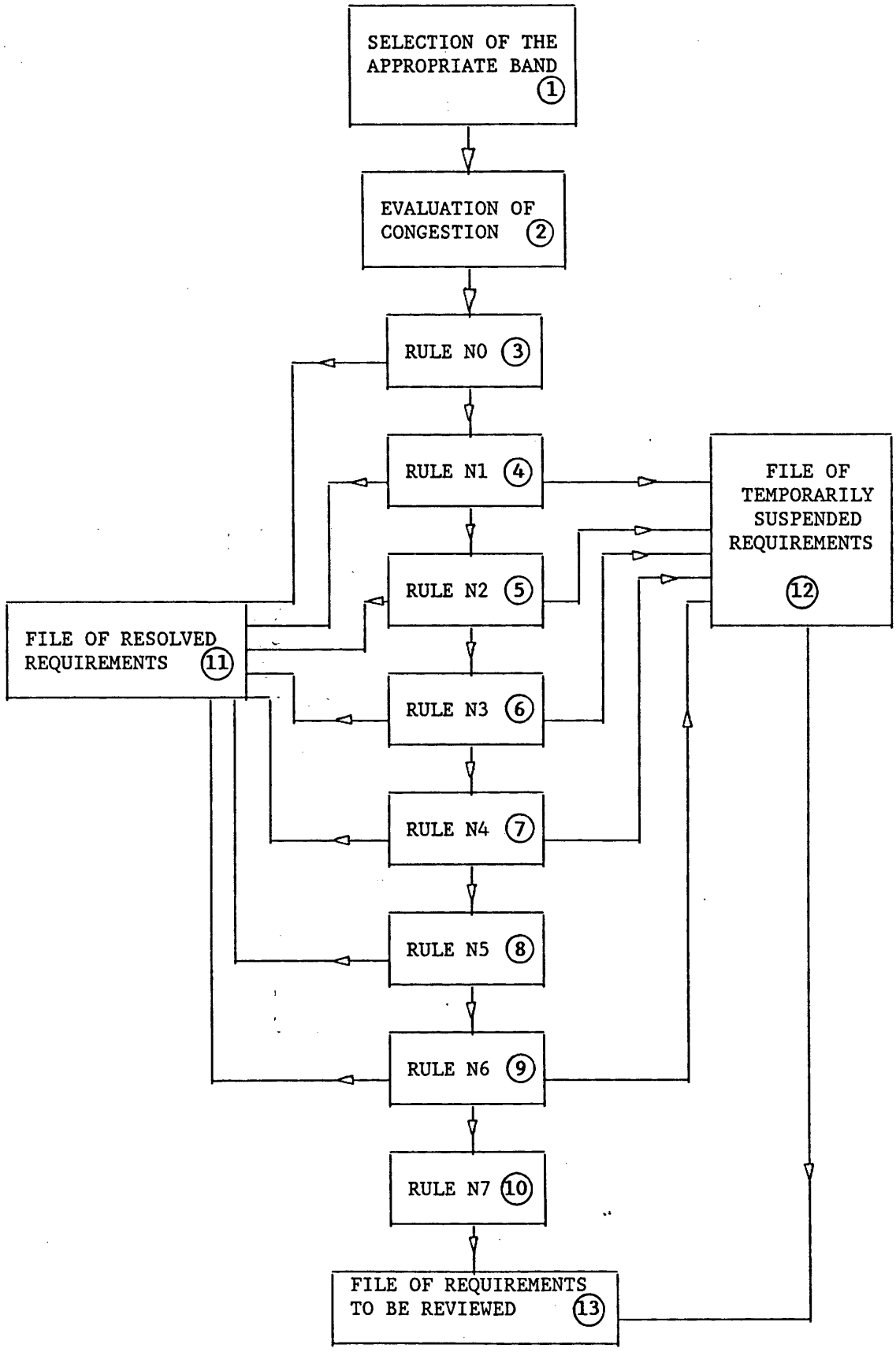
---

*) A summary description of these rules is attached.

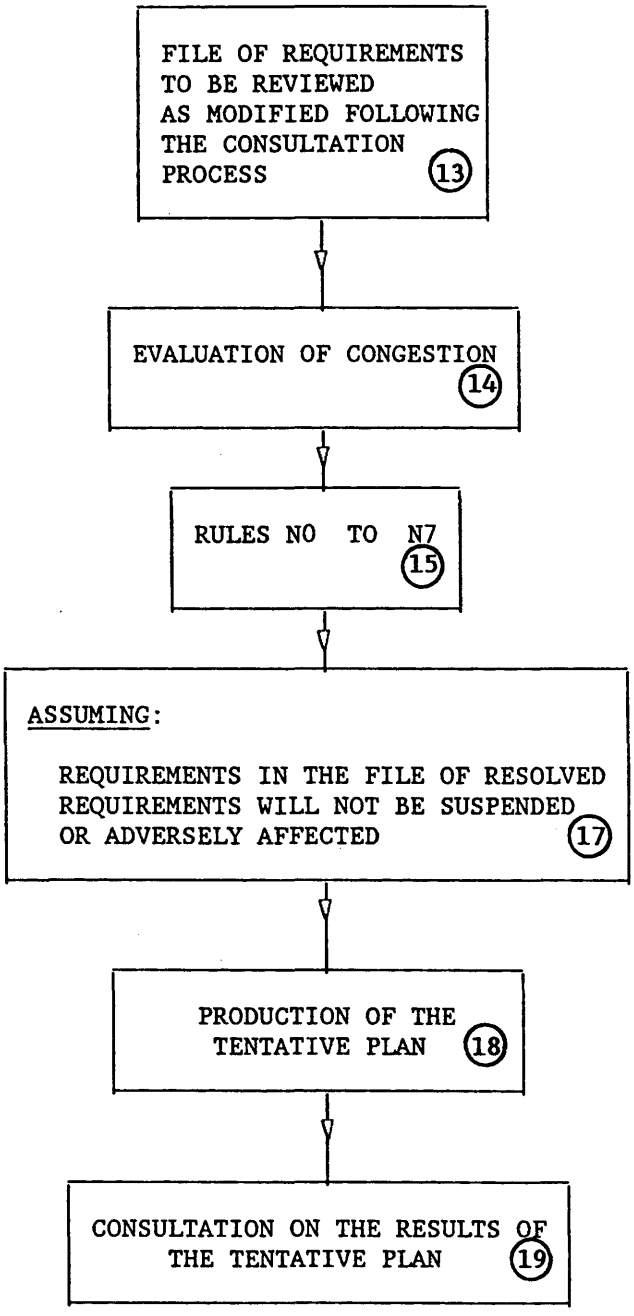
3. The modifications received and processed, and the planning system are run again following flowchart B. However, requirements appearing in the "File of Resolved Requirements" shall not be suspended in this second run. The modified requirements which are suspended during the second run shall be reinserted on the condition that the protection ratio of requirements in the "File of Resolved Requirements" shall not be reduced below [17 dB or 9 dB]. These requirements shall be reinserted without regard to the frequency continuity.

4. The modified requirements which cannot be reinserted are "eliminated" from the planning process.

T. BOE
Chairman of Sub-Working Group 5A-4


SELECTION OF THE APPROPRIATE BAND (1)
EVALUATION OF CONGESTION (2)
RULE N0 (3)
RULE N1 (4)
RULE N2 (5)
RULE N3 (6)
RULE N4 (7)
RULE N5 (8)
RULE N6 (9)
RULE N7 (10)
FILE OF RESOLVED REQUIREMENTS (11)
FILE OF TEMPORARILY SUSPENDED REQUIREMENTS (12)
FILE OF REQUIREMENTS TO BE REVIEWED (13)

FLOWCHART A


FILE OF REQUIREMENTS TO BE REVIEWED AS MODIFIED FOLLOWING THE CONSULTATION PROCESS 13
EVALUATION OF CONGESTION 14
RULES NO TO N7 15
ASSUMING:
REQUIREMENTS IN THE FILE OF RESOLVED REQUIREMENTS WILL NOT BE SUSPENDED OR ADVERSELY AFFECTED 17
PRODUCTION OF THE TENTATIVE PLAN 18
CONSULTATION ON THE RESULTS OF THE TENTATIVE PLAN 19

FLOWCHART B

5. NOTES ON RULES FOR RESOLVING INCOMPATIBILITIES

5.1 Evaluation of congestion

Congestion in each hour block and band is evaluated using the concept of GIR described in Document 8.

5.2 Rule N0

For the purposes of the assessment of congestion a value of co-channel protection ratio of 27 dB plus 6 dB for fading and multiple interference margins is used. If there is congestion with a total protection ratio (TPR) of 33 dB (27 + 6) the TPR is reduced until congestion is resolved or until TPR reaches a value of [17 dB], whichever comes first.

5.3 Rules N1, N2, N3

These suspension rules are to be applied as described is Document 8 pending a decision on their applicability to national requirements.

5.4 Rule N4

This suspension rule can be applied to a requirement in a congested hour block/band, if the band under consideration is not the primary band.

5.5 Rule N5

If the application of Rules N_0 to N_4 did not resolve the congestion problem, the Total Protection Ratio (TPR) is lowered to [9 dB].

5.6 Rule N6

If congestion persists after the application of Rule N_5, suspension Rule N_6 will be applied as described in Document 8. Its application will however be limited to the requirements for which the hour block under consideration is either the first or the last hour block of their transmission period Sub-Working Group 5A-4 would need to review the use of the hour block to which a reference is made in Foot-note 2 of page 74 of the Report to the Second Session).

5.7 Rule N7

If Rule N_6 failed to resolve the congestion problem, the Total Protection Ratio (TPR) is reduced in steps from [9 dB] to a lower value until congestion is resolved.

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
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ALLOCATED TO THE BROADCASTING SERVICE
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WORKING GROUP 4-A

Draft

NOTE FOR COMMITTEE 5 CONCERNING OVERALL RELIABILITY

Overall reliability terms and, in particular, overall broadcasting reliability take into account the contributions of noise and interference to the reliability of a service in a particular, specified way. The majority of administrations consider that the impact of noise and interference should be indicated separately, and that overall reliability is an unnecessary concept. On the other hand, some administrations consider that overall reliability is a useful indicator and that values should continue to be calculated.

L.W. BARCLAY
Chairman of Working Group 4-A

(This note is to be attached to both [DT/34] and to [Document 127].)

HFBC (2) INTERNATIONAL TELECOMMUNICATION UNION
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WORKING GROUP 4-A AD HOC 5

Draft

RECOMMENDATION /COM4/F/

Propagation Prediction Method to be Used for the /Planning/ of the HF Bands Allocated to the Broadcasting Service

The World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service (Geneva, 1987),

considering

a) the decisions of the First Session of the Conference (Geneva, 1984) to adopt a propagation prediction method to be used for the /planning/ of the HF bands allocated to the broadcasting service;

b) the work by the CCIR during the intersessional period in improving some aspects of the adopted method;

c) that the IFRB has developed and implemented computer software based on the propagation prediction method adopted by the First Session of the Conference (Geneva, 1984) and the further work by the CCIR, and has used this for its intersessional work;

d) that the propagation prediction method used by the IFRB is the starting basis for further improvements;

e) Recommendation /COM4/A/ (Document 109) relating to Further Improvements to the Propagation Prediction Method to be Used for the Planning of the HF Bands Allocated to the Broadcasting Service;

/f) Resolution /COM6/1/ (Document 112) relating to the Procedure to be Applied by the IFRB in the Revision of Relevant Parts of Its Technical Standards Used for HF Broadcasting,/

recommends

1. that the propagation prediction method and the associated computer software to be used immediately after the Conference shall be that implemented by the IFRB during the intersessional period;

2. that the IFRB prepare complete documentation of the propagation prediction method, summarized in /DT/34(Rev.1), section 1.5.1/, for inclusion in its Technical Standards;

3. that the procedures adopted in Resolution /COM6/1/ (Document 112) be used for further improvements to this method.

Dr. T. DAMBOLDT
Chairman of Working Group 4-A ad hoc 5

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS
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WORKING GROUP 5-A

Draft

RESOLUTION [COM5/1]

Transitional Provisions Relating to the Establishment of the Requirements File and the Preparation of the First Seasonal [Schedule] [Plan]

The World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service (Geneva, 1987),

considering

a) that it has adopted a planning method based inter alia on the use of a requirements file;

b) that the provisional requirements file established pursuant to the decisions of the First Session contains requirements which are to be brought into service by the season March-April 1988 at the latest;

c) that the Final Acts of the Conference will enter into force on ....;

d) that the requirements file should be established in advance so that it can be used for the first seasonal plan to apply after the date on which the Final Acts of the Conference enter into force;

e) that, in establishing such a file, some time might be needed to enable the IFRB to consult administrations with a view to ensuring that their requirements are formulated in accordance with the decisions of the Conference,

resolves

1. that the IFRB shall request administrations to notify it, before [two years], of their requirements for the following seasons:

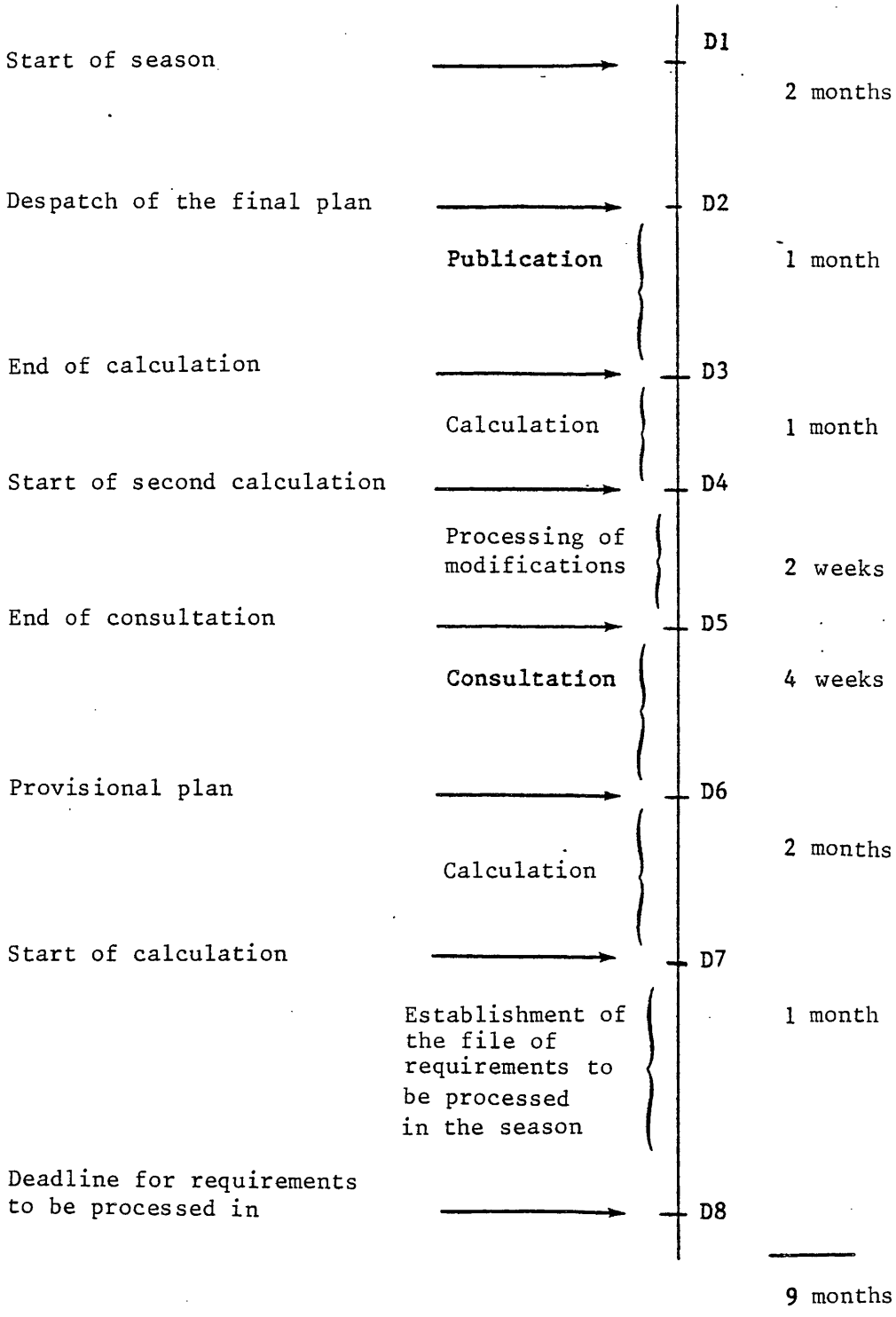
-
-
-

2. that, for this purpose, administrations shall use the forms drawn up by the IFRB on the basis of Appendix 2 to the Radio Regulations;

3. that the Board shall process these requirements, endeavour to identify flagrant incompatibilities and then request administrations to supply any missing information and to modify any requirements identified as incompatible with other requirements so as to eliminate the incompatibility,

4. [Publication]

5. that, one year before the beginning of the season in question, the Board shall inform administrations of the solar index for that season and request them to confirm the requirements for the season at least nine months before it starts.



D. SAUVET GOICHON
Chairman of Working Group 5-A-1

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS
ALLOCATED TO THE BROADCASTING SERVICE
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WORKING GROUP 5-A

DRAFT TEXT ON THE REQUIREMENTS FILE BY EDITORIAL GROUP 5-A-1

1. For the purposes of this Article, a file of the HF broadcasting requirements expected to be operational during the corresponding [seasons] shall be established. Each requirement listed in the file shall give the characteristics listed in Appendix 2 and indicate the [season(s)] in which the requirement will be used.

2. For the purposes of the HFBC Planning System, a requirement shall be defined as follows:

"A requirement indicated by an administration to provide a broadcasting service at specified periods of time to a specified reception area from a particular transmitting station".

[3. For the purposes of [Article 17], a requirement shall be defined as above with indication of the assigned frequency. In the application of [Article 17], when a requirement does not give the assigned frequency or the preferred band, the frequency to be assigned shall be recommended by the Board under No. [ ] of the Radio Regulations.]

4. Pursuant to Resolution [COM5/1], the Board shall take the necessary steps to establish the requirements file so that it can be used for the first seasonal [plans or schedules]. It shall be limited to the [first 4 seasons] after the entry into force of the Final Acts.

5. Any administration may at any time notify the Board of any additions, modifications or deletions it wishes to make in its requirements in the Requirements File. Information specific to a particular season as indicated in Appendix 2 must reach the Board not more than [x] months or less than [12] months[1] before the beginning of the season in question.

6. The Board shall verify that the information provided is complete and, in consultation with the administration concerned, shall make any necessary corrections. If, by the date for the start of processing of the requirements for a particular season, the information for a requirement is still incomplete despite the action taken by the Board, it shall be left out of account for the season in question.

---

[1] [The period may vary depending on whether the information is to be used for the HFBC Planning System or for Article 17.]

7. The Board shall examine the requirements thus expressed without necessarily applying the HFBC System in detail. This examination will serve where possible to identify apparent incompatibilities such as cases of two preset frequencies serving the same area.

8. The requirements appearing in the requirements file [12] months before the beginning of the [season] to be processed shall be used in drawing up the seasonal [plans] [schedules] without any priority being conferred by the date of revision of the requirements file. [One year] before the beginning of the [season] to be processed the Board shall advise the administrations of the solar index for the [season] to be processed and request them to confirm, by [9] months before the beginning of the [season] at the latest, the requirements which are to be used during that [season].

9. The processing of urgent additions or modifications notified to the IFRB after the date[s] given in [8] shall be considered under the HFBC Planning System and [Article 17] procedures.

10. The Board shall keep in the file for [5] years the history of the use of each requirement, chiefly in order to keep a record of requirements confirmed but not used.

Note to Committee 5

During the discussion on this last paragraph, it was suggested that information be published on requirements confirmed but not used and on unauthorized transmissions. Such information can only be obtained from monitoring. Committee 5 is requested to consider the guidelines to be conveyed to Committee 6 in this regard.

D. SAUVET-GOICHON
Chairman of Editorial Group 5-A-1

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, **February-March 1987**

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WORKING GROUP 5-B

NOTE BY THE CHAIRMAN OF WORKING GROUP 5-B

In response to the requests formulated by several administrations at the first meeting of Working Group 5-B, the IFRB has supplied the following information:

REQTS: Number of requirements processed (present in a given hour).

CHNL: Number of channels required.

AVL: Number of channels available.

RULE N1-N6: Number of requirements suspended in application of the rule.

FRQ-A: Number of frequency assignments.

PROT R: Lowest value of protection ratio.

C. TERZANI
Chairman of Working Group 5-B

A PLAN NUMBER: 10 FOR ALL HOURS

	BANDS(MHZ)									
	6	7	9	11	13	15	17	21	26	TTL
REQTS:	9266	4714	6849	3938	891	2529	1520	549	58	30314
CHNLS:	5087	3075	3721	2320	699	1657	1175	506	56	18296
AVL :	600	480	960	960	480	1200	840	960	1032	7512
RULE										
N1 :	2602	1140	1567	754	100	216	163	35		6577
N2 :	1873	652	904	373	78	162	80	10		4132
N3 :	537	710	620	360	49	107	126	1		2510
N4 :	61	71	83	31	4	22	52			324
N6 :	2657	1097	1488	402		58	44			5746
FRQ-A:	4193	2141	3675	2420	660	2022	1099	503	58	16771
PROT R										
-VE :	1171	404								1575
0-17:	1592	798	1297	162						3849
17-23:	574	297	1270	996	73	557	330			4097
23-27:	76	24	174	128	34	159	56			651
>27:	780	618	934	1134	553	1306	713	503	58	6599

A PLAN NUMBER: 20 FOR ALL HOURS

BANDS(MHZ)	6	7	9	11	13	15	17	21	26	TTL
REQTS:	7017	4327	8266	6653	1734	4190	2434	341	33	34995
CHNLS:	3155	2191	4313	3770	1109	2644	1756	293	33	19264
AVL :	600	480	960	960	480	1200	840	960	1032	7512
RULE										
N1 :	1965	1032	2220	1631	320	632	437			8237
N2 :	1051	663	1071	887	186	447	249			4554
N3 :	398	604	760	612	185	236	177			2972
N4 :	49	49	93	82	41	32	68			414
N6 :	1367	607	1691	1519	144	715	428			6471
FRQ-A:	3554	1979	4122	3441	1002	2843	1503	341	33	18818
PROT R										
-VE :	248	95	27	9						379
0-17:	1180	475	1714	1431	39	512	284			5635
17-23:	699	303	1064	1231	303	1297	489			5386
23-27:	168	91	291	116	23	162	33			884
>27:	1259	1015	1026	654	637	872	697	341	33	6534

A PLAN NUMBER: 30 FOR ALL HOURS

BANDS(MHZ)	6	7	9	11	13	15	17	21	26	TTL
REQTS:	6826	4632	10195	7719	1322	4679	4124	1960	267	41724
CHNLS:	3239	2750	5859	4811	968	3083	3203	1681	265	25859
AVL :	600	480	960	960	480	1200	840	960	1032	7512
RULE										
N1 :	1835	1057	3021	2039	238	774	860	321		10145
N2 :	1119	686	1472	1173	112	560	553	207		5882
N3 :	435	807	913	690	174	430	536	134		4119
N4 :	37	37	53	34	19	25	82	25		312
N6 :	1178	509	1667	1791		758	1002	155		7060
FRQ-A:	3400	2045	4736	3783	779	2890	2093	1273	267	21266
PROT R										
-VE :	216	143	178	18						555
0-17:	1019	383	1675	1659		245	818			5799
17-23:	619	303	853	1229	155	1587	768	518		6032
23-27:	85	53	187	177	37	129	169	59		896
>27:	1461	1163	1843	700	587	929	338	696	267	7984

A PLAN NUMBER: 50 FOR ALL HOURS

BANDS(MHZ)	6	7	9	11	13	15	17	21	26	TTL
REQTS:	7757	4244	6309	4661	707	3024	2441	1257	225	30625
CHNLS:	4400	2909	3603	2688	498	1849	1745	1095	222	19009
AVL :	600	480	960	960	480	1200	840	960	1032	7512
RULE										
N1 :	1910	981	1264	920	32	367	385	142		6001
N2 :	1452	561	755	569	20	196	222	83		3858
N3 :	443	765	557	452	11	169	201	47		2645
N4 :	52	62	45	20	3	20	40	16		258
N6 :	2134	882	1201	456		120	323	31		5147
FRQ-A:	3900	1875	3688	2700	641	2272	1593	969	225	17863
PROT R										
-VE :	1000	230								1230
0-17:	1357	471	1237	178			246	45		3534
17-23:	464	474	789	1392		796	350	271		4536
23-27:	83	40	266	155		214	26	9		793
>27:	996	660	1396	975	641	1262	971	644	225	7770

A PLAN NUMBER: 40 FOR ALL HOURS

BANDS(MHZ)	6	7	9	11	13	15	17	21	26	TTL
REQTS:	5969	3855	9159	7847	1820	5194	4370	1381	128	39723
CHNLS:	2590	1972	4795	4843	1308	3407	3295	1233	129	23572
AVL :	600	480	960	960	480	1200	840	960	1032	7512
RULE										
N1 :	1610	844	2707	2003	324	837	922	189		9436
N2 :	846	501	1154	1061	243	684	673	152		5314
N3 :	306	598	757	706	303	356	546	52		3624
N4 :	14	21	47	76	32	33	95	11		329
N6 :	725	293	1360	1849	90	1223	953	76		6569
FRQ-A:	3193	1891	4494	4001	918	3284	2134	977	128	21020
PROT R										
-VE :	71	19		12						102
0-17:	611	295	1466	2043	36	620	1025			6096
17-23:	771	215	883	886	235	1627	431	309		5357
23-27:	143	73	115	151	42	274	128	13		939
>27:	1597	1289	2030	909	605	763	550	655	128	8526

HFBC (2) INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/51-E
19 February 1987
Original: English

WORKING GROUP 5-A

DRAFT REPORT FROM THE CHAIRMAN OF SUB-WORKING GROUP 5-A-4

Introduction

Sub-Working Group 5-A-4 met five times during one week, and had its last meeting on Thursday morning, 19 February 1987.

We have been through all the issues assigned to us but, due to the limited time assigned to us, it was not possible to have an approved document to be presented to Working Group 5-A. With the approval of the Group, I have prepared this report which contains the conclusions and decisions taken by the Group, as well as a summary of the discussions on certain items.

The terms of reference of the Group were:

"to examine paragraph 4.2.3.4.5 of the Report from the First Session, and to propose a text that takes account, where necessary, of the difference between national and international HFBC".

The four items to which our discussions were oriented were the following:

- suspension rules;
- reinsertion process;
- consultation process;
- national/international requirements.

As a result of the discussion on the three first points, a flowchart accompanied by necessary explanations has been prepared (see Annex 1). This annex can be used to form the basis of a new paragraph 4.2.3.4.5.

There are a few square brackets in this annex pending decisions in other Working Groups and Committees.

Two other important issues were discussed in connection with the application of suspension Rules N1, N2, N3, namely:

1) the question of the applicability of these rules to national requirements;

2) the question of the definition of the basic unit of service area to be used when applying these rules.

Annex 2 provides a summary of the first issue while Annex 3 provides the substance of a proposal by Syria on the second issue. No consensus was reached on these issues. It is proposed that the matter of national/international requirements be brought to the attention of Committee 5. The second matter is to be discussed in Working Group 5-A.

Annex 4 contains the response provided by the Board following a question raised by the United Kingdom Delegation.

T.BOE
Chairman of Sub-Working Group 5-A-4

Annexes: 4

ANNEX 1

Rules for dealing with incompatibilities

Following the selection of the appropriate band for each requirement, the Planning System will attempt to resolve the congestion cases that may arise in an hour block, band and unit or service area by applying the process illustrated in flowcharts A and B.

Step 1 The selection of the appropriate band is undertaken for each requirement by considering in particular the need to ensure frequency continuity (see ...).

Step 2 For each hour and band, the evaluation of congestion is made using the concept of GIR (see Document 8) and using to start with a total co-channel protection ratio of 33 dB. If there is no congestion, all requirements are placed in a "file of resolved requirements" (see step 9). If, however, there is congestion, step 3 is applied.

Step 3 Rule N0 is applied and the total co-channel protection ratio is lowered in steps from 33 dB to [17 dB] until congestion is resolved, in which case requirements are placed in a "file of resolved requirements" (see step 9). If congestion still persists at the level of [17 dB], step 4 is applied.

Step 4 Rule N1 is applied as described in Document 8 and all suspended requirements are placed in a file of temporarily suspended requirements (see step 10). If Rule N1 fails to resolve the case of congestion, step 5 is applied to the remaining requirements. If Rule N1 resolves the congestion case, all remaining requirements are placed in the "file of resolved requirements" (see step 9).

Step 5 Rule N2 is applied as described in Document 8 and all suspended requirements are placed in a file of temporarily suspended requirements (see step 10). If Rule N2 fails to resolve the case of congestion, step 6 is applied to the remaining requirements. If Rule N2 resolves the congestion case, all remaining requirements are placed in the "file of resolved requirements" (see step 9).

Step 6 Rule N3 is applied as described in Document 8 and all suspended requirements are placed in a file of temporarily suspended requirements (see step 10). If Rule N3 fails to resolve the case of congestion, step 7 is applied to the remaining requirements. If Rule N3 resolves the congestion case, all remaining requirements are placed in the "file of resolved requirements" (see step 9).

Step 7 Rule N4 is applied as described in Document 8 if, and only if, the band under consideration is not the primary band of the requirement and all suspended requirements are placed in a file of temporarily suspended requirements (see step 10). If Rule N4 fails to resolve the case of congestion, step 8 is applied to the remaining requirements. If Rule N4 resolves the congestion case, all remaining requirements are placed in the "file of resolved requirements" (see step 9).

Step 8 Rule N5 is applied and the total co-channel protection ratio is lowered in steps from [17 dB] to the value which permits resolution of the congestion case. No suspensions are made in the application of this rule, consequently the requirements remaining after the application of Rule N4 remain the same. The requirements whose co-channel protection ratio has been lowered to a value smaller than [17 dB] are, however, entered in the "file of requirements to be reviewed" (see step 11).

Step 9 Al requirements which, as a result of the previous steps, have neither been suspended nor have retained a co-channel protection ratio lower than [17 dB], have been placed in a "file of resolved requirements". This file contains, therefore, all the requirements which will always enter in the "Tentative Plan" [see step 16].

Step 10 This file of temporarily suspended requirements contains all requirements which have been suspended as a result of the application of suspension Rules N1, N2, N3, N4 and which are then placed in the "file of requirements to be reviewed".

Step 11 All requirements which have been suspended or which have retained a co-channel protection ratio lower than [17 dB] may be modified by the administrations concerned, as indicated in step 12.

Step 12 At the end of the first run, the administrations having a requirement in the "file of requirements to be reviewed" shall be consulted and requested to consider a review of their requirements for a possible:

- suppression, or
- reduction of their period of transmission, or
- reduction of their power, or
- reduction of their service area, or
- any other modification that would not, in the second run, either result in suspension of any requirement included in the "file of resolved requirements" or result in any of these requirements being adversely affected.

Step 13 As a result of the consultation process described in step 12, whose function shall not exceed [30] days, all requirements which have been modified as well as all other requirements contained in the "file of requirements to be reviewed" which have not been modified by the administration, are subjected to step 15.

Step 14 During the production of a seasonal plan, all requirements communicated to the IFRB after the initial deadline for submission or confirmation of requirements will be subjected to step 15.

Step 15 All requirements contained in the files described in steps 13 and 14 are processed with a view to inserting them in the "Tentative Plan". During this second run, steps 1 to 8 are applied to all requirements; however, none of the requirements contained in the "file of resolved requirements" may be suspended. A requirement in the "file of resolved requirements" will be considered to be adversely affected if its protection ratio is lowered to a value smaller than [17 dB] because of the insertion of any other requirement. In this case, it would not be possible to insert the requirement under consideration in which case this requirement would be placed in the "file of requirements that cannot be reinserted" (see step 17).

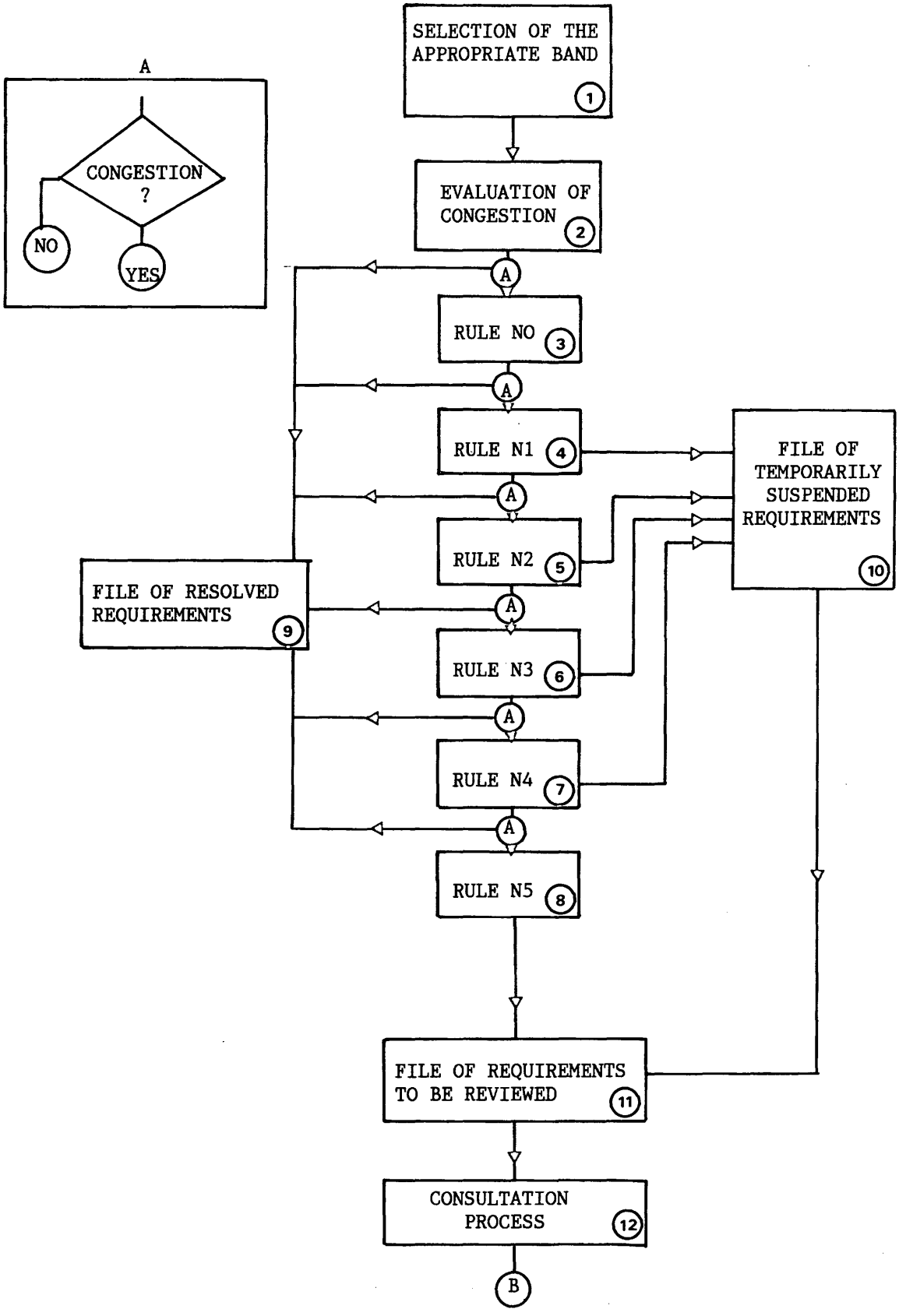
In an attempt to satisfy as many as possible of the requirements to be inserted, the following process is applied:

1. frequency continuity will be attempted to the extent possible;

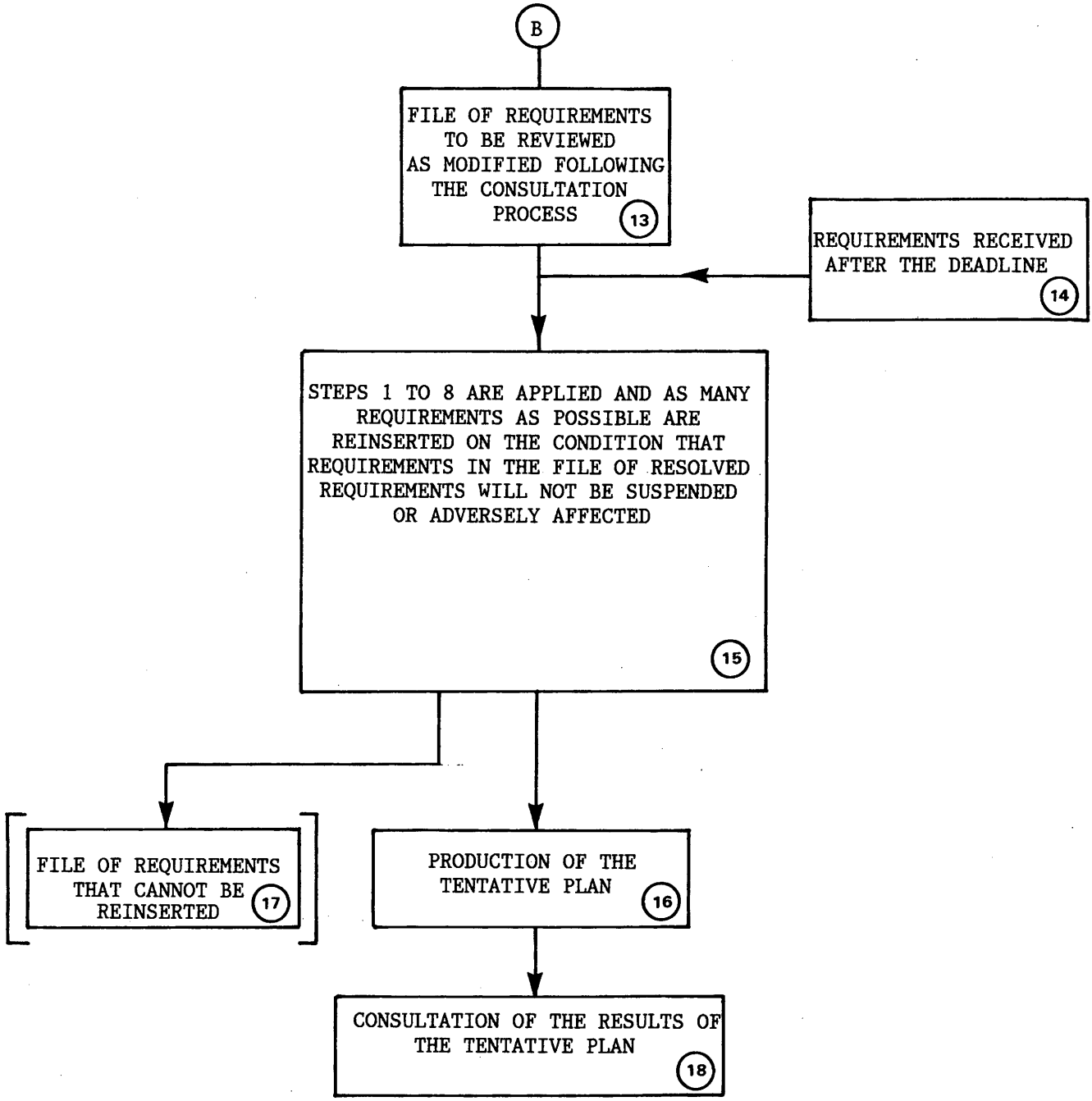
2. if frequency continuity cannot be achieved, an attempt will be made to insert the requirement in another of its usable bands.

Step 16 As a result of the process described in step 15, as many requirements as possible are satisfied and the "Tentative Plan" is produced.

Step 17 All requirements which could not be inserted after the application of step 15 are placed in a "file of requirements that cannot be inserted".


SELECTION OF THE APPROPRIATE BAND
1
EVALUATION OF CONGESTION
2
A
CONGESTION ?
NO
YES
RULE NO
3
RULE N1
4
RULE N2
5
RULE N3
6
RULE N4
7
RULE N5
8
FILE OF RESOLVED REQUIREMENTS
9
FILE OF TEMPORARILY SUSPENDED REQUIREMENTS
10
FILE OF REQUIREMENTS TO BE REVIEWED
11
CONSULTATION PROCESS
12
B

FLOWCHART A


B
FILE OF REQUIREMENTS TO BE REVIEWED AS MODIFIED FOLLOWING THE CONSULTATION PROCESS 13
REQUIREMENTS RECEIVED AFTER THE DEADLINE 14
STEPS 1 TO 8 ARE APPLIED AND AS MANY REQUIREMENTS AS POSSIBLE ARE REINSERTED ON THE CONDITION THAT REQUIREMENTS IN THE FILE OF RESOLVED REQUIREMENTS WILL NOT BE SUSPENDED OR ADVERSELY AFFECTED 15
FILE OF REQUIREMENTS THAT CANNOT BE REINSERTED 17
PRODUCTION OF THE TENTATIVE PLAN 16
CONSULTATION OF THE RESULTS OF THE TENTATIVE PLAN 18

FLOWCHART B

ANNEX 2

National/international HFBC

After a statement made by the Board as a response to a question posed by the United Kingdom Delegation (see Annex 4), reference was made to paragraph 4.1.2.2 of the Report to the Second Session (Planning principles).

It was suggested that, in the limited time available, delegations should try to identify the differences between national and international HFBC.

Some speakers pointed out what they considered to be the differences between national and international broadcasting services:

national HFBC:

- lower power,
- different service area,
- longer transmission time,
- different antennas,
- different interference considerations,
- need to cover national rural areas,
- lower bands.

Others questioned if it is required to consider any difference between national and international HFBC.

Reference was made to RR 954 with regard to the use of certain frequency bands to be used, especially for HFBC long distance operation.

The term "domestic" was suggested to be more exact than the term "national".

No conclusion was drawn since the matter is also under consideration in another Group. We suggest this matter be transferred to Committee 5.

ANNEX 3

Syria raised the question of the definition of the basic unit of service area to be used when applying the Rules N1, N2 and N3.

This question was further amended by Iraq.

After a discussion, the Chairman concluded the following:

- it was difficult to detect a clear majority, although there appeared to be a slight tendance in favour of the Syrian proposal;

- several speakers expressed uncertainty with regard to the consequence and effect upon the Planning System;

- concern was expressed that the planning process would become considerably more complex.

To give delegates more time to consider this proposal, it was suggested that this question should be dealt with in Working Group 5-A at a later meeting.

ANNEX 4

National and international broadcasting in HF bands allocated to the broadcsting service

The frequency allocations to broadcasting in the HF bands were considered by the Radio Communications Conference (Atlantic City, 1947). the Conference, in examining the broadcasting requirements, decided that separate allocations were necessary in the "Tropical Zone" where, because of the high atmospheric noise level and propagation, it was not possible to provide, economically, a more satisfactory service by using low, medium or very high frequencies for internal national use; many administrations at this Conference considered that national services should be developed in these bands. However, the examination of the uses of the HF bands allocated to broadcasting (other than the "tropical bands" was referred to the International High Frequency Broadcasting Conference (Atlantic City, 1947).

The second Plenary Meeting of the International High Frequency Broadcasting Conference (Atlantic City, 1947) adopted an agenda where item 4 was given as:

"Examination of the categories of broadcasting services on high frequencies of which the needs have to be satisfied in the bands of frequencies allocated to broadcasting by the Radio Communications Conference of Atlantic City and the different types and orders of priority to be considered" (Document 46).

This work was entrusted to Committee 13, which reported on 20 September 1947 (Document 128) as follows:

"C. Point 4 of the Agenda

Examination of the categories of broadcasting services on high frequencies and the orders of priority to be considered.

a) The Committee believes that it is not possible to set up actual priorities at this time". The position was adopted with the following:

"In order to aid the planning committee, which will prepare a draft assignment plan, it is recommended that the various countries indicate in Form 4 the precedence and order of importance which they apply to their requirements.".

In the Report (Final) of the International High Frequency Broadcasting Conference (Atlantic City, 1947) the following is given:

"D. Categories of Services and Priorities

(1) It is not possible to establish at this time an order of priorities

(2) In order to aid the Planning Committee, it is recommended that countries indicate, on form 4, the procedure and order of importance which they attach to their requirements.".

The question of priorities and classification was referred to the High Frequency Broadcasting Conference (Mexico City, 1948) and again, although there was considerable discussion on both aspects, no agreement was reached (Documents 448 and 589).

There appears to have been no attempt at later conferences to address either the question of priorities or the question of classification.

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
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SECOND SESSION, GENEVA, February-March 1987

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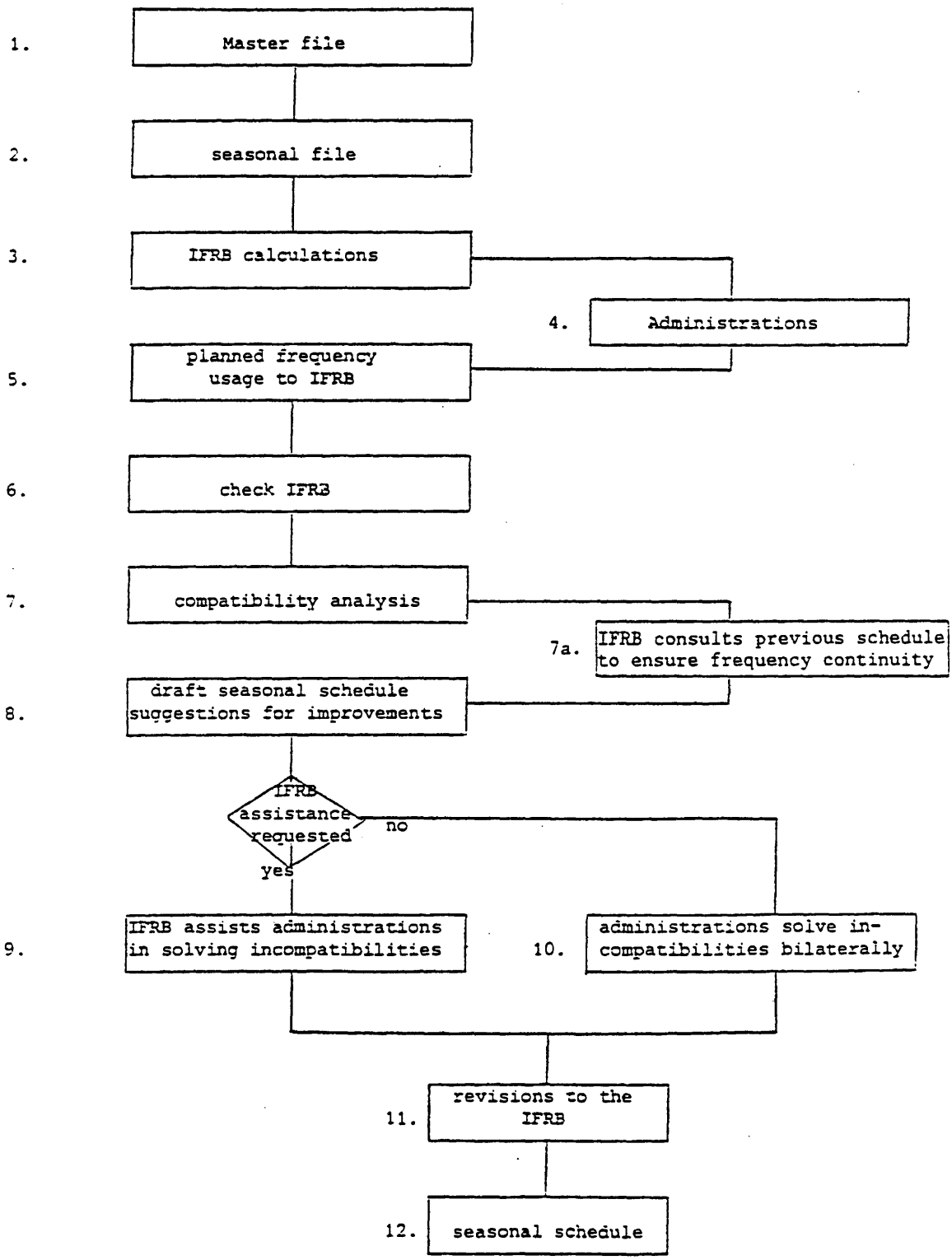
20 February 1987
Original : English

WORKING GROUP 5-C

FLOW DIAGRAM OF THE PROPOSED INTERIM PROCEDURE (REV.1)



J.F. BROERE
Chairman of Working Group 5-C

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/52-E
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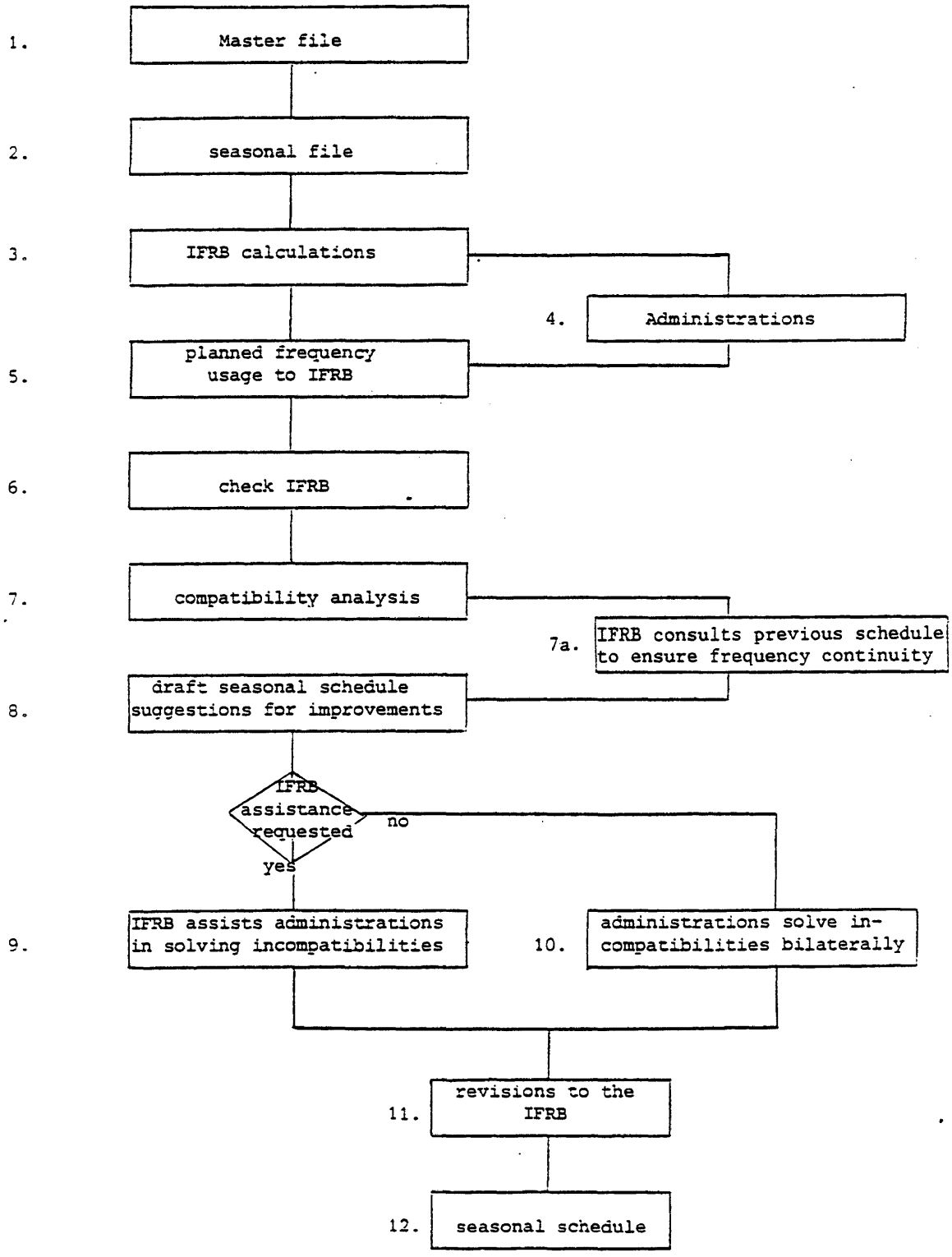
WORKING GROUP 5-C

FLOW DIAGRAM OF THE PROPOSED INTERIM PROCEDURE (REV.1)



J.F. BROERE
Chairman of Working Group 5-C

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
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Original: English

WORKING GROUP 5-C

Note by the Chairman of Working Group 5-C

In response to a question raised in the first meeting of the Working Group, paragraph 19 of the Report by the IFRB to WARC for HF Broadcasting, 1984, is reproduced below.

"19. General Remarks

Concerning the application Article 17 procedure, two remarks of a general nature can be made.

19.1 So far, only in a very limited number of cases, the requirements of administrations could not be satisfied. This situation has arisen, in particular, when administrations ask the IFRB to select for them a frequency assignment within a given band. Indeed it might happen that no suitable frequency can be found, particularly in the most occupied target CIRAF zones and broadcasting time periods. In such cases the Board communicated with the administrations concerned and suggested a change in one or more of the parameters of the broadcasting requirement.

19.2 The second remark concerns the seasonal nature (4 seasonal schedules per year) of the Article 17 procedure, adopted by the OARC-59. The fact that the four yearly seasons do not cover equal time periods, two seasons lasting four months and the two others lasting two months, contributes to create peaks of higher IFRB activity which are reflected by occasionally longer turnaround times in the processing of notifications. However every care is taken to ensure that the time limits set for preparation of the Tentative Schedules is respected."

J.F. BROERE
Chairman of Working Group 5-C

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
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SECOND SESSION, GENEVA, **February-March 1987**

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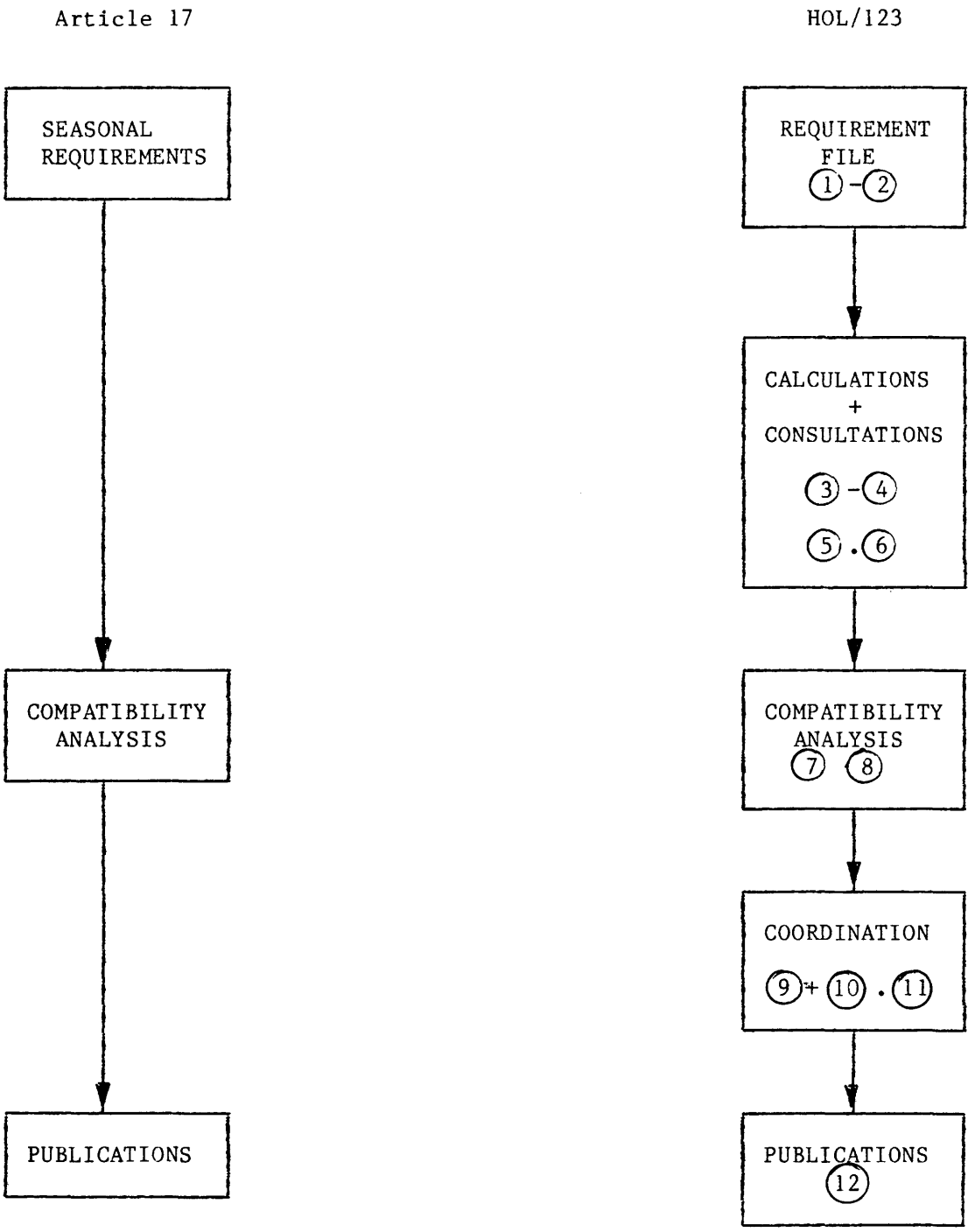
20 February 1987
Original : English

WORKING GROUP 5C

In order to facilitate the proceedings and in accordance with the requests voiced during the discussions the following schematic comparison is presented in the Annex.

J.F. BROERE
Chairman of Working Group 5C

SCHEMATIC COMPARISON



HFBC (2) INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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WORKING GROUP 5D

Draft

RECOMMENDATION [COM5/A]

Relating to the possibility of extending the frequency bands allocated to HF broadcasting at a future competent World Administrative Radio Conference

The World Administrative Radio Conference for the Planning of the HF Bands allocated to the Broadcasting Service, (Geneva, 1987),

considering

a) Resolution No. 508 of the WARC (Geneva, 1979) inviting the Administrative Council to convene a conference in two sessions with a view to the planning of the HF bands allocated to the broadcasting service;

b) the Report of the First Session to the Second Session of the Conference;

c) Administrative Council Resolution No. 912 containing the agenda of the Second Session of the WARC for the Planning of the HF Bands allocated to the Broadcasting Service (HFBC(2));

d) the results of the planning exercises carried out by the IFRB during the period between the two sessions of this Conference;

e) that this Conference, to improve the efficiency of the use by the Broadcasting Service of the available spectrum in the HF Bands, has adopted measures such as improved planning provisions and the use of single-sideband technique but concluded that these measures may be insufficient to meet the current and the future needs of the HF Broadcasting Service,

recognizing

that the HF spectrum is also used by other radio services,

recommends to the Administrative Council

to take the necessary steps to call the attention of the Plenipotentiary Conference (Nice, 1989) to the need to hold a WARC which shall include in its agenda the question of [the possible allocation of additional frequency spectrum] [the possibility of extending the frequency bands allocated] to the HF broadcasting service, such conference to be held as soon as possible after the Plenipotentiary Conference,

requests the Secretary General

to bring this Recommendation to the attention of all administrations and of the 42nd Session of the Administrative Council, 1987.

E.D. DUCHARME
Chairman of Working Group 5D

HFBC (2) INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/56-E
20 February 1987
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WORKING GROUP 5-A

Note by the Chairman of Working Group 5-A

PERIODICITY OF APPLICATION OF THE PLANNING METHOD

(extract from Chapter 4 of the Report of the First Session)

..... the First Session of the Conference concluded that the Planning of the HF broadcasting service shall be based on [four] [two] seasonal plans to be prepared [annually] [semi-annually].

J.F. ARNAUD
Chairman of Working Group 5-A

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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WORKING GROUP 5-B

Note by the Chairman of Working Group 5-B

Working Group 5-B devoted its first three meetings to the following item of its terms of reference:

> "To determine the frequency bands in which the HFBC Planning System once it has been improved and approved in accordance with the decisions of this Conference would be applied."

It considered Documents 11, 33, 35, 72, 110 and DT/50.

Having regard to the Group's terms of reference, it emerged from the lengthy discussions that the following two main positions should be taken into consideration:

A - application of the HFBC Planning System once it has been improved and approved in accordance with the decisions of this Conference, in parts or all of the frequency bands between 13 and 26 MHz allocated to HF broadcasting;

B - application of the same HFBC Planning System in parts of all the bands allocated to HF broadcasting.

The Working Group also considered a compromise between the above-mentioned positions, consisting in the adoption of position A initially, in anticipation of a procedure which would lead, by successive stages, to position B.

C. TERZANI
Chairman of Working Group 5-B

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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WORKING GROUP 5-C

Note by the Chairman of Working Group 5-C

DRAFT GUIDELINES FOR A PROCEDURE

1. The requirements file will be created on the basis of data communicated by the administrations relating to operational and projected broadcasting requirements. These requirements are submitted [2] years in advance.

The file should accommodate requirements for re-establishment of a broadcasting facility temporarily suspended by national disasters or other calamitous events.

2. There will be four seasonal schedules as in Article 17. Calculations will be carried out twice per year. Two seasons will be presented at a time. Administrations shall confirm seasonal requirements [ ] ahead of the commencement of the season.

3. The IFRB calculates for each requirement the field strength at each test point of the required service area, the BBR in the service area and the appropriate bands. These calculations are carried out in accordance with the decisions of the Conference and are communicated to each administration for information.

4. Taking the information obtained by step 3 into account, each administration prepares its intended frequency (transmission) schedule. The number of frequencies per requirement, however, in no case shall be higher than that identified by the system using the calculation procedures adopted by the Conference.

5. Administrations may ask the Board to assign frequencies and may request frequency continuity from season to season. Such a request may be included in the requirement form.

6. The administrations submit their intended transmission schedules to the IFRB and indicate whether the help of the IFRB is required in solving possible incompatibilities in the draft seasonal schedule.

7. The IFRB, after receiving these data, identifies possible discrepancies in the frequency schedules submitted and determines whether the data submitted under step 6 with respect to the number of frequencies are in accordance with those obtained under step 3.

8. Using the data available in the requirements file and considering the frequencies designated by administrations as pre-set frequencies, the IFRB will assign frequencies for those administrations which did not indicate their schedule (see also step 5 above).

9. The seasonal schedule should contain for each transmission:

- the country symbol;
- the transmitter site;
- the hours of operation, including specifics when not on a daily basis;
- the number of frequencies for the programme;
- the required service area (CIRAF zones + quadrants);
- the transmitter power;
- antenna characteristics (type, azimuth).

10. Administrations will, either bilaterally or multilaterally, with the assistance of the IFRB if required, try to solve the remaining incompatibilities that may appear in the seasonal schedule.

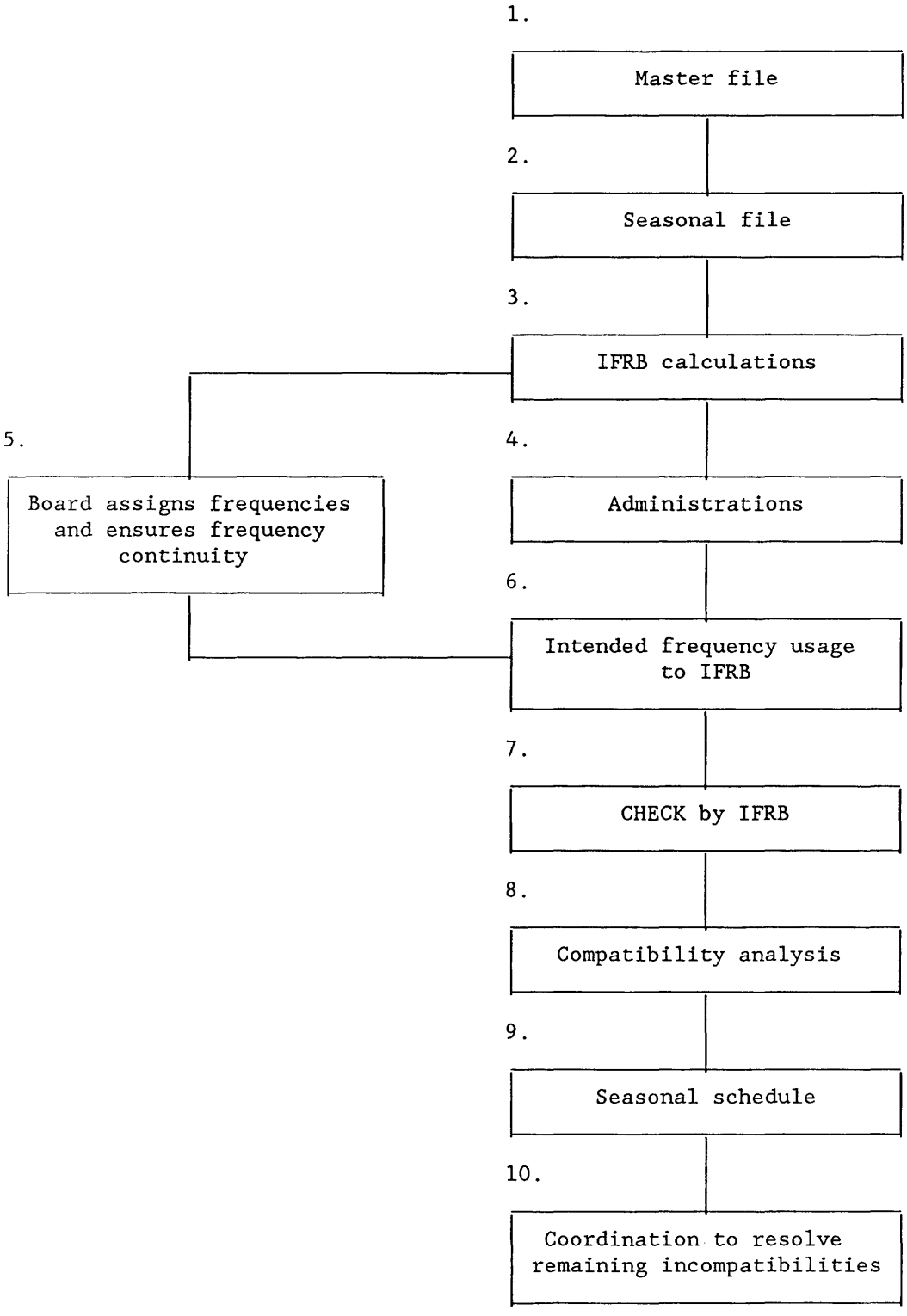
Changes in transmission characteristics resulting from these consultations should immediately be notified to the IFRB. The Board will thereupon publish the corrections to the schedule on a monthly basis.

J.F. BROERE
Chairman of Working Group 5-C

Annex: 1

ANNEX

Flow diagram of the proposed interim procedure



HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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21 February 1987
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COMMITTEE 5

NOTE BY THE CHAIRMAN OF COMMITTEE 5

As announced in my note published in Document DT/41, the development of a procedure (strategy and programme) for future work up to the introduction of the Plan(s) is one of the four main elements of the package compromise to be worked out.

The following points of concern have been raised:

- the need to improve the HFBC Planning System,
- the need to allow countries to continue operating their existing systems without disruption;
- the need to take all the requisite precautions to ensure the successful implementation of the HFBC Planning System,

argue in favour of setting on foot a short-, medium- and long-term strategy to be implemented before the final objective of our WARC for the Planning of the HF Bands Allocated to the Broadcasting Service is achieved.

To this end, having regard to the following points:

- lifetime of equipments in operation,
- date on which the widened bands start to be used,
- time required to improve the HFBC Planning System;
- date on which SSB is introduced;
- etc.,

it would be necessary to identify:

- the short-, medium- and long-term stages,
- the procedures for achieving the objectives of each stage;
- the measures to be taken;
- etc.

In the light of the above, the Working Group's terms of reference might read as follows:

> "Having regard to the lifetime of equipments in operation, the date on which the widened bands start to be used, the time required to improve the HFBC Planning System, the date on which SSB is introduced and any other relevant considerations, to decide on the short-, medium- and long-term stages, procedures and action required for planning the HF bands allocated to the broadcasting service."

C.T. NDIONGUE
Chairman of Committee 5

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
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23 February 1987
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WORKING GROUP 5B

Note from Chairman of Working Group 5B

During the meeting of Working Group 5B held last Friday, the Board was asked to provide information concerning the number of unsatisfied/satisfied frequency hours by band for each of the basic planning exercises. (Plans 10, 20, 30, 40, 50).

The following information was provided by the Board.

Frequency hours suspended and not reinserted, by frequency band

	BANDS									
PLAN	6	7	9	11	13	15	17	21	26	TOTAL
10	3081	1498	1856	714	70	200	175	34	0	7631
20	2270	1292	2427	2002	317	778	570	0	0	9659
30	2171	1541	2988	2438	143	1003	1343	422	0	12053
40	1688	1062	2442	2534	345	1244	1457	218	0	10992
50	2391	1422	1562	998	16	311	514	179	0	7395

Frequency hours included in the plans by frequency band

PLAN	6	7	9	11	13	15	17	21	26	TOTAL
10	4419	2570	4237	3388	909	2613	1539	761	116	20555
20	4181	2180	4693	3776	1213	3363	2011	1033	131	22584
30	4375	2379	5935	4630	1058	3546	2327	1756	434	26444
40	4086	2144	5447	4734	1175	3685	2548	1652	334	25807
50	4104	2221	4359	3515	839	2762	1751	1223	291	21068

C. TERZANI
Chairman of Working Group 5B

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS
ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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WORKING GROUP 6-A

NOTE BY THE CHAIRMAN OF WORKING GROUP 6-A

The annex contains a draft Appendix to the Radio Regulations containing the double-sideband and single-sideband system specifications in the HF bands allocated to the broadcasting service, for consideration in Working Group 6-A.

E. GEORGE
Chairman of Working Group 6-A

Annex: 1

ANNEX

Draft texts for inclusion in the Final Acts

APPENDIX /COM6/A/ TO THE RADIO REGULATIONS

Double-Sideband and Single-Sideband System Specifications
in the HF Bands Allocated to the Broadcasting Service

PART A

Double-sideband system

1. Channel spacing

The nominal spacing for double sideband (DSB) shall be 10 kHz. However the interleaved channels with a separation of 5 kHz may be used in accordance with the relative protection criteria.

2. Transmission characteristics

2.1 Nominal carrier frequencies

Carrier frequencies shall be integral multiples of 5 kHz.

2.2 Audio-frequency band

The upper limit of the audio-frequency band (-3 dB) of the transmitter shall not exceed 4.5 kHz and the lower limit shall be 150 Hz, with an attenuation of 6 dB per octave for frequencies lower than 150 Hz.

2.3 Modulation processing

If audio-frequency signal processing is used, the modulating signal shall retain a dynamic range of not less than 20 dB.

2.4 Necessary bandwidth

The necessary bandwidth shall not exceed 9 kHz.

PART B

Single-sideband system

1. System planning parameters

1.1 Channel spacing

During the transition period [(see Resolution COM4/2)], the channel spacing shall be 10 kHz. In the interest of spectrum conservation, during the transition period, it is also permissible to interleave SSB emissions midway between two adjacent DSB channels, i.e., with 5 kHz separation between carrier frequencies, provided that the interleaved emission is not to the same geographical area as either of the emissions between which it is interleaved.

After the end of the transition period the channel spacing and carrier frequency separation shall be 5 kHz.

1.2 Equivalent sideband power

For the case where the carrier reduction relative to peak envelope power is 6 dB, an equivalent SSB emission is one giving the same audio-frequency signal-to-noise ratio at the receiver output as the corresponding DSB emission, when it is received by a DSB receiver with envelope detection. This is achieved when the sideband power of the SSB emission is 3 dB larger than the total sideband power of the DSB emission. (The peak envelope power of the equivalent SSB emission as well as the carrier power are the same as that of the DSB emission.)

1.3 RF protection ratio

For RF protection ratios to be applied for all relevant combinations of wanted and unwanted (interfering) double- and single-sideband emissions see Recommendation / COM6/A /.

2. Transmission characteristics

2.1 Nominal carrier frequencies

Nominal carrier frequencies shall be integral multiples of 5 kHz.

2.2 Frequency tolerance

The carrier frequencies shall be maintained within a tolerance of ±10 Hz.

2.3 Audio-frequency band

The upper limit of the audio-frequency band (-3 dB) of the transmitter shall not exceed 4.5 kHz with a further slope of attenuation of 35 dB/kHz and the lower limit shall be 150 Hz with lower frequencies attenuated at a slope of 6 dB per octave.

2.4 Modulation processing

If audio-frequency signal processing is used, the modulating signal shall retain a dynamic range of not less than 20 dB.

2.5 Necessary bandwidth

The necessary bandwidth shall not exceed 4.5 kHz.

2.6 Carrier reduction (relative to peak envelope power)

During the transition period the carrier reduction shall be 6 dB, to allow SSB emissions to be received by conventional DSB receivers with envelope detection without significant deterioration of the reception quality.

At the end of the transition period the carrier reduction shall be 12 dB.

2.7 Sideband to be emitted

Only the upper sideband shall be used.

2.8 Suppression of the unwanted sideband

The suppression of the unwanted sideband (lower sideband) and of intermodulation products in that part of the transmitter spectrum shall be at least 35 dB relative to the wanted sideband signal level. Because of the large difference of signal amplitudes in adjacent channels in practice, however, a greater suppression is recommended.

3. Characteristics of the reference receiver

The reference receiver has the main characteristics as given below. For more detailed characteristics see the relevant CCIR Recommendations.

3.1 Noise limited sensitivity

The value of the noise limited sensitivity is equal to or less than 40 dB relative to 1 μV/m.

3.2 Demodulator and carrier acquisition

The reference receiver is equipped with a synchronous demodulator, using for the carrier acquisition a method whereby a carrier is regenerated by means of a suitable control loop which locks the receiver to the incoming carrier. The reference receiver should work equally well with conventional DSB emissions and with SSB emissions having a carrier reduced to 6 or 12 dB below peak envelope power.

3.3 Overall selectivity

The reference receiver has an overall bandwidth (-3 dB) of 4 kHz, with a slope of attenuation of 35 dB/kHz.

Note - Other combinations of bandwidth and slope of attenuation as given below are possible and will give the same relative RF protection ratio of about -27 dB at 5 kHz carrier difference.

Slope of attenuation	Overall bandwidth (-3 dB)
25 dB/kHz	3 300 Hz
15 dB/kHz	2 700 Hz

PART C

System planning parameters applicable to double-sideband and single-sideband systems

1. Proportionally Reduced Protection (PRP)

PRP is a margin (M) by which the RF protection ratio to be applied at a test point is reduced under the following specified conditions:

1) the BBR < [80%], and

2) only one frequency band is given by the planning system, and

3) at the test point considered the field strength E_w is less than E_{min} and greater than or equal to E_{min} -[Z].

In these conditions M is determined as: $M = E_{min} - E_w$.

In such cases the proportionally reduced protection ratio is used in the evaluation of S/I at the test point considered. For all the remaining points within the required service area, full protection as determined by the relevant protection ratio is given when $E_w \geq E_{min}$ and no protection is given when $E_w < E_{min}$ -[Z].

In cases where PRP is not applicable, full protection as determined by the relevant protection ratio is afforded when $E_w \geq E_{min}$ and no protection is afforded when $E_w < E_{min}$.

2. Required service areas and test points

2.1 In specifying the required service area reference shall be made to a combination of:

- CIRAF zones,
- quadrants of CIRAF zones,
- a part of a quadrant specified by the set of test points contained within that part.

2.2 Where it is necessary to specify a required service area which is smaller than an entire zone or quadrant, this may be done by specifying the boundaries of the area as two azimuths and two ranges from the transmitter location.

2.3 The set of 911 test points listed in the IFRB Technical Standards shall be used to represent the CIRAF zones and quadrants for planning purposes.

Where a required service area is defined as set out in paragraph 2.2, and where such an area does not include a test point, the IFRB shall generate a new test point and include it within the Technical Standards. Such additions to the Technical Standards will be distributed to administrations (Nos. 1001 and 1001.1 of the Radio Regulations).

3. Seasonal divisions of the year and representative months

The year shall be sub-divided into four seasons for propagation prediction purposes. These seasons are listed in Table C-1. When predictions are made for a single month to represent a season, the month selected shall be as indicated in the second column of the table.

TABLE C-1

Season	Representative month	Season symbol
November-February	January	D
March-April	April	M
May-August	July	J
September-October	October	S

4. Solar index values

The 12-month running mean sunspot number R_{12} shall be the solar index to be used for planning.

The [seasonal] plan shall be prepared in accordance with the values of R_{12} for the period. The lowest value of R_{12} predicted for any of the months in that [season] shall be used.

5. Reliability[1]

5.1 Calculation of basic circuit reliability (BCR)

The process for calculating basic circuit reliability is indicated in Table C-2. The median value of field strength for the wanted signal at step (1) is determined by the field strength prediction method. The upper and lower decile values (2) through (5) are also determined, taking account of long-term (day-to-day) and short-term (within the hour) fading. The combined upper and lower deciles of the wanted signal are then calculated in steps (6) and (7) in order to derive the signal levels exceeded for 10% and 90% of the time at steps (8) and (9).

[1] Abbreviations of the English terms are used in the formulas throughout the three languages in order to facilitate the practical implementation of the methods described in this section.

The wanted signal probability distribution, assumed to be log-normal, is illustrated in Figure C-1 which indicates the signal level (in decibels) versus the probability that the value of signal level is exceeded (plotted on a normal probability scale). This distribution is used to obtain the basic circuit reliability (11), which is the value of probability corresponding to the minimum usable field strength (10).

TABLE C-2

Parameters used to compute basic circuit reliability

STEP	PARAMETER	DESCRIPTION	SOURCE
(1)	$E_W(50)$ dB (μV/m)	Median field strength of wanted signal[1]	IFRB Technical Standards
(2)	$D_U(S)$ dB	Upper decile of slow fading signal (day-to-day)	IFRB Technical Standards
(3)	$D_L(S)$ dB	Lower decile of slow fading signal (day-to-day)	IFRB Technical Standards
(4)	$D_U(F)$ dB	Upper decile of fast fading signal (within the hour)	IFRB Technical Standards
(5)	$D_L(F)$ dB	Lower decile of fast fading signal (within the hour)	IFRB Technical Standards
(6)	$D_U(E_W)$ dB	Upper decile of wanted signal	$\sqrt{D_U(S)^2 + D_U(F)^2}$
(7)	$D_L(E_W)$ dB	Lower decile of wanted signal	$\sqrt{D_L(S)^2 + D_L(F)^2}$
(8)	$E_W(10)$ dB (μV/m)	Wanted signal exceeded 10% of the time	$E_W + D_U(E_W)$
(9)	$E_W(90)$ dB (μV/m)	Wanted signal exceeded 90% of the time	$E_W - D_L(E_W)$
(10)	E_{min} dB (μV/m)	Minimum usable field strength	IFRB Technical Standards
(11)	BCR	Basic circuit reliability	Figure C-1

Note 1 - In the calculation of BCR at the test points within the required service areas of synchronized transmitters, the field strength value to be used is calculated by the method of root sum square of the contributing field strengths in volts/metre.

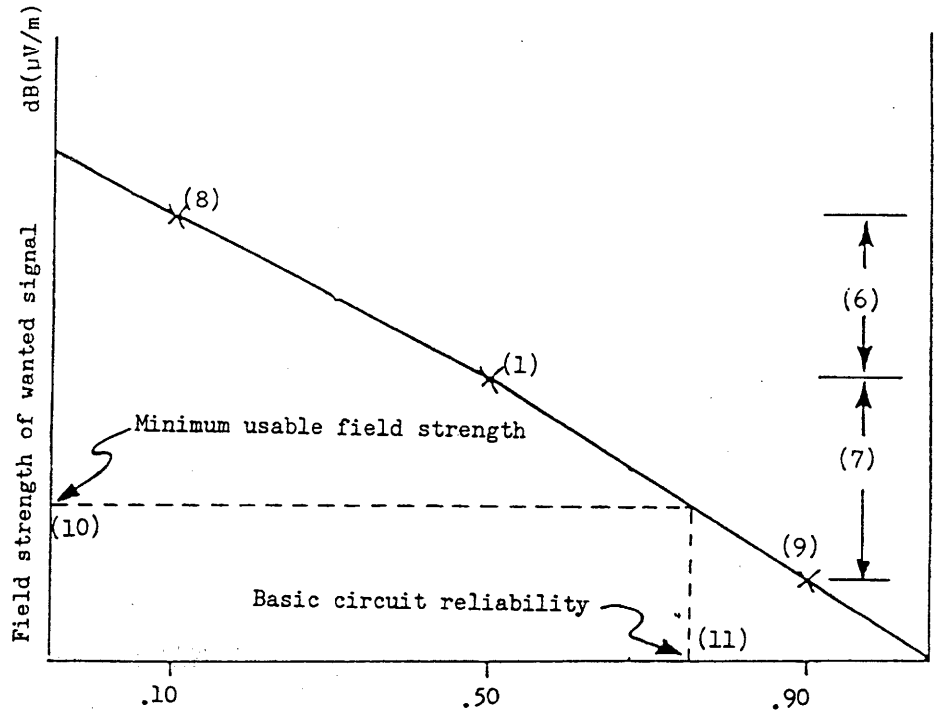

FIGURE C-1

Parameters used to compute basic circuit reliability

(Figures appearing in brackets refer to step numbers as shown in Table C-2

The basic circuit reliability is given by the expression:

$$BCR = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{Y} \exp(-\tau^2/2)\, d\tau$$

when $E_W \geq E_{min}$

$$Y = \frac{E_W - E_{min}}{\sigma_L}$$

$$\sigma_L = D_L(E_W)/1.282$$

when $E_W < E_{min}$

$$Y = \frac{E_W - E_{min}}{\sigma_U}$$

$$\sigma_U = D_U(E_W)/1.282$$

5.2 Calculation of [overall/interference] circuit reliability [(OCR) (ICR)]

The method is outlined in Table C-3. In step (1), the median wanted signal level is computed by the signal strength prediction method.

In step (2), the median field strength levels (E_i) of each interfering source are obtained from the prediction method. In step (3), for a single source of interference the predicted median field strength is used; for multiple sources of interference the median field strength is calculated as follows : the field strengths of the interfering signals E_i are listed in decreasing order. Successive r.s.s. additions of the field strengths E_i are computed, stopping when the difference between the resultant field strength and the next field strength is greater than 6 dB. In step (3), the resultant field strength I is taken as the last computed value.

The values of the wanted signal and interference determined in steps (1) and (3) are combined in step (4) to derive the median signal-to-interference ratio. The 10% and 90% fading allowances are included in steps (5) and (6) in order to derive the signal-to-interference ratio exceeded for 10% and 90% of the time in steps (7) and (8).

The probability distribution for the signal-to-interference ratio may now be determined as shown in Figure C-2. The ratios are presented in decibels on a linear scale versus the probability that the value of the signal-to-interference ratio is exceeded on a normal probability scale. In Figure C-2, the value of probability corresponding to the required signal-to-interference ratio (9) is the circuit reliability in the presence of interference only (ICR). [The overall circuit reliability (OCR, step (12)) is the minimum value of either ICR (step (10)) or BCR (step (11)), whichever produces the lower value.]

The mathematical treatment of the calculation of ICR can be given in terms of the probability density distribution of the protection ratio. These functions are taken to be log normal, as is the resulting distribution of the signal-to-interference ratio.

The parameter ICR is given by the following expression :

$$ICR = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{Y} \exp(-\tau^2/2)\, d\tau$$

when for $E_W - I \geq RSI$

$$Y = \frac{E_W - I - RSI}{\sigma_L}$$

$$\sigma_L = D_L(SIR)/1.282$$

and for $E_W - I < RSI$

$$Y = \frac{E_W - I - RSI}{\sigma_U}$$

$$\sigma_U = D_U(SIR)/1.282$$

Values of the various parameters in the above expressions are found in the steps indicated below of Table C-3.

E_W	step 1
I	step 3
$D_U(SIR)$	step 5
$D_L(SIR)$	step 6
RSI	step 9

TABLE C-3

Parameters used to compute overall circuit reliability

STEP	PARAMETER	DESCRIPTION	SOURCE
1	E_W dB (μV/m)	Median field strength of wanted signal	IFRB Technical Standards
2	E_i dB (μV/m)	Median field strength of interfering signals $E_1, E_2, \ldots E_n$	IFRB Technical Standards
3	I dB (μV/m)	Resultant field strength of interference	$I=20 \log_{10}\sqrt{\sum_{i=1}^{n} 10^{\left(\frac{E_i+\alpha}{10}\right)}}$ 1)
4	SIR(50)dB	Median signal to interference ratio	$E_W - I$
5	D_U(SIR)dB	10% fading allowance	10 dB(<60°), 14 dB(≥60°) 2)
6	D_L(SIR)dB	90% fading allowance	10 dB(<60°), 14 dB(≥60°) 2)
7	SIR(10)dB	Subjective signal-to-interference ratio exceeded 10% of the time	SIR(50) + D_U(SIR)
8	SIR(90)dB	Subjective signal-to-interference ratio exceeded 90% of the time	SIR(50) - D_L(SIR)
9	RSI dB	Required RF protection ratio 3)	IFRB Technical Standards
10	ICR	Circuit reliability in presence of interference only (without noise)	See Figure C-2
11	BCR	Basic circuit reliability	See Figure C-1
12	OCR	Overall circuit reliability	Min(ICR, BCR)

Note 1 - α is the appropriate relative protection ratio corresponding to the carrier frequency separation between the wanted and each unwanted signal.

Note 2 - i) If any point on that part of the great circle which passes through the transmitter and the receiver and which lies between control points located 1,000 km from each end of the path reaches a corrected geomagnetic latitude of 60° or more, the values for ≥ 60° have to be used.

ii) The value of 14 dB applies for overall circuit reliabilities not exceeding 80%. In other cases the value of 10 dB applies.

iii) These values relate to the path of the wanted signal only.

iv) For synchronized transmissions, the fading allowance associated with the predominant wanted signal is to be used. For those conditions where the contributing wanted field strengths are equal and Note 2 i) applies to at least one of the paths, the value of 14 dB is to be used for D_U(SIR) and D_L(SIR).

Note 3 - In these calculations a single value of the co-channel protection ratio must be used.

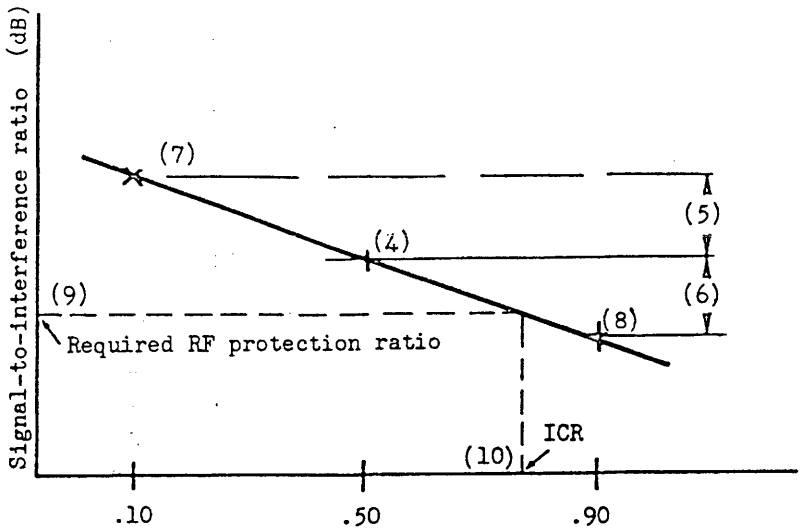

FIGURE C-2

Parameters used to compute overall circuit reliability

(Figures appearing in brackets refer to step numbers as shown in Table C-3)

5.3 Basic reception reliability (BRR)

The method for computing basic reception reliability is outlined in Table C-4. With a single frequency, basic reception reliability (BRR) is the same as the basic circuit reliability (BCR) defined in the section 1.7.1.1. With multiple frequencies, the interdependence between propagation conditions at different frequencies leads to the computation method given in Table C-4. In steps (4) and (6), BCR (n) is the basic circuit reliability for frequency n, where n = F_1, F_2, etc. The basic reception reliability is obtained in step (2) for a single frequency, in step (4) for a set of two frequencies and in step (6) for a set of three frequencies.

5.4 Overall reception reliability (ORR)

The method for computing overall reception reliability is outlined in Table C-5. With a single frequency, overall reception reliability (ORR) is the same as the overall circuit reliability (OCR) defined in section 1.7.1.2 With multiple frequencies, the interdependence between propagation conditions at different frequencies leads to the computation method given in Table C-5. In steps (4) and (6), OCR (n) is the overall circuit reliability for frequency n, where n = F_1, F_2, etc. The overall reception reliability is obtained in step (2) for a single frequency, in step (4) for a set of two frequencies and in step (6) for a set of three frequencies.

TABLE C-4

Basic reception reliability

The following parameters are involved :

Single-frequency operation

Step	Parameter	Description	Source
(1)	BCR (F_1) %	Basic circuit reliability for frequency F_1	step 11, Table C-2
(2)	BRR (F_1) %	Basic reception reliability	BCR (F_1)

Two-frequency operation [1]

(3)	BCR (F_2) %	Basic circuit reliability for frequency F_2	step 11, Table C-2
(4)	BRR (F_1) (F_2) %	Basic reception reliability	$1-\prod_{n=F_1}^{F_2}(1-BCR(n))$

[1] The two frequencies F_1 and F_2 shall be situated in different frequency bands allocated to the HF broadcasting service.

TABLE C-4 (continued)

Basic reception reliability

Three-frequency operation [1]

Step	Parameter	Description	Source
(5)	BCR (F_3) %	Basic circuit reliability for frequency F_3	Step 11, Table C-2
(6)	BRR (F_1)(F_2)(F_3) %	Basic reception reliability	$1-\prod_{n=F_1}^{F_3}(1-BCR(n))$

[1] The three frequencies F_1, F_2 and F_3 shall be situated in different frequency bands allocated to the HF broadcasting service.

TABLE C-5

Overall reception reliability

The following parameters are involved :

Single-frequency operation

Step	Parameter	Description	Source
(1)	OCR (F_1) %	Overall circuit reliability for frequency F_1	Step 12, Table C-3
(2)	ORR (F_1) %	Overall reception reliability	OCR (F_1)

Two-frequency operation [1]

(3)	OCR (F_2) %	Overall circuit reliability for frequency F_2	Step 12, Table C-3
(4)	ORR (F_1) (F_2) %	Overall reception reliability	$1-\prod_{n=F_1}^{F_2}(1-OCR(n))$

[1] The two frequencies F_1 and F_2 shall be situated in different frequency bands allocated to the HF broadcasting service.

TABLE C-5 (continued)

Overall reception reliability

Three-frequency operation [1]

Step	Parameter	Description	Source
(5)	OCR (F_3) %	Overall circuit reliability for frequency F_3	Step 12, Table C-3
(6)	ORR (F_1) (F_2) (F_3) %	Overall reception reliability	$1-\prod_{n=F_1}^{F_3}(1-OCR(n))$

[1] The three frequencies F_1, F_2 and F_3 shall be situated in different frequency bands allocated to the HF broadcasting service.

5.5 Basic and /overall/interference/ broadcast reliability

The determination of basic broadcast reliability involves the use of test points within the required service area. The basic broadcast reliability is an extension of the basic reception reliability concept to an area instead of a single reception point. The method for computing basic broadcast reliability is outlined in Table C-6. In step (1), the basic reception reliabilities BRR (L_1), BRR (L_2), --- BRR (L_N) are computed as described in Table C-4 at each test point L_1, L_2 --- L_N. these values are ranked in step (2) and the basic broadcast reliability is the value associated with a percentile /X/ of the test points.

In a similar way, the /overall/interference/ broadcast reliability is computed as described in Table C-7 and it is the value associated with a percentile /X/ of the test points.

Broadcast reliability is associated with the expected performance of a broadcast service at a given hour. For periods longer than an hour, computation at one-hour intervals is required.

TABLE C-6

Basic broadcast reliability

The following parameters are involved :

Step	Parameter	Description	Source
(1)	BRR (L_1), BRR (L_2) --- BRR (L_N) %	Basic reception reliability at all test points considered in the required service area	Step (2), (4) or (6), as appropriate, from Table C-4
(2)	BBR (X) %	Basic broadcast reliability associated with percentile [X]	Any percentile chosen from the values ranked from (1) of this Table

TABLE C-7

Overall broadcast reliability

The following parameters are involved :

Step	Parameter	Description	Source
(1)	ORR (L_1), ORR (L_2) --- ORR (L_N) %	Overall reception reliability at all test points considered in the required service area	Step (2), (4) or (6), as appropriate, from Table C-5
(2)	OBR (X) %	Overall broadcast reliability associated with percentile [X]	Any percentile chosen from the values ranked from (1) of this Table

6. Maximum number of frequencies required for broadcasting the same programme to the same zone

6.1 Introduction

Wherever possible, only one frequency should be used to broadcast a particular programme to a given reception area. In certain special circumstances, it may be found necessary to use more than one frequency per programme, i.e.:

- over certain paths, e.g. very long paths, those passing through the auroral zone, or paths over which the MUF is changing rapidly;
- areas where the depth of the area extending outwards from the transmitter is too great to be served by a single frequency;
- when highly directional antennas are used to maintain satisfactory signal-to-noise ratios, thereby limiting the geographical area covered by the station concerned.

The decision to use more than one frequency per programme should be made on the merits of the particular case concerned.

Use of synchronized transmitters should be encouraged whenever possible with a view to minimizing the need for additional frequencies.

6.2 Use of additional frequencies

The number of frequencies needed to achieve the specified level of basic broadcast reliability shall be determined by the method given below. If the calculated basic broadcast reliability for a single frequency does not reach the adopted value, it is necessary to consider whether the BBR could be improved by additional frequencies in separate bands and whether the improvement would justify the use of additional frequencies.

6.3 Determination of additional frequency bands

In cases where the BBR[1] for the first band, based on all test points in the required service area, is between 50% and 80%, an additional band shall be tested as follows.

Those test points whose basic circuit reliability BCR is less than or equal to the BBR are identified and only these points are used to determine the second band. For each band, the minimum value of BCR (BCR_{min}) at these points is determined and that band having the highest BCR_{min} value is selected. If more than one band has this value, the highest frequency band is selected. The two-band BBR, taking account of the BRR at all test points in the required service area is then computed and if it exceeds the limit specified in Figure 3-14[2] then the second band is permitted. In those special cases where the two-band BBR is less than 80% then a third band shall be tested as follows.

The BBR for each of the remaining bands is computed considering all test points in the required service area. Of these bands, that band having the highest BBR is selected as the third band. If more than one band has this value, the highest frequency band is selected. If the resulting three-band BBR taking account of the BRR at all test points exceeds the limit specified in Figure C-3, the third band is permitted.

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1 For calculation of the basic broadcast reliability, see paragraph 1.6.5.

2 The contents of this figure can be expressed by the following equation:

BBR (after) > 30 + .75*BBR (before) additional frequency permitted

BBR (after) $\leq$ 30 + .75*BBR (before) additional frequency not permitted

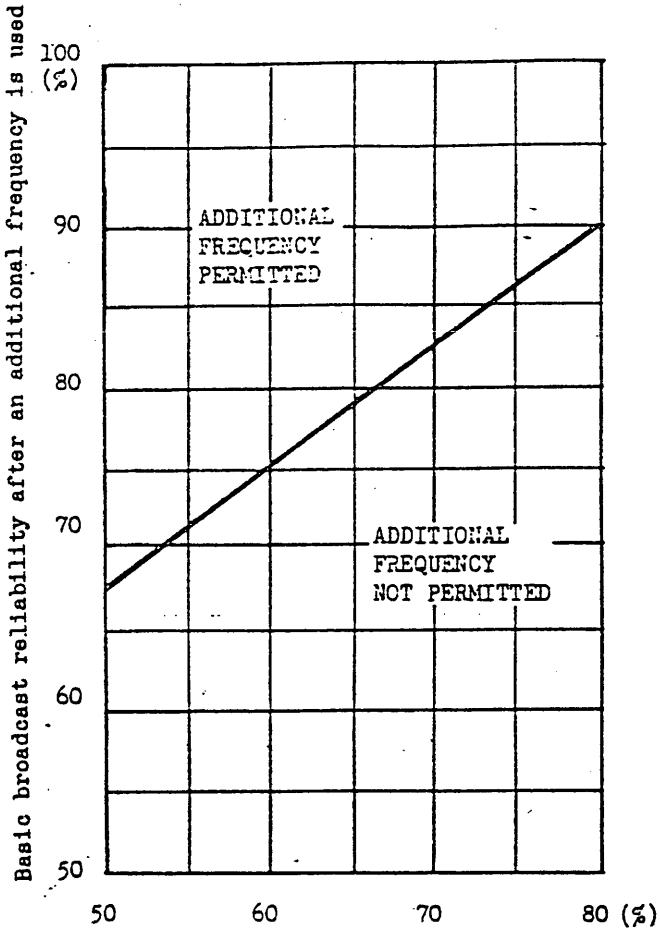

FIGURE C-3

Limits for use of an additional frequency

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/62-E
23 February 1987
Original: English

WORKING GROUP 6-A

DRAFT

RECOMMENDATION [COM6/C]

Relating to the System Planning Parameters for the Use of Double-Sideband Systems in the HF Bands Allocated to the Broadcasting Service

The World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service (Geneva, 1987),

considering

a) that this Conference has considered in detail the system planning and technical parameters used for HF broadcasting;

b) that certain double-sideband system parameters for HF broadcasting are contained in Appendix [COM6/A] to the Radio Regulations;

c) that the RF protection ratio, minimum usable field strength and signal fading allowance are basic planning parameters which may be improved in the future as a result of further studies;

d) that this Conference has adopted Resolution [COM6/1] relating to the procedure to be applied by the IFRB in the revision of relevant parts of its Technical Standards used for HF broadcasting,

recommends

that, subject to the procedure to be applied by the IFRB in the revision of relevant parts of its Technical Standards used for HF broadcasting given in Resolution [COM6/1], the values of system planning parameters given in the annex to this Recommendation be used by the IFRB in its Technical Standards relating to double-sideband systems in the HF bands allocated to the broadcasting service,

requests the CCIR

to continue to study values of the parameters contained in the annex to this Recommendation,

invites administrations

to participate actively in these studies.

ANNEX TO RECOMMENDATION [COM6/C]

System planning parameters

1. Radio-frequency protection ratios

1.1 Protection ratio for unsynchronized transmissions

[The co-channel protection ratio for unsynchronized transmission should be ...]
[to be developed by Committee 5].

1.2 Protection ratio for synchronized transmissions

The co-channel protection ratio between synchronized transmissions in the same network should be:

Distance L between synchronized transmitters: km	Protection ratio dB
$L \leq 700$	0
$700 < L \leq 2{,}500$	4
$2{,}500 < L$	8

1.3 Relative radio-frequency protection ratios

The relative rf protection ratios (α) for carrier frequency separations*, with reference to that for the co-channel case, should be:

Δf	α
0 kHz	0 dB
$\pm$5 kHz	-3 dB
$\pm$10 kHz	-35 dB
$\pm$15 kHz	-49 dB
$\pm$20 kHz	-54 dB

2. Minimum usable field strength

The minimum usable field strength should be determined by adding 34 dB to the greater of:

- the field strength due to atmospheric radio noise as contained in CCIR Report 322-2;
- 3.5 dB(μV/m), which is the intrinsic receiver noise level.

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* Frequency separations, $\Delta f < -20$ kHz, as well as $\Delta f > +20$ kHz, need not be considered in planning.

3. Signal fading allowance

3.1 Short-term (within the hour) fading

The upper-decile amplitude deviation from the median of a single signal is to be taken as 5 dB and the lower-decile deviation is to be taken as -8 dB.

3.2 Long-term (day-to-day) fading

The magnitude of the long-term fading, as determined by the ratio of the operating frequency to the basis MUF, is given in Table III of CCIR Report 266-6.

For synchronized transmissions, the fading allowance associated with the predominant signal should be used. For those conditions where the contributing wanted field strengths are equal and Note 1 of Table III of CCIR Report 266-6 applies to at least one of the paths, the values for geomagnetic latitudes $\geq 60^{o}$ should be used.

E. GEORGE
Chairman of Working Group 6-A

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

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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, for the work immediately following the World Administrative Radio Conference HFBC(2), the Administrative Council, at its 41st session (1986), approved the extension of four posts until 30 June 1987, and the possible extension of these posts until 31 December 1987, subject to a decision by the Second Session of WARC-HFBC and the financial provisions approved by the Budget Control Committee.

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, and in particular the common services provided for the Conference, had been entirely satisfactory.

2. Conference budget

The Budget Control Committee examined the Conference budget, amounting to 2,210,000 Swiss francs, including IFRB post-conference work for 1987, which was approved by the Administrative Council at its 41st session (1986).

The Committee noted that the Conference budget did not comprise expenditure on common services supernumerary staff salaries, which are charged to a special section of the ordinary budget. This expenditure was estimated at 542,000 Swiss francs.

In addition, the Committee 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. As a result of these adjustments, the budget of the Conference stands at 2,061,000 Swiss francs, i.e. a decrease of 149,000 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 costs ... shall be decided by the Plenary Meeting of the conference or meeting."

As all the documents which can be used as a basis for the sales edition of the Final Acts of the Conference are prepared using word processing systems, no expenditure under this heading need be charged to the supplementary publications budget.

On the other hand, in accordance with the provisions of Nos. 119 and 122 of the Convention (Nairobi, 1982), the costs of translating the Final Acts of the Conference into the six official languages are charged to the Conference.

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 sub-heads and items as well as the actual expenditure incurred as at 23 February 1987. There is also an indication of the expenditure committed up to that date and an estimate of expenditure up to the close of the Conference's work.

The above statement shows that the total amount to be charged to the ordinary budget for WARC-HFBC(2) is estimated at 1,997,000 Swiss francs, i.e. 64,000 Swiss francs less than the amount allocated by the Administrative Council and adjusted under Resolution No. 647. It can therefore be assumed that Conference expenditure will remain within the limits laid down.

Annexes 2.1, 2.2 and 2.3 to this document show, for information, the situation of expenditure on preparatory work for the First Session of the WARC-HFBC, expenditure for the First Session, 1984, and intersessional work for 1985 and 1986.

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 work and intersessional work, in relation to the expenditure limit fixed for WARC-HFBC 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 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 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."

In this connection, it is recalled that, in the budget approved for 1987, the Administrative Council made provision for the possible extension of four P.4 posts for immediate post-conference work for the period from 1 July to 31 December 1987, the period up to 30 June 1987 being already covered by the budget of the Second Session of the Conference itself. Provision for the possibility of extending these posts was included in section 18 relating to expenditure concerning the "implementation by the IFRB of the decisions of administrative conferences" subject to a decision by the Second Session of WARC-HFBC and the financial provisions approved by the Budget Control Committee.

(to be completed later)

* * *

The Plenary Meeting is requested to examine this report.

Dr. M.K. RAO
Chairman of the
Budget Control Committee

Annexes: 4

ANNEX 1

Position of WARC HFBC 1987 accounts as at 23 February 1987

Heading	Budget approved by AC	Budget adjusted on 01.02.87	Expenditure at 23.02.87 actual committed	Expenditure at 23.02.87 estimated total	
col.	1	2	3	4	5
	thousands of Swiss francs				
Subheads II-IV - Work of the Conference					
Subhead II - Staff costs					
423.11 Salaries and related exp.	1326	1195	45	1110	1155
423.38 Recruit. travel costs	81	81	6	52	58
423.41 Insurance	35	35	7	35	42
	1442	1311	58	1197	1255
Subhead III - Premises and equipment costs					
433.61 Premises, furniture, machines	40	40	0	39	39
433.62 Document production	60	60	0	69	69
433.63 Office supplies & costs	50	50	3	33	36
433.64 PTT	50	50	25	23	48
433.65 Technical installations	4	4	0	4	4
433.69 Sundry & unforeseen	10	10	1	9	10
	214	214	29	177	206
Subhead IV - Other expenditure					
443.00 Final Acts of the Conference	54	54	0	54	54
Subhead VI - Post-Conference work					
461.11 Salaries & related exp.	103				0
461.12 Supernumerary staff	120	225	82	143	225
461.41 Insurance	20				0
461.50 Computer facilities	217	217	1	216	217
461.61 Premises, furniture, machines	40	40	4	36	40
	500	482	87	395	482
TOTAL SECTION 11.4	2210	2061	174	1823	1997
UNUSED CREDITS					64

Col. 2: Budget including additional credits to take account of changes in the common system of the United Nations and its specialized agencies.

ANNEX 2.1

Preparatory work in 1983 for the World Administrative Conference for HF Broadcasting

Items	Budget 1983	1983 Accounts
	- Swiss francs -	
Sub-head I - Staff expenditure		
11.401 Salaries and related expenses	205,700	198,773.40
11.402 Insurance	31,400	35,609.70
Total, sub-head I	237,100	234,383.10
Sub-head II - Other expenses		
11.405 Document production	-	8,265.95
11.410 CCIR preparatory work	270,000	86,385.70
Total, sub-head II	270,000	94,651.65
Total expenditure, Section 11.4	507,100	329,034.75

ANNEX 2.2

World Radio Conference HFBC-84

Items		Budget 1984	Accounts 1984
		- Swiss francs -	
Sub-head 1 - IFRB preparatory work			
11.401	Salaries and related expenses	506,200	458,371.35
11.402	Initial installation expenses	105,000	116,736.05
11.403	Insurance	90,200	76,692.75
11.404	Office space, furniture	104,000	86,267.00
11.405	Electronic equipment	100,000	105,049.65
	Total for sub-head 1	941,400	843,116.80
Sub-head 2 - Staff expenditure			
11.421	Salaries and related expenditure	1,192,500	1,183,146.15
11.422	Travel - recruitment	92,000	78,254.85
11.423	Insurance	34,000	16,869.85
	Total for sub-head 2	1,318,500	1,278,270.85
Sub-head 3 - Premises and equipment			
11.431	Premises, furniture, machines	90,000	36,370.65
11.432	Document production	100,000	74,041.50
11.433	Office supplies and overheads	40,000	48,003.05
11.434	PTT	43,000	21,721.45
11.435	Technical installations	20,000	-
11.436	Sundry and unforeseen	10,000	7,016.65
	Total for sub-head 3	303,000	187,153.30
Sub-head 4 - Other expenses			
11.441	Report to the Second Session/ Final Acts	15,000	4,721.95
	Total, Section 11.4	2,577,900	2,313,262.90

ANNEX 2.3

World Radio Conference HFBC-84
intersessional work

Items	Budget 1985	Expenses 1985
	- Swiss francs -	
Sub-head I - IFRB preparatory work		
11.451 Salaries and related expenses	1,060,600	1,058,570.85
11.453 Insurance	214,600	195,782.55
11.454 Computer facilities	332,000	326,506.40
11.455 Offices, furniture, supplies	120,000	124,768.45
Total, sub-head I	1,727,200	1,705,628.25
Sub-head II - CCIR preparatory work		
11.461 Salaries and related expenses and insurance	80,000	72,135.05
11.462 Document production	20,000	17,737.65
Total, sub-head II	100,000	89,872.70
Total, Section 11.4	1,827,200	1,795,500.95

ANNEX 3

Expenditure limit fixed by Additional Protocol I
to the Convention (Nairobi, 1982)

WARC-HFBC	Sections 11 and 17		
	Limit on expenditure Add. Prot. I	Actual or estimated expenditure	Difference
	- Swiss francs -		
Limit on expenditure	10,000,000		
1983: Preparatory work		403,000*	
1984: Preparatory work, cost of First Session, intersessional work		2,860,600*	
1985: Intersessional work		1,655,000*	
1986: Intersessional work		1,754,000*	
1987: Intersessional work, cost of Second Session, immediate post-Conference work		2,448,000**	
	10,000,000	9,120,600	879,400

The figures given in the table correspond to 1 September 1982 values.

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* Actual expenses.

** Expenses provided for in the budget.

ANNEX 4

List of recognized private operating agencies and international organizations contributing to the work of the Conference

		No. of contributory units
I.	Recognized private operating agencies	
	None	
II.	International organizations	
II.1	United Nations	*)
II.2	Specialized agencies	
	International Civil Aviation Organization (ICAO)	*)
	World Meteorological Organization (WMO)	*)
II.3	Regional telecommunication organizations	
	Arab Telecommunication Union (ATU)	*)
II.4	Other international organizations	
	International Association of Broadcasting (IAB)	*)
	International Radio and Television Organization (OIRT)	*)
	Asia-Pacific Broadcasting Union (ABU)	*)
	Arab States Broadcasting Union (ASBU)	*)
	Union of National Radio and Television Organizations of Africa (URTNA)	*)
	European Broadcasting Union (EBU)	*)
	International Amateur Radio Union (IARU)	*)

*) Exempted from any contribution by Administrative Council Resolution No. 925.

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/63-E
25 February 1987
Original: French

BUDGET CONTROL COMMITTEE

Draft

REPORT OF THE BUDGET CONTROL COMMITTEE TO THE PLENARY MEETING

The Budget Control Committee held ... 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, for the work immediately following the World Administrative Radio Conference HFBC(2), the Administrative Council, at its 41st session (1986), approved the extension of four posts until 30 June 1987, and the possible extension of these posts until 31 December 1987, subject to a decision by the Second Session of WARC-HFBC and the financial provisions approved by the Budget Control Committee. (See section ... of this document.)

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 2,210,000 Swiss francs, including IFRB post-conference work for 1987, which was approved by the Administrative Council at its 41st session (1986).

The Committee noted that the Conference budget did not comprise expenditure on common services supernumerary staff salaries, which are charged to a special section of the ordinary budget. This expenditure was estimated at 542,000 Swiss francs.

In addition, the Committee 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. As a result of these adjustments, the budget of the Conference stands at 2,113,100 Swiss francs, i.e. a decrease of 96,900 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 costs ... shall be decided by the Plenary Meeting of the conference or meeting."

As all the documents which can be used as a basis for the sales edition of the Final Acts of the Conference are prepared using word processing systems, no expenditure under this heading need be charged to the supplementary publications budget.

On the other hand, in accordance with the provisions of Nos. 119 and 122 of the Convention (Nairobi, 1982), the costs of translating the Final Acts of the Conference into the six official languages are charged to the Conference.

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 sub-heads and items as well as the actual expenditure incurred as at 23 February 1987. There is also an indication of the expenditure committed up to that date and an estimate of expenditure up to the close of the Conference's work.

The above statement shows that the total amount to be charged to the ordinary budget for WARC-HFBC(2) is estimated at ... Swiss francs, i.e. ... Swiss francs less than the amount allocated by the Administrative Council and adjusted under Resolution No. 647. It can therefore be assumed that Conference expenditure will remain within the limits laid down.

Annexes 2.1, 2.2 and 2.3 to this document show, for information, the situation of expenditure on preparatory work for the First Session of the WARC-HFBC, expenditure for the First Session, 1984, and intersessional work for 1985 and 1986.

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 work and intersessional work, in relation to the expenditure limit fixed for WARC-HFBC 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 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 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."

In this connection, it is recalled that, in the budget approved for 1987, the Administrative Council made provision for the possible extension of four P.4 posts for immediate post-conference work for the period from 1 July to 31 December 1987, the period up to 30 June 1987 being already covered by the budget of the Second Session of the Conference itself. Provision for the possibility of extending these posts was included in section 18 relating to expenditure concerning the "implementation by the IFRB of the decisions of administrative conferences" subject to a decision by the Second Session of WARC-HFBC and the financial provisions approved by the Budget Control Committee.

(to be completed later)

* * *

The Plenary Meeting is requested to examine this report.

Dr. M.K. RAO
Chairman of the
Budget Control Committee

Annexes: 4

ANNEX 1

Position of WARC-HFBC 1987 accounts as at 23 February 1987

(to be completed later)

ANNEX 2.1

Preparatory work in 1983 for the World Administrative Conference for HF Broadcasting

Items	Budget 1983	1983 Accounts
	- Swiss francs -	
Sub-head I - Staff expenditure		
11.401 Salaries and related expenses	205,700	198,773.40
11.402 Insurance	31,400	35,609.70
Total, sub-head I	237,100	234,383.10
Sub-head II - Other expenses		
11.405 Document production	-	8,265.95
11.410 CCIR preparatory work	270,000	86,385.70
Total, sub-head II	270,000	94,651.65
Total expenditure, Section 11.4	507,100	329,034.75

ANNEX 2.2

World Radio Conference HFBC-84

Items		Budget 1984	Accounts 1984
		- Swiss francs -	
Sub-head 1 - IFRB preparatory work			
11.401	Salaries and related expenses	506,200	458,371.35
11.402	Initial installation expenses	105,000	116,736.05
11.403	Insurance	90,200	76,692.75
11.404	Office space, furniture	104,000	86,267.00
11.405	Electronic equipment	100,000	105,049.65
	Total for sub-head 1	941,400	843,116.80
Sub-head 2 - Staff expenditure			
11.421	Salaries and related expenditure	1,192,500	1,183,146.15
11.422	Travel - recruitment	92,000	78,254.85
11.423	Insurance	34,000	16,869.85
	Total for sub-head 2	1,318,500	1,278,270.85
Sub-head 3 - Premises and equipment			
11.431	Premises, furniture, machines	90,000	36,370.65
11.432	Document production	100,000	74,041.50
11.433	Office supplies and overheads	40,000	48,003.05
11.434	PTT	43,000	21,721.45
11.435	Technical installations	20,000	-
11.436	Sundry and unforeseen	10,000	7,016.65
	Total for sub-head 3	303,000	187,153.30
Sub-head 4 - Other expenses			
11.441	Report to the Second Session/ Final Acts	15,000	4,721.95
	Total, Section 11.4	2,577,900	2,313,262.90

ANNEX 2.3

World Radio Conference HFBC-84
intersessional work

Items	Budget 1985	Expenses 1985
	- Swiss francs -	
Sub-head I - IFRB preparatory work		
11.451 Salaries and related expenses	1,060,600	1,058,570.85
11.453 Insurance	214,600	195,782.55
11.454 Computer facilities	332,000	326,506.40
11.455 Offices, furniture, supplies	120,000	124,768.45
Total, sub-head I	1,727,200	1,705,628.25
Sub-head II - CCIR preparatory work		
11.461 Salaries and related expenses and insurance	80,000	72,135.05
11.462 Document production	20,000	17,737.65
Total, sub-head II	100,000	89,872.70
Total, Section 11.4	1,827,200	1,795,500.95

ANNEX 3

Expenditure limit fixed by Additional Protocol I to the Convention (Nairobi, 1982)

WARC-HFBC	Sections 11 and 17		
	Limit on expenditure Add. Prot. I	Actual or estimated expenditure	Difference
	- Swiss francs -		
Limit on expenditure	10,000,000		
1983: Preparatory work		403,000*	
1984: Preparatory work, cost of First Session, intersessional work		2,860,600*	
1985: Intersessional work		1,655,000*	
1986: Intersessional work		1,754,000*	
1987: Intersessional work, cost of Second Session, immediate post-Conference work		2,448,000**	
	10,000,000	9,120,600	879,400

The figures given in the table correspond to 1 September 1982 values.

---

* Actual expenses.

** Expenses provided for in the budget.

ANNEX 4

List of recognized private operating agencies and international organizations contributing to the work of the Conference

		No. of contributory units
I.	Recognized private operating agencies	
	None	
II.	International organizations	
II.1	United Nations	*)
II.2	Specialized agencies	
	International Civil Aviation Organization (ICAO)	*)
	World Meteorological Organization (WMO)	*)
II.3	Regional telecommunication organizations	
	Arab Telecommunication Union (ATU)	*)
II.4	Other international organizations	
	International Association of Broadcasting (IAB)	*)
	International Radio and Television Organization (OIRT)	*)
	Asia-Pacific Broadcasting Union (ABU)	*)
	Arab States Broadcasting Union (ASBU)	*)
	Union of National Radio and Television Organizations of Africa (URTNA)	*)
	European Broadcasting Union (EBU)	*)
	International Amateur Radio Union (IARU)	*)

*) Exempted from any contribution by Administrative Council Resolution No. 925.

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS
ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/64-E
27 February 1987
Original : French

COMMITTEE 2

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 40.

2. Meetings

The Committee met twice, on 3 February and 2 March 1987.

At its first meeting, it set up a Working Group consisting of the Chairman and Vice-Chairman of the Committee and one delegate from Canada, from the Federal Republic of Germany, and from Indonesia 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 Vice-Chairman of Committee 2 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.K. CHEMAI

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)

Afghanistan (Democratic Republic of)
Albania (Socialist People's Republic of)
Algeria (People's Democratic Republic of)
Germany (Federal Republic of)
Antigua and Barbuda
Saudi Arabia (Kingdom of)
Argentine Republic
Australia
Belgium
Byelorussian Soviet Socialist Republic
Botswana (Republic of)
Bulgaria (People's Republic of)
Burkina Faso
Cameroon (Republic of)
Canada
Chile
China (People's Republic of)
Cyprus (Republic of)
Vatican City State
Colombia (Republic of)
Korea (Republic of)
Côte d'Ivoire (Republic of)
Cuba
Denmark
Egypt (Arab Republic of)
United Arab Emirates
Spain
United States of America
Finland
France
Ghana
Greece
Hungarian People's Republic
India (Republic of)
Indonesia (Republic of)
Iran (Islamic Republic of)
Iraq (Republic of)
Iceland
Israel (State of)
Italy
Japan
Jordan (Hashemite Kingdom of)
Kenya (Republic of)
Kuwait (State of)

Lesotho (Kingdom of)
Luxembourg
Madagascar (Democratic Republic of)
Malaysia
Maldives (Republic of)
Malta (Republic of)
Mexico
Monaco
Mongolian People's Republic
Norway
New Zealand
Oman (Sultanate of)
Pakistan (Islamic Republic of)
Papua New Guinea
Paraguay (Republic of)
Netherlands (Kingdom of the)
Philippines (Republic 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
Rwandese Republic
Senegal (Republic of)
Singapore (Republic of)
Somali Democratic Republic
Sweden
Switzerland (Confederation of)
Suriname (Republic of)
Swaziland (Kingdom of)
Tanzania (United Republic of)
Czechoslovak Socialist Republic
Thailand
Tunisia
Turkey
Union of Soviet Socialist Republics
Uruguay (Eastern Republic of)
Venezuela (Republic of)
Viet Nam (Socialist Republic of)
Yugoslavia (Socialist Federal Republic of)
Zambia (Republic of)
Zimbabwe (Republic of)

Conclusion : The delegations of these countries are entitled to vote and to sign the Final Acts.

./..

2. Credentials found to be in order, deposited by the delegations of countries which do not have the right to vote (see Document 22 + Rev.)

Angola (People's Republic of)
Austria
Brazil (Federative Republic of)
Burundi (Republic of)
Gabonese Republic
Gambia (Republic of the)
Guinea (Republic of)
Honduras (Republic of)
Ireland
Liberia (Republic of)
Mali (Republic of)
Morocco (Kingdom of)
Mauritania (Islamic Republic of)
Niger (Republic of the)
Togolese Republic
Yemen Arab Republic
Yemen (People's Democratic Republic of)

Conclusion : The delegations of these countries are not entitled to vote, but may sign the Final Acts.

3. Delegations attending the Conference which have not deposited credentials

Bahrain (State of)
*Bangladesh (People's Republic of)
*Central African Republic
*Ecuador
Libya (Socialist People's Libyan Arab Jamahiriya)
Nigeria (Federal Republic of)
*Peru
Sri Lanka (Democratic Socialist Republic of)
*Zaire (Republic of)

Conclusion : The delegations of these countries are neither entitled to vote nor to sign the Final Acts.

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* Appears in the list of countries which have lost their right to vote (see Document 22 + Rev.)

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/65-E
2 March 1987
Original: French

COMMITTEE 5

DRAFT REPORT OF THE CHAIRMAN OF WORKING GROUP 5 AD HOC

Working Group 5 ad hoc, comprising delegations from ALG, ARS, B, BUL, CAN, CHN, CLM, D, F, G, IND, IRN, KEN, LBY, PAK, PNG, POL, S, SEN, URS and USA, held eight meetings with the following terms of reference:

"Working Group 5 ad hoc, taking into account:

- the background information given in Documents DT/41 and DT/59,
- the statement by the Chairman of the Conference at the sixth Plenary Meeting (Document 133),

and the discussions thereon and any relevant document, to suggest:

1) elements of the package,

2) programme of actions towards implementation of the HFBC Planning System".

The Group considered globally the question of the elements of the package to be discussed, i.e.:

- adoption of the Planning Method;
- improvement of the HFBC Planning System;
- interim provisions;
- improvement of Article 17;
- adoption of the improved HFBC Planning System and decision on the date of its implementation;
- adoption of improved Article 17 and decision on the date of its implementation;
- national and international broadcasting;
- short- and medium-term strategy.

Important: All the elements of the "package" are indissociable.

The Group arrived at the following conclusions:

1. It is proposed that the Conference should confirm the planning principles laid down by the First Session and adopt, grosso modo, the Planning Method, which will be incorporated in the Final Acts.

This adoption will constitute a commitment on the part of the Conference to the effect that the process initiated in 1979 and 1984 for planning of the bands allocated to HF broadcasting will be applied.

2. On the basis of these adopted principles and Planning Method, the IFRB will develop an improved HFBC Planning System. This improved System will be operational in 1990/1991, i.e. will have undergone, after its development:

- software tests;
- tests with hypothetical data;
- tests with actual data from the requirements file, although these will still only be theoretical trials.

The result of the tests will be submitted to a competent WARC [Recommendation to be drafted] which shall:

- examine the results obtained;
- decide on the date of practical implementation of the System in the parts of the bands in which tests have been carried out;
- draw up one or more plans for the first seasons.

3. Up to the date of the WARC in [1992], the current provisions of Article 17 will be applied as an interim measure.

4. The improved Article 17 will also be available at the same time as the HFBC Planning System in 1990/1991. The [1992] Conference shall:

- examine the results submitted by the IFRB concerning the improved Article 17;
- decide on the date of its implementation in the parts of the frequency bands in which tests have been carried out.

5. The improved HFBC Planning System and Article 17 will be tested in the parts of the frequency bands shown in Annex 1, which consist of the extension bands plus a portion of the existing bands.

According to the decision of the [1992] WARC, the improved HFBC Planning System and Article 17 will be implemented in the same parts of the bands shown in Annex 1.

6. <u>National and international broadcasting</u>

In view of the decisions taken for implementation of the HFBC Planning System in the parts of the bands shown in Annex 1, it was considered that the problem of national broadcasting should not be discussed at this Conference and should be studied further by the Administrations and the IFRB [Recommendation to be drafted].

7. Short- and medium-term strategy (see time-table in Annex 2).

7.1 Short-term strategy

The short-term strategy comprises the following stages:

a) Confirmation of the planning principles adopted by the First Session and adoption of the Planning Method by this Conference.

b) Application of the current Article 17 up to the date of entry into force of the Final Acts of the WARC-[1992].

c) Improvement of the HFBC Planning System by the IFRB.

d) Testing of the HFBC Planning System.

e) Analysis of the results of the HFBC Planning System.

f) Implementation of the HFBC Planning System in the parts of the bands shown in Annex 1.

g) Implementation of the improved Article 17 in the parts of the bands listed in Annex 1.

7.2 Medium-term strategy

The medium-term strategy comprises the following two stages:

a) Implementation of the HFBC Planning System in the 9 MHz extension bands (1994).

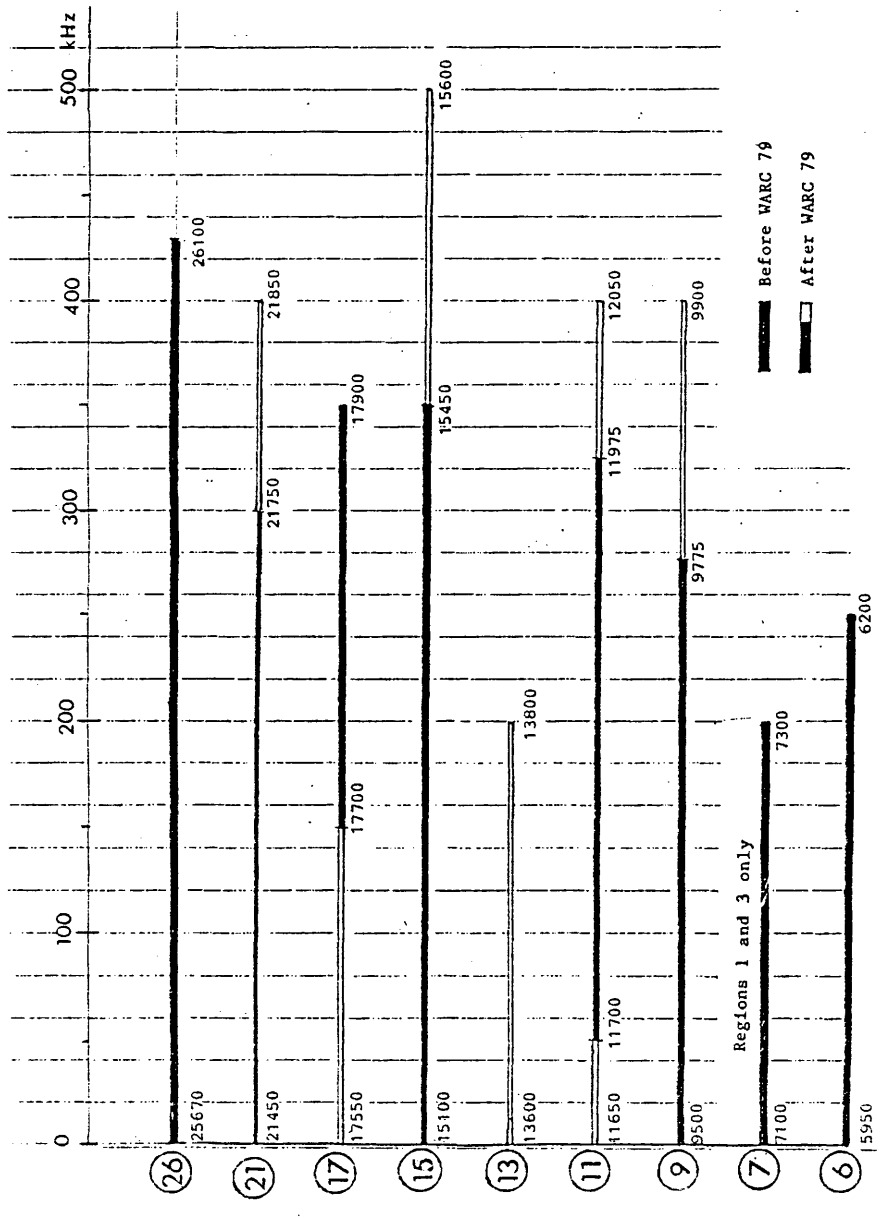
b) Possible band extension.

C.T. NDIONGUE
Chairman of Working Group 5 ad hoc

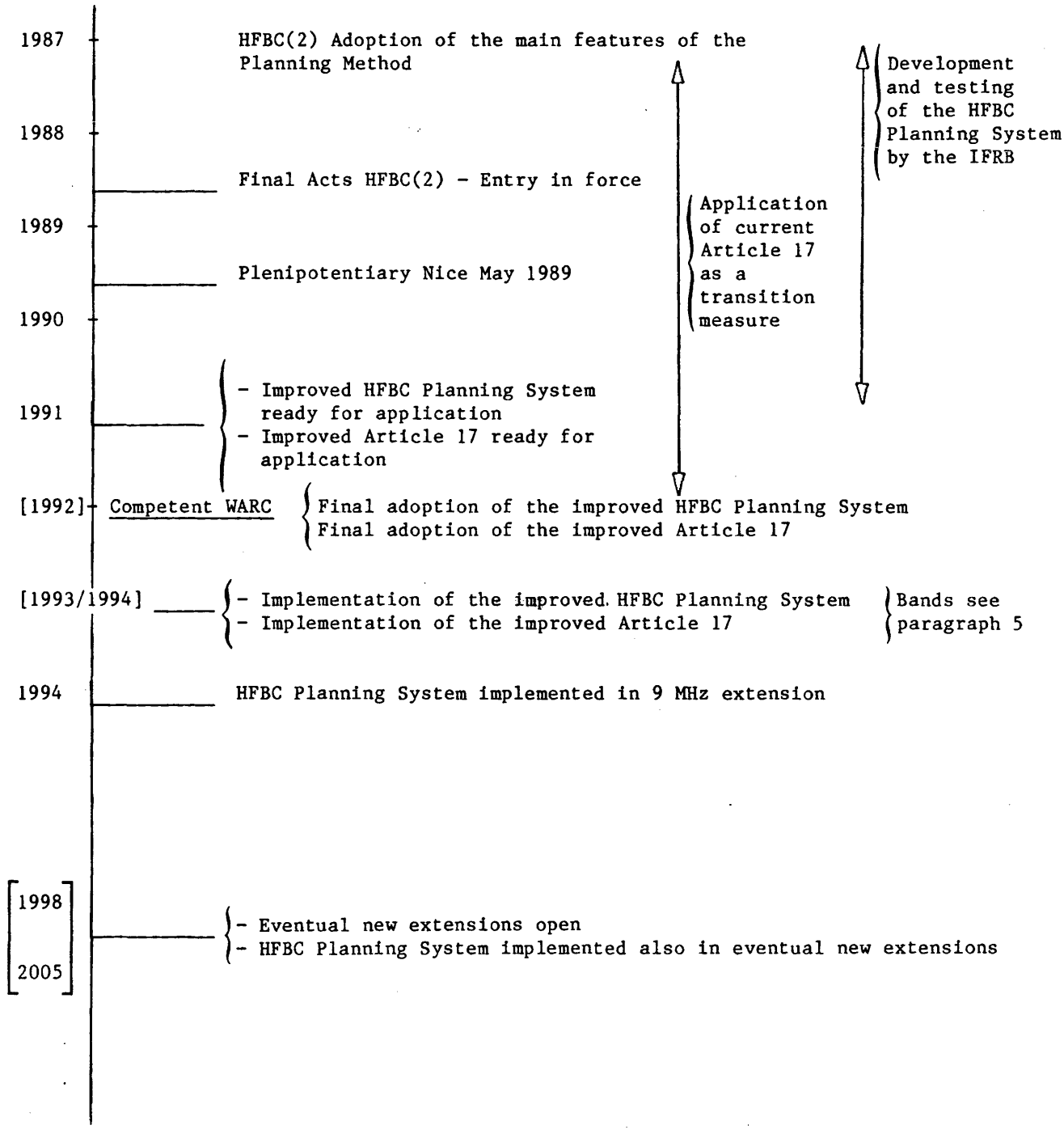
Annexes: 2

ANNEX 1

Total (kHz)	Application of the improved Article 17 (kHz)	Application of the improved HFBC Planning System (kHz)
430	230	200
400	200	200
350	150	200
500	300	200
200		200
400	275	125
400	275	125



ANNEX 2


1987
HFBC(2) Adoption of the main features of the Planning Method
1988
Final Acts HFBC(2) - Entry in force
1989
Plenipotentiary Nice May 1989
1990
1991
- Improved HFBC Planning System ready for application
- Improved Article 17 ready for application
[1992]
Competent WARC
Final adoption of the improved HFBC Planning System
Final adoption of the improved Article 17
[1993/1994]
- Implementation of the improved HFBC Planning System
- Implementation of the improved Article 17
Bands see paragraph 5
1994
HFBC Planning System implemented in 9 MHz extension
[1998
2005]
- Eventual new extensions open
- HFBC Planning System implemented also in eventual new extensions
Application of current Article 17 as a transition measure
Development and testing of the HFBC Planning System by the IFRB

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/66-E
2 March 1987
Original: English

Source: Documents DL/22(Rev.3), DL/23, DL/25, DL/28, 166, 119

DRAFTING GROUP 6-2

DRAFT REPORT OF DRAFTING GROUP 6-2 TO COMMITTEE 6

Drafting Group 6-2 has finished the following four draft texts relevant to the Planning Method as annexed:

- Annex 1: "Procedures relating to the HFBC Planning System".
- Annex 2: "Appendix 2: Data to be entered into the requirements file".
- Annex 3: "Appendix [.]: System specifications and rules applicable to those HF bands exclusively allocated to broadcasting that are to be planned".
- Annex 4: "HFBC requirements file".

Note - Annex 4 is common to both HFBC schedule/planning

S.M. CHALLO
Chairman of Drafting Group 6-2

Annexes: 4

ANNEX 1

Draft*

Section [ ] procedures relating to the HFBC Planning System

[1. The provisions of this section apply to the broadcasting service in the bands [ ].]

2. Periodically, administrations shall confirm to the IFRB which of their requirements appearing in the HFBC requirements file are to be used in a given season. Administrations may also notify additions or modifications to, or deletions from, the HFBC requirements file. When the Board finds that the information submitted by the administration is in conformity with Appendix 2, it shall establish the seasonal file accordingly.

3. The broadcasting requirements of administrations shall be submitted in the requirements form prescribed in [Appendix] which specifies the data to be furnished.

4. The closure date for the receipt of the information referred to in [2] is set by the Board. The Board shall gradually reduce the time period between the closure date and the start of the season to the minimum practicable.

If, in spite of reminders by the Board, no reply is received from an administration by the closure date set by the Board, the Board shall consider that the requirements appearing in the requirements file for the season under consideration are [confirmed and that the requirements without an indication of a frequency shall have the frequencies selected by the Board]/[considered as not confirmed and therefore not included in the seasonal file].

5. The IFRB shall calculate the field strength at each test point and the basic broadcasting reliability (BBR) in each of these bands and shall identify for each requirement the appropriate bands. In so doing account shall also be taken of the need to ensure a continuity in the frequency usage as indicated in [-].

6. The IFRB shall, on the basis of the above calculations, apply the rules contained in [Appendix -] from which the following results are derived for each hour/band:

a) a list of resolved requirements that shall be entered in the tentative plan including:

- requirements with the protection ratio greater than or equal to 17 dB;

- requirements with protection ratio less than 17 dB. Consultation shall be undertaken with administrations which have indicated in their requirement forms a desire for consultation;

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* Reservations by the United Kingdom.

b) a list of the requirements that could not be entered into the tentative plan as a result of a) above which need to be reviewed for their possible entry in the tentative plan following the consultations of the administrations concerned.

7. For those administrations wishing to be consulted and having requirements in the list of [6 a) second indent] the Board will consult the administration concerned to see if it wishes to have its requirement in the tentative plan with the characteristics notified and the resulting protection ratios.

8. For those administrations wishing to be consulted and having requirements in the list of [6 a) second indent] and who have indicated that they do not wish their requirements to be inserted in the tentative file under the specified conditions, the Board shall transfer those requirements to the list of [6 b)].

9. The Board shall send to each administration having requirements in the list of [6 b)] the results of its calculations. The Board shall also request administrations to submit any possible modifications to their requirements within a period of [6] weeks.

10. Upon receipt of the information referred to in [9] administrations shall reconsider their requirements and shall submit to the Board their modifications to their requirements.

If, in spite of reminders communicated to the administrations two weeks prior to the deadline, no reply is received within the time limit, the Board will attempt to insert these requirements in the tentative plan in accordance with [13].

11. Any administration may submit requirements after the closure date and before the date referred to in [9].

12. The Board shall advise all administrations of the time limit indicated in [9].

13. Following the receipt of the information received in accordance with [10 and 11], the Board shall process these requirements and shall attempt to insert them in the tentative plans following the steps indicated in [Appendix -] without affecting* those requirements already entered in the tentative plan.

14. All requirements which could not be inserted following the application of [13] above will not be inserted in the tentative plan and the administrations will be informed accordingly.**

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* The criteria to determine whether a requirement is adversely affected are to be found in [Appendix -].

** Reservation by the United States of America.

15. Administrations who so wish may request the Board to select alternative frequencies for their requirements. The Board shall attempt to select alternative frequencies without affecting the requirements appearing in the Plan. If the Board receives no comment from administrations following the publication of the tentative plan, it shall consider that the frequencies indicated in the seasonal plan will be assigned by administrations to their stations.

[Note 1 - Suspension Rules N1, N2 and N3 shall not apply to national requirements.]

[Note 2 - All rules shall only apply to requirements above an equal minimum number of requirement hours that should be satisfied for each administration on an equal basis.]

ANNEX 2

Draft Appendix 2

Data to be Entered into the Requirements File

A. Introduction

A broadcasting requirement is a requirement indicated by an administration to provide a broadcasting service at specified periods of time to a specified reception area from a particular transmitting station.

An administration wishing to notify a broadcasting requirement to the Board will do so on the basis of the characteristics provided in [B] of this Appendix. The necessary information shall be provided on a requirement form to be developed by the Board.

A separate requirement form shall be sent to the IFRB for notifying:

- each requirement to be put into use for particular seasons;
- any modification in the characteristics of a requirement;
- any deletion of a requirement.

The map of CIRAF Zones to be used in notifying a requirement is given in [C].

B. Information relating to the broadcasting service in the exclusive HFBC bands to be provided in requirement forms

1. Notifying administration*

The notifying administration shall be indicated using the symbols given in Table ... of the Preface to the International Frequency List.

2. Name of transmitting station.*

3. Symbol of the country or geographical area in which the transmitting station is located.*

4. Geographical coordinates of the transmitting station*

When two or more transmitting stations are almost co-located, the administration shall indicate, as far as possible, the same coordinates.

5. Required service areas*

In specifying the required service area, reference shall be made to a combination of:

- CIRAF zones,
- quadrants of CIRAF zones,

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* Basic characteristics which shall be provided.

- parts of quadrants specified by the set of test points contained within those parts.

Where it is necessary to specify a required service area which is smaller than an entire zone or quadrant, this may be done by specifying the boundaries of the area as two azimuths and two ranges from the transmitter location.

The set of test points listed in the IFRB Technical Standards shall be used to represent the CIRAF zones and quadrants for planning purposes.

[Where a required service area is defined as set out in paragraph 5 above and where such an area does not include a test point, the IFRB shall generate a new test point and include it within the Technical Standards. Such additions to the Technical Standards will be distributed to administrations (Nos. 1001 and 1001.1 of the Radio Regulations).]

6. Season*

The season or seasons during which the requirement is intended to be operated. When the requirement is not intended to be used on a daily basis, the days during which it will be operated shall be indicated.

7. Hours of operation (UTC)*

[7.1 Indication on legal clock time changes.]

8. Indication on temporary interruption of broadcasting services due, for example, to natural disasters.

9. Transmitting antenna characteristics*

9.1 For all types of antennas indicate:

9 1.1 The type of antenna to be used with the specific reference of the antenna type appearing in the IFRB Technical Standards.

9.1.2 The azimuth of maximum radiation in degrees from true North in closewise direction.

9.1.3 The maximum gain (isotropic, G_i, dB) if different from that associated with the relevant pattern in the reference antenna set. In the case of slewed horizontal dipole arrays this maximum gain is the gain in the slewed mode.

9.1.4 The lowest and highest frequency bands (in MHz) for multi-band antennas, or the band for single band antennas.

9.2 For horizontal dipole arrays indicate in addition to the above parameters:

9.2.1 Type of radiator, end-fed or centre-fed dipole elements.

9.2.2 Type of reflector (tuned dipoles or aperiodic screen).

9.3 For multi-band horizontal dipole arrays indicate in addition to the above parameters:

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* Basic characteristics which shall be provided.

9.3.1 Design frequency, in MHz. If not indicated, the design frequency will be assumed as the arithmetic mean of the centre frequencies of the lowest and highest frequency bands covered by the antenna.

9.4 For slewed horizontal dipole arrays indicate in addition to the above parameters the:

9.4.1 Azimuth of the normal to the plane of the radiating elements in degrees from true North in clockwise direction.

10. Transmitter power (dBW)*

1) For DSB emissions indicate the carrier power in dBW.

2) For SSB indicate the peak envelope power in dBW.

3) Indicate the range of available power capabilities.

11. Class of emission*

Indicate if it is a double-sideband emission or a single-sideband emission with a reduced carrier of 6 dB or 12 dB.

11.1 Indicate if the transmitter can operate with two modes (DSB, SSB).**

[12. Assigned frequencies [under Article 17].***]

13. Preset frequencies (in kHz).***

14. Preferred frequency (in kHz).***

15. Preferred frequency band (in MHz).

16. Equipment availability and limitations

Indicate the number of transmitters that can be used simultaneously and the associated bands for a possible use in case it is necessary to use more than one frequency to reach the required BBR.

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* Basic characteristics which shall be provided.

** For information only.

*** a) For a double-sideband transmission, the assigned frequency shall be expressed in kHz terminating by 0 or 5.

b) For a single-sideband transmission, the assigned frequency shall be expressed in kHz terminating by 2.5 or 7.5.****

**** Literally, as the occupied bandwidth is 4.5 kHz, the assigned frequency shall normally terminate in 2.25 or 7.25. Committee 6 may adopt either of the two solutions.

17. Requested types of frequency continuity (types 2, 3, 4 and/or 5)

17.1 Identification of requirements related by these types of continuity.

18. Lowest value of BBR to be used for this requirement (see paragraph 3 of 4.2.3.4.4, Document 157).

19. Indication on the use of synchronized transmitters.

20. Indicate equipment limitations (see the form for submission of requirements, Document 3).

21. Indication if consultations are required when the co-channel protection ratio is less than 17 dB.

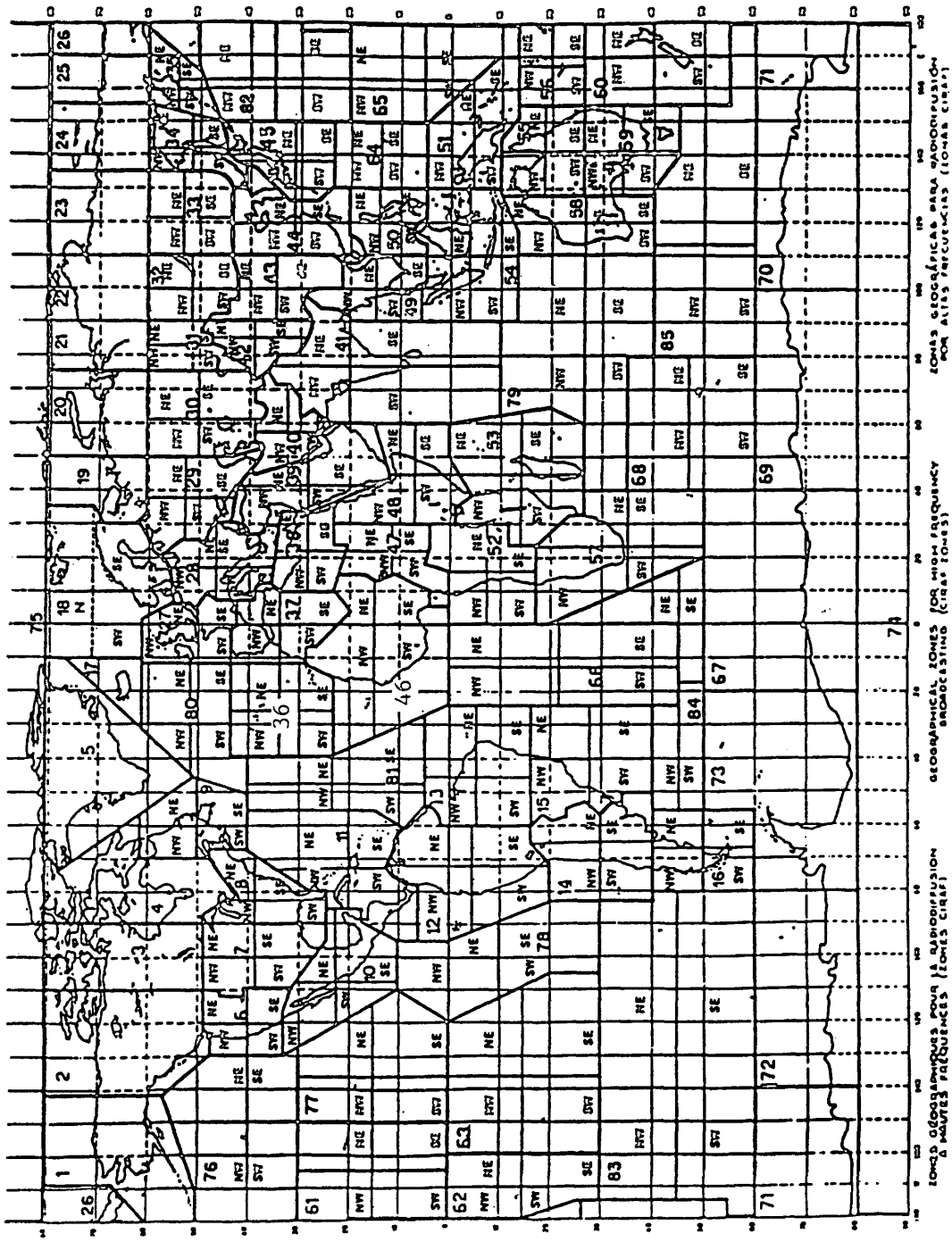
[22. Nature of requirement (national or international).]

[23. Nature of requirement (see Document 134)].

24. Postal and telegraphic addresses of the administration responsible for the station (see column 12b of Appendix 2-5).

Note - The Board shall provide a column for remarks on the requirement form to be developed.

C. Map of CIRAF Zones



ANNEX 3

Draft Appendix [ ]

This appendix contains the following sections:

A. Double-sideband system specifications in the HF bands allocated exclusively to the broadcasting service

B. Single-sideband system specifications in the HF bands allocated exclusively to the broadcasting service

C. Rules applicable to those HF bands exclusively allocated to broadcasting that are to be planned

A. [SEE PART A OF DOCUMENT 179]

B. [SEE PART B OF DOCUMENT 179]

C. RULES APPLICABLE TO THOSE HF BANDS EXCLUSIVELY ALLOCATED TO BROADCASTING THAT ARE TO BE PLANNED

[I. INTRODUCTION

I.1 The planning of the HFBC in accordance with sections [--] and [--] of Article 17 shall use the criteria and method contained in this appendix.

I.2 The application of this appendix shall ensure the maximum possible utilization of all available channels.]

II. DEFINITIONS

II.1 Appropriate frequency band

The appropriate band for a requirement, is the band which will ensure the continuity of use of the same frequency during the longest possible period of operation, with the best possible values of BBR (basic broadcast reliability), taking account of propagation conditions, operational limitations and equipment availability and limitations.

II.2 Circuit reliability

Probability for a circuit that a specified performance is achieved at a single frequency.

II.3 Reception reliability

Probability for a receiver that a specified performance is achieved, taking into account all transmitted frequencies.

II.4 Broadcast reliability

Probability for a service area that a specified performance is achieved, taking into account all transmitted frequencies.

II.5 Percentile

The X percentile (X%) value for a given set of values is defined by the following conditions:

1) the X% value is a member of the set of values;

2) the X% value is that value which is equal to or exceeded by at least X per cent of the members in the set;

3) the X% value is the largest value satisfying conditions 1 and 2.

Note 1 - In the above terms, circuit means a one-way transmission from one transmitter to one receiving location.

[Note 2 - The term "reliability" is qualified by the word "basic" when the background consists of noise alone and by "overall" when the background consists of both noise and interference.]

Note 3 - When the background consists of both noise and interference, the term "reliability" may relate either to the effects of a single interferer or to multiple interference from co-channel and adjacent-channel transmissions.

Note 4 - The specified performance is expressed by a given value of signal-to-noise ratio or signal-to-(noise and interference) ratio.

Note 5 - The term "reliability" relates to one or more periods of time, which shall be stated.

II.6 Radio-frequency (RF) wanted-to-interfering signal ratio

The ratio, expressed in dB, between the values of the radio-frequency voltage of the wanted signal and the interfering signal, measured at the receiver input under specified conditions[1].

II.7 Relative radio-frequency protection ratio

The difference, expressed in dB, between the protection ratio when the carriers of the wanted and unwanted emissions have a frequency difference of ΔF (Hz or kHz) and the protection ratio when the carriers of these emissions have the same frequency.

II.8 Term relating to the service area

- Required service area (in HF broadcasting): The area within which an administration proposes to provide a broadcasting service.

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[1] The specified conditions include such diverse parameters as: spacing ΔF of the wanted and interfering carrier, emission characteristics (type of modulation, modulation depth, carrier-frequency tolerance, etc.), receiver input level, as well as the receiver characteristics (selectivity, susceptibility to cross-modulation, etc.).

II.9 Minimum usable field strength (E_{min})[1]

Minimum value of the field strength necessary to permit a desired reception quality, in specified receiving conditions, in the presence of natural and man-made noise, but in the absence of interference from other transmitters.

II.10 Usable field strength (E_u)[1]

Minimum value of the field strength necessary to permit a desired reception quality, in specified receiving conditions, in the presence of noise and interference, either in an existing situation or as determined by agreements or frequency plans.

[III. HFBC PLANNING SYSTEM]

III.1 Planning constraints

III.1.1 Preset frequency

a) When an administration indicates that its facilities can operate only on a limited number of fixed specified frequencies, the planning method shall take them into account as indicated in III.3.11.

III.1.2 Limited use of the frequency bands

a) When an administration indicates that its facilities can operate only in a given frequency band, only frequencies from that band shall be included in the plan.

b) When an administration indicates a preferred frequency band, the system shall attempt to select a frequency from this band. If this is impossible, frequencies from the nearest appropriate band shall be tried. Otherwise the system will select frequencies from the appropriate band, taking into account the equipment constraints referred to in paragraph III.1.1.

III.1.3 Power

a) When an administration indicates only a single power value due to equipment constraints, it shall be used in the planning process.

b) When an administration indicates several possible power values, the appropriate value shall be used to achieve the basic circuit reliability, and a single power value shall be determined for the duration of the emission.

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[1] The terms "minimum usable field strength" and "usable field strength" refer to the specified field strength values which a wanted signal must have in order to provide the required reception quality.

In determining whether these requirements are met, the median value (50%) of a fading signal should be used.

III.1.4 Antenna

When an administration indicates that its antenna can operate only in a given frequency band, only frequencies from that band shall be included in the plan.

III.1.5 Preferred frequency

In accordance with the planning principles and without imposing constraints on planning, the following provisions shall be applied in the seasonal plans:

1) administrations may indicate the preferred frequency;

2) during the planning process, attempts shall be made to include the preferred frequency in the plan;

3) if this is impossible, attempts shall be made to select a frequency in the same band.

Otherwise, the automated system shall be used to select the appropriate frequencies in such a way as to accommodate the maximum number of requirements, taking into account the constraints imposed by the technical characteristics of the equipment.

III.2 Frequency continuity

III.2.1 Introduction

Continuity in the use of a frequency is an important matter for both the broadcaster and the listener, it is a characteristic inherent in the broadcasting of a programme. In addition, limitations imposed by the technical characteristics of the means of transmission available to some administrations will impose mandatory requirements for frequency continuity. The desirable aim is that changes in frequency should be limited to those necessitated by changes in propagation conditions. The rules for applying frequency continuity are given in paragraph III.2.4 below.

III.2.2 Definitions

III.2.2.1 Intra-seasonal

III.2.2.1.1 Type 1 continuity

Continuity of use of the same frequency within an hour or from one hour to another consecutive hour within a requirement.

III.2.2.1.2 Type 2 continuity

Continuity of use of the same frequency in the same season when passing from one requirement to another or one time block to another.

III.2.2.2 Inter-seasonal

III.2.2.2.1 Type 3 continuity

Continuity of use of the same frequency by the same requirement in two consecutive seasons.

III.2.2.2.2 Type 4 continuity

Continuity of use of the same frequency by the same requirement in two consecutive equinox seasons.

III.2.2.2.3 Type 5 continuity

Continuity of use of the same frequency by the same requirement in the same season of two consecutive years.

III.2.3 Relationship between frequency continuity and appropriate band(s)

III.2.3.1 For the case where a single frequency is sufficient to provide basic broadcast reliability (BBR)* equal to or greater than the agreed reference value, the appropriate band is to be established by the HFBC Planning System by taking account, amongst other things, of the rules set out in section III.2.4 regarding the maintenance of the maximum frequency continuity within the limits of the agreed reference value for BBR 80%.

However, an administration may choose extended frequency continuity at the expense of BBR and shall indicate the lower value of BBR to be used in this event. As, in this portion of the requirement, the BBR falls below the above-mentioned reference value the second and/or third frequencies are afforded only when the application of frequency continuity would not result in a number of additional frequencies greater than would be necessary with operation in the appropriate bands.

III.2.3.2 In the case where BBR obtainable by use of a single frequency is less than 80% continuity of use of the first frequency or the single operating frequency will be provided within the lower limits of BBR indicated by the administration.

When the administration indicates that it has the capability to operate on more than one frequency the use of this lower value of BBR shall not lead to the use of a third frequency.

III.2.3.3 When the requirement under consideration is eligible to use a second or third frequency according to the procedures established in paragraphs IV.3.2 and IV.3.3, frequency continuity shall also be applied to the second (and third) frequency in the same manner as for the first frequency.

III.2.3.4 When the type 2 continuity is requested (from one requirement to another), the HFBC Planning System shall identify the appropriate band separately for each of the requirements concerned. The frequency assigned to the first of these requirements, shall be assigned to another related requirement if it is in its appropriate band.

III.2.4 Application of continuity

III.2.4.1 Type 1 continuity shall be applied automatically to all requirements under the conditions set out in section 3 above.

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* Abbreviations of the English terms are used throughout the three languages in order to facilitate the practical implementation of the concepts and methods described.

III.2.4.2 At the request of an administration, type 2 continuity shall be applied when this corresponds to equipment constraints. However, in other cases, type 2 continuity could be applied to the extent possible. Paragraph III.2.3.4 above applies to type 2 continuity.

III.2.4.3 Continuity of types 3, 4 and 5 shall be applied to the extent possible when requested by the administration.

III.3 Planning steps and rules for dealing with incompatibilities

III.3.1 Definitions

III.3.1.1 Unit of service area

Each CIRAF Zone is sub-divided into one or more smaller units of area called "quadrants"; these are depicted in Figure [ ] of Appendix [ ]. Any such "quadrant" containing at least one test point of a given requirement is called a "unit of service area" for the given requirement.

III.3.1.2 A group of incompatible requirements (GIR) is a set of (two or more) requirements each of which is incompatible with all other requirements in the set.

III.3.1.3 A greatest GIR (GGIR) is a GIR which contains the largest number of requirements.

III.3.1.4 A maximal GIR (MGIR) is the set of all requirements contained in at least one GGIR.

III.3.2 In the planning method, in order to evaluate congestion, use is made of the concept of the MGIR.

III.3.3 Congestion is evaluated by determining the GGIR and by comparing the number of channels required by that group with the number of channels available in the band considered.

III.3.4 When in a given hour/band no congestion is found the requirements concerned shall be entered in a file of requirements (file of resolved cases) for which a frequency to be assigned shall be identified.

III.3.5 When a congestion in a given hour/band is identified by means of a GGIR, the requirements included in the MGIR will have their protection ratio reduced by a 3 dB value with the view to resolve the congestion. If, following this action, the congestion is not resolved, another MGIR is identified and a new attempt is made with the view to resolve the congestion. The process is repeated until it will not be possible to find a solution with a protection ratio [of 17 dB]. Requirements appearing in an hour/band that can be resolved in this manner an entered in the "file of resolved cases".

III.3.6 When following the action taken in accordance with [III.3.5], if congestion still exists, a new MGIR is identified and a set of requirements of each administration in the band under consideration with identical service areas are identified. The planning process then suspends for further consideration a number of such requirements in order to resolve the congestion. With the view to identify the requirements to be first suspended, administrations having requirements in the MGIR are sorted in the decreasing order of the number of such requirements. The process is repeated as many times as necessary until the congestion is resolved or the number of such requirements becomes equal to one per administration. Requirements appearing in an hour/band that can be resolved in this manner are entered in the "file of resolved cases".

III.3.7 Following the application of [III.3.6], if congestion still exists, all requirements of a given administration appearing in a MGIR have different service areas, some of them having common units of service area. More suspensions may be required with the view to resolve the congestion; they shall be made by having recourse to the identification of the unit of service area which appears very often in the requirements of a given administration in the hour/band under consideration. Once this unit of service area is identified, administrations having it in their requirements are sorted in a decreasing order with the view to suspend requirements containing the unit of service area which appears very often. The GGIR is re-evaluated to determine whether congestion exists and the process is repeated as many times as possible until the congestion is resolved or the number of such requirements becomes one for all administrations concerned. This suspension rule shall be applied in such a way that any quadrant notified by an administration in the band/hour under consideration appears at least once in the plan. Requirements appearing in an hour/band that can be resolved in this manner are entered in the "file of resolved cases".

III.3.8 If the congestion is not resolved following the application of [III.3.7] the same rule is applied taking account of the requirements in all the bands with the view to identify the requirements containing the quadrant that appear very often. Requirements appearing in an hour/band that can be resolved in this manner are entered in the "file of resolved cases".

III.3.9 If the congestion is not resolved following the application of [III.3.8], the requirements appearing in the MGIR are verified with the view to identify those which appear in two or three bands due to their low BBR. Such requirements may be suspended if they are present in another band with a better BBR. Requirements appearing in an hour/band that can be resolved in this manner are entered in the "file of resolved cases".

III.3.10 If the congestion is not resolved following the application of [III.3.9], the requirements included in the MGIR shall have their protection ratio reduced by 3 dB. Following this action another MGIR is identified, and the 3 dB reduction shall be applied to requirements appearing in the new MGIR not yet affected by this reduction. The process of reduction by 3 dB shall be repeated until congestion is removed. Additional reductions of the protection ratio by steps of 3 dB are made in the same manner until all the remaining requirements are entered in the "file of resolved cases". In this manner all requirements which, as a result of the previous steps, have not been suspended, have been placed in a "file of resolved requirements". This file contains, therefore, all the requirements which will always enter in the "Tentative Plan". This will be the case of requirements with a protection ratio less than [17 dB]. However, the requirements of those administrations who wish as a result of consultation with the IFRB may be included in the list of resolved requirements or in the file of requirements to be reconsidered.*

III.3.11 Following the application of the above steps for the resolution of incompatibilities, frequencies shall be identified for its requirements appearing in the file of "resolved requirements". In this process the following shall be applied:

- requirements with a single preset frequency shall be assigned this frequency;

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* Reservation by the United States.

- requirements with more than one preset frequency shall be assigned that frequency that has the least degree of incompatibility;

- if two requirements have the same preset frequency, which after analysis results in an incompatibility, the case is referred to the administration(s) concerned;

- requirements with a preferred frequency, attempts shall be made to assign them this frequency.

III.3.12 Requirements which have been suspended following the application of III.3.6, III.3.7, III.3.8 and III.3.9 are subject to consultation and are reinserted in the plan on the condition that they do not adversely affect the requirements already entered in the plan. In applying this provision a requirement already entered in the plan with a protection ratio exceeding [17 dB] is deemed to be adversely affected if its protection ratio is reduced below [17 dB]. A requirement already entered in the plan with a protection ratio lower than [17 dB] is deemed to be adversely affected if its protection ratio is reduced by more than [0.1 dB], [1 dB].*

III.3.13 Requirements received by the IFRB after the beginning of the planning exercise [after the deadline for submission of requirements] are entered in the plan under the conditions stipulated in [III.3.11].

IV. RELIABILITY[1]

IV.1 Calculation of basic circuit reliability (BCR)

The process for calculating basic circuit reliability is indicated in Table C-2. The median value of field strength for the wanted signal at step (1) is determined by the field strength prediction method. The upper and lower decile values (2) through (5) are also determined, taking account of long-term (day-to-day) and short-term (within the hour) fading. The combined upper and lower deciles of the wanted signal are then calculated in steps (6) and (7) in order to derive the signal levels exceeded for 10% and 90% of the time at steps (8) and (9).

The wanted signal probability distribution, assumed to be log-normal, is illustrated in Figure C-1 which indicates the signal level (in decibels) versus the probability that the value of signal level is exceeded (plotted on a normal probability scale). This distribution is used to obtain the basic circuit reliability (11), which is the value of probability corresponding to the minimum usable field strength (10).

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* Reservation by the United States.

1 Abbreviations of the English terms are used in the formulae throughout the three languages in order to facilitate the practical implementation of the methods described in this section.

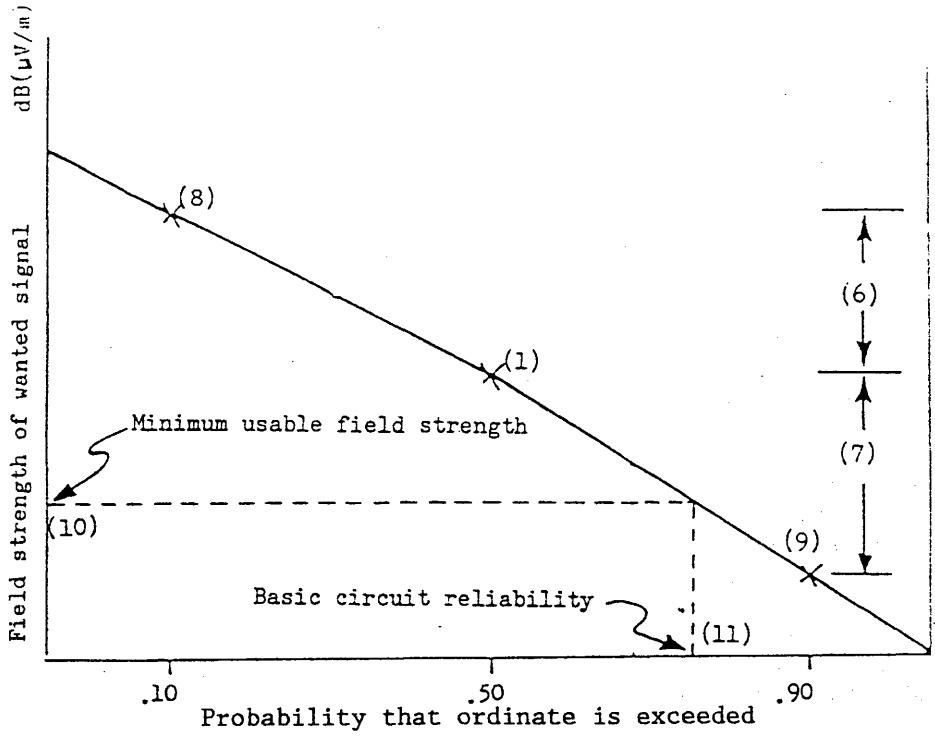

FIGURE C-1

Parameters used to compute basic circuit reliability

(Figures appearing in brackets refer to step numbers as shown in Table C-2.)

TABLE C-2

Parameters used to compute basic circuit reliability

STEP	PARAMETER	DESCRIPTION	SOURCE
(1)	$E_w(50)$ dB(μV/m)	Median field strength of wanted signal[1]	IFRB Technical Standards
(2)	$D_U(S)$ dB	Upper decile of slow fading signal (day-to-day)	IFRB Technical Standards
(3)	$D_L(S)$ dB	Lower decile of slow fading signal (day-to-day)	IFRB Technical Standards
(4)	$D_U(F)$ dB	Upper decile of fast fading signal (within the hour)	IFRB Technical Standards
(5)	$D_L(F)$ dB	Lower decile of fast fading signal (within the hour)	IFRB Technical Standards
(6)	$D_U(E_w)$ dB	Upper decile of wanted signal	$\sqrt{D_U(S)^2 + D_U(F)^2}$
(7)	$D_L(E_w)$ dB	Lower decile of wanted signal	$\sqrt{D_L(S)^2 + D_L(F)^2}$
(8)	$E_w(10)$ dB (μV/m)	Wanted signal exceeded 10% of the time	$E_w + D_U(E_w)$
(9)	$E_w(90)$ dB (μV/m)	Wanted signal exceeded 90% of the time	$E_w - D_L(E_w)$
(10)	E_{min} dB (μV/m)	Minimum usable field strength	IFRB Technical Standards
(11)	BCR	Basic circuit reliability	Expression (1), Figure C-1

Note 1 - In the calculation of BCR at the test points within the required service areas of synchronized transmitters, the field strength value to be used is calculated by the method of root sum square of the contributing field strengths in volts/metre.

The basic circuit reliability is given by the expression:

$$BCR = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{Y} \exp(-\tau^2/2)\, d\tau \qquad (1)$$

when $E_W \geq E_{min}$

$$Y = \frac{E_W - E_{min}}{\sigma_L}$$

$$\sigma_L = D_L(E_W)/1.282$$

when $E_W < E_{min}$

$$Y = \frac{E_W - E_{min}}{\sigma_U}$$

$$\sigma_U = D_U(E_W)/1.282$$

IV.2 Calculation of [overall/interference] circuit reliability [(OCR) (ICR)]

The method is outlined in Table C-3. In step (1), the median wanted signal level is computed by the signal strength prediction method.

In step (2), the median field strength levels (E_i) of each interfering source are obtained from the prediction method. In step (3), for a single source of interference the predicted median field strength is used; for multiple sources of interference the median field strength is calculated as follows: the field strengths of the interfering signals E_i are listed in decreasing order. Successive r.s.s. additions of the field strengths E_i are computed, stopping when the difference between the resultant field strength and the next field strength is greater than 6 dB. In step (3), the resultant field strength I is taken as the last computed value.

The values of the wanted signal and interference determined in steps (1) and (3) are combined in step (4) to derive the median signal-to-interference ratio. The 10% and 90% fading allowances are included in steps (5) and (6) in order to derive the signal-to-interference ratio exceeded for 10% and 90% of the time in steps (7) and (8).

The probability distribution for the signal-to-interference ratio may now be determined as shown in Figure C-2. The ratios are presented in decibels on a linear scale versus the probability that the value of the signal-to-interference ratio is exceeded on a normal probability scale. In Figure C-2, the value of probability corresponding to the required signal-to-interference ratio (9) is the circuit reliability in the presence of interference only (ICR). [The overall circuit reliability (OCR, step (12)) is the minimum value of either ICR (step (10)) or BCR (step (11)), whichever produces the lower value.]

The mathematical treatment of the calculation of ICR can be given in terms of the probability density distribution of the protection ratio. These functions are taken to be log normal, as is the resulting distribution of the signal-to-interference ratio.

The parameter ICR is given by the following expression:

$$ICR = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{Y} \exp(-\tau^2/2)\, d\tau \qquad (2)$$

when for $E_W - I \geq RSI$

$$Y = \frac{E_W - I - RSI}{\sigma_L}$$

$$\sigma_L = D_L(SIR)/1.282$$

and for $E_W - I < RSI$

$$Y = \frac{E_W - I - RSI}{\sigma_U}$$

$$\sigma_U = D_U(SIR)/1.282$$

Values of the various parameters in the above expressions are found in steps indicated below, Table C-3.

E_W step (1)

I step (3)

$D_U(SIR)$ step (5)

$D_L(SIR)$ step (6)

RSI step (9)

TABLE C-3

Parameters used to compute overall circuit reliability

STEP	PARAMETER	DESCRIPTION	SOURCE
1	E_w dB(μV/m)	Median field strength of wanted signal	IFRB Technical Standards
2	E_i dB(μV/m)	Median field strength of interfering signals E_1, E_2, ... E_n	IFRB Technical Standards
3	I dB(μV/m)	Resultant field strength of interference	1) $I=20\log_{10}\sqrt{\sum_{i=1}^{n}10^{\left(\frac{E_i+\alpha}{10}\right)}}$
4	SIR(50)dB	Median signal to interference ratio	E_w - I
5	D_U(SIR)dB	10% fading allowance	10 dB(<60°), 14 dB(≥60°) 2)
6	D_L(SIR)dB	90% fading allowance	10 dB(<60°), 14 dB(≥60°) 2)
7	SIR(10)dB	Subjective signal-to-interference ratio exceeded 10% of the time	SIR(50) + D_U(SIR)
8	SIR(90)dB	Subjective signal-to-interference ratio exceeded 90% of the time	SIR(50) - D_L(SIR)
9	RSI dB	Required RF protection ratio 3)	IFRB Technical Standards
10	ICR	Circuit reliability in presence of interference only (without noise)	Expression (2), Figure C-2
11	BCR	Basic circuit reliability	Expression (1), Figure C-1
12	OCR	Overall circuit reliability	Min(ICR,BCR)

Note 1 - α is the appropriate relative protection ratio corresponding to the carrier frequency separation between the wanted and each unwanted signal.

Note 2 - i) If any point on that part of the great circle which passes through the transmitter and the receiver and which lies between control points located 1,000 km from each end of the path reaches a corrected geomagnetic latitude of 60° or more, the values for ≥60° have to be used.

ii) The value of 14 dB applies for overall circuit reliabilities not exceeding 80%. In other cases the value of 10 dB applies.

iii) These values relate to the path of the wanted signal only.

iv) For synchronized transmissions, the fading allowance associated with the predominant wanted signal is to be used. For those conditions where the contributing wanted field strengths are equal and Note 2 i) applies to at least one of the paths, the value of 14 dB is to be used for $D_U(SIR)$ and $D_L(SIR)$.

Note 3 - In these calculations a single value of the co-channel protection ratio must be used.

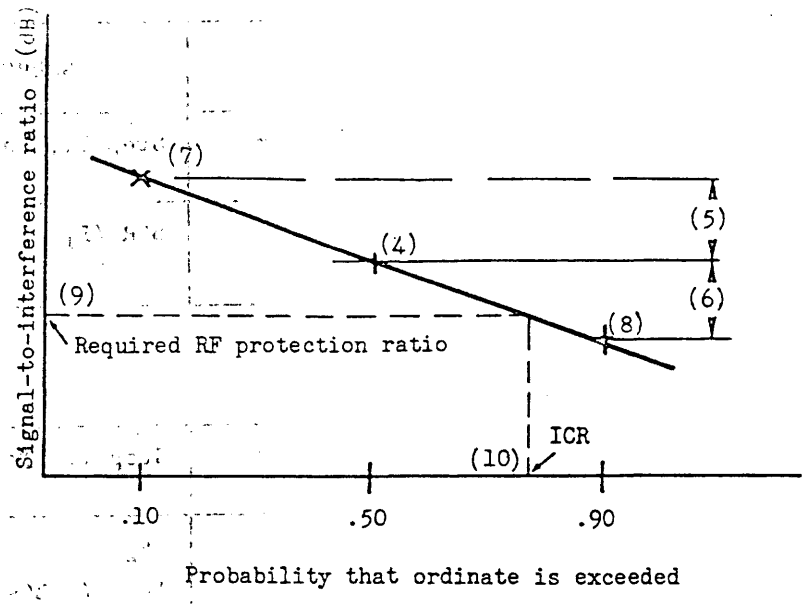

FIGURE C-2

Parameters used to compute overall circuit reliability

(Figures appearing in brackets refer to step numbers as shown in Table C-3.)

IV.3 Basic reception reliability (BRR)

The method for computing basic reception reliability is outlined in Table C-4. With a single frequency, basic reception reliability (BRR) is the same as the basic circuit reliability (BCR) defined in section IV.1. With multiple frequencies, the interdependence between propagation conditions at different frequencies leads to the computation method given in Table C-4. In steps (4) and (6), BCR (n) is the basic circuit reliability for frequency n, where n = F_1, F_2, etc. The basic reception reliability is obtained in step (2) for a single frequency, in step (4) for a set of two frequencies and in step (6) for a set of three frequencies.

IV.4 Overall reception reliability (ORR)

The method for computing overall reception reliability is outlined in Table C-5. With a single frequency, overall reception reliability (ORR) is the same as the overall circuit reliability (OCR) defined in section IV.2. With multiple frequencies, the interdependence between propagation conditions at different frequencies leads to the computation method given in Table C-5. In steps (4) and (6), OCR (n) is the overall circuit reliability for frequency n, where n = F_1, F_2, etc. The overall reception reliability is obtained in step (2) for a single frequency, in step (4) for a set of two frequencies and in step (6) for a set of three frequencies.

TABLE C-4

Basic reception reliability

The following parameters are involved:

Single-frequency operation

STEP	PARAMETER	DESCRIPTION	SOURCE
(1)	BCR (F_1) %	Basic circuit reliability for frequency F_1	Step 11, Table C-2
(2)	BRR (F_1) %	Basic reception reliability	BCR (F_1)

Two-frequency operation[1]

(3)	BCR (F_2) %	Basic circuit reliability for frequency F_2	Step 11, Table C-2
(4)	BRR (F_1) (F_2) %	Basic reception reliability	$1-\prod_{n=F_1}^{F_2}(1-BCR(n))$

1 The two frequencies F_1 and F_2 shall be situated in different HF bands allocated to the broadcasting service.

TABLE C-4 (continued)

Basic reception reliability

Three-frequency operation[1]

STEP	PARAMETER	DESCRIPTION	SOURCE
(5)	BCR (F_3) %	Basic circuit reliability for frequency F_3	Step 11, Table C-2
(6)	BRR (F_1) (F_2) (F_3) %	Basic reception reliability	$1-\prod_{n=F_1}^{F_3}(1-BCR(n))$

1 The three frequencies F_1, F_2 and F_3 shall be situated in different HF bands allocated to the broadcasting serivce.

TABLE C-5

Overall reception reliability

The following parameters are involved:

Single-frequency operation

STEP	PARAMETER	DESCRIPTION	SOURCE
(1)	OCR (F_1) %	Overall circuit reliability for frequency F_1	Step 12, Table C-3
(2)	ORR (F_1) %	Overall reception reliability	OCR (F_1)

Two-frequency operation[1]

(3)	OCR (F_2) %	Overall circuit reliability for frequency F_2	Step 12, Table C-3
(4)	ORR (F_1) (F_2) %	Overall reception reliability	$1-\prod_{n=F_1}^{F_2}(1-OCR(n))$

1 The two frequencies F_1 and F_2 shall be situated in different HF bands allocated to the broadcasting service.

TABLE C-5 (continued)

Overall reception reliability

Three-frequency operation[1]

STEP	PARAMETER	DESCRIPTION	SOURCE
(5)	OCR (F_3) %	Overall circuit reliability for frequency F_3	Step 12, Table C-3
(6)	ORR (F_1) (F_2) (F_3) %	Overall reception reliability	$1-\prod_{n=F_1}^{F_3}(1-OCR(n))$

1 The three frequencies F_1, F_2 and F_3 shall be situated in different HF bands allocated to the broadcasting service.

IV.5 Basic and [overall/interference] broadcast reliability

The determination of basic broadcast reliability involves the use of test points within the required service area. The basic broadcast reliability is an extension of the basic reception reliability concept to an area instead of a single reception point. The method for computing basic broadcast reliability is outlined in Table C-6. In step (1), the basic reception reliabilities BRR (L_1), BRR (L_2), --- BRR (L_N) are computed as described in Table C-4 at each test point L_1, L_2 --- L_N. These values are ranked in step (2) and the basic broadcast reliability is the value associated with a percentile [X] of the test points.

In a similar way, the [overall/interference] broadcast reliability is computed as described in Table C-7 and it is the value associated with a percentile [X] of the test points.

Broadcast reliability is associated with the expected performance of a broadcast service at a given hour. For periods longer than an hour, computation at one-hour intervals is required.

TABLE C-6

Basic broadcast reliability

The following parameters are involved:

STEP	PARAMETER	DESCRIPTION	SOURCE
(1)	BRR (L_1), BRR (L_2), --- BRR (L_N) %	Basic reception reliability at all test points considered in the required service area	Step (2), (4) or (6), as appropriate, from Table C-4
(2)	BBR (X) %	Basic broadcast reliability associated with percentile [X]	Any percentile chosen from the values ranked from (1) of this table

TABLE C-7

Overall broadcast reliability

The following parameters are involved:

STEP	PARAMETER	DESCRIPTION	SOURCE
(1)	ORR (L_1), ORR (L_2), --- ORR (L_N) %	Overall reception reliability at all points considered in the required service area	Step (2), (4) or (6), as appropriate, from Table C-5
(2)	OBR (X) %	Overall broadcast reliability associated with percentile [X]	Any percentile chosen from the values ranked from (1) of this table

The decision to use more than one frequency per requirement should be made on the merits of the particular case concerned.

Use of synchronized transmitters should be encouraged whenever possible with a view to minimizing the need for additional frequencies.

V. PROPORTIONALLY REDUCED PROTECTION (PRP)

PRP is a margin (M) by which the RF protection ratio to be applied at a test point is reduced under the following specified conditions:

1) the BBR < [80%], and

2) only one frequency band is given by the planning system, and

3) at the test point considered the field strength E_w is less than E_{min} and greater than or equal to E_{min} - [Z].

In these conditions M is determined as: $M = E_{min} - E_w$.

In such cases the proportionally reduced protection ratio is used in the evaluation of S/I at the test point considered. For all the remaining points within the required service area, full protection as determined by the relevant protection ratio is given when $E_w \geq E_{min}$ and no protection is given when $E_w < E_{min}$ - [Z].

In cases where PRP is not applicable, full protection as determined by the relevant protection ratio is afforded when $E_w \geq E_{min}$ and no protection is afforded when $E_w < E_{min}$.

VI. MAXIMUM NUMBER OF FREQUENCIES REQUIRED PER REQUIREMENT

VI.1 Introduction

Wherever possible, only one frequency should be used for a particular requirement. In certain special circumstances, it may be found necessary to use more than one frequency per requirement, i.e.:

- over certain paths, e.g. very long paths, those passing through the auroral zone, or paths over which the MUF is changing rapidly;

- areas where the depth of the area extending outwards from the transmitter is too great to be served by a single frequency;

- when highly directional antennas are used to maintain satisfactory signal-to-noise ratios, thereby limiting the geographical area covered by the station concerned.

VI.2 Use of additional frequencies

The number of frequencies needed to achieve the specified level of basic broadcast reliability shall be determined by the method given below. If the calculated basic broadcast reliability for a single frequency does not reach the adopted value, it is necessary to consider whether the BBR could be improved by additional frequencies in separate bands and whether the improvement would justify the use of additional frequencies.

VI.3 Determination of additional frequency bands

In cases where the BBR[1] for the first band, based on all test points in the required service area, is between 50% and 80%, an additional band shall be tested as follows.

Those test points whose basic circuit reliability BCR is less than or equal to the BBR are identified and only these points are used to determine the second band. For each band, the minimum value of BCR (BCR_{min}) at these points is determined and that band having the highest BCR_{min} value is selected. If more than one band has this value, the highest frequency band is selected. The two-band BBR, taking account of the BRR at all test points in the required service area is then computed and if it exceeds the limit specified in Figure C-3[2] then the second band is permitted. In those special cases where the two-band BBR is less than 80% then a third band shall be tested as follows.

The BBR for each of the remaining bands is computed considering all test points in the required service area. Of these bands, that band having the highest BBR is selected as the third band. If more than one band has this value the highest frequency band is selected. If the resulting three-band BBR taking account of the BRR at all test points exceeds the limit specified in Figure C-3, the third band is permitted.

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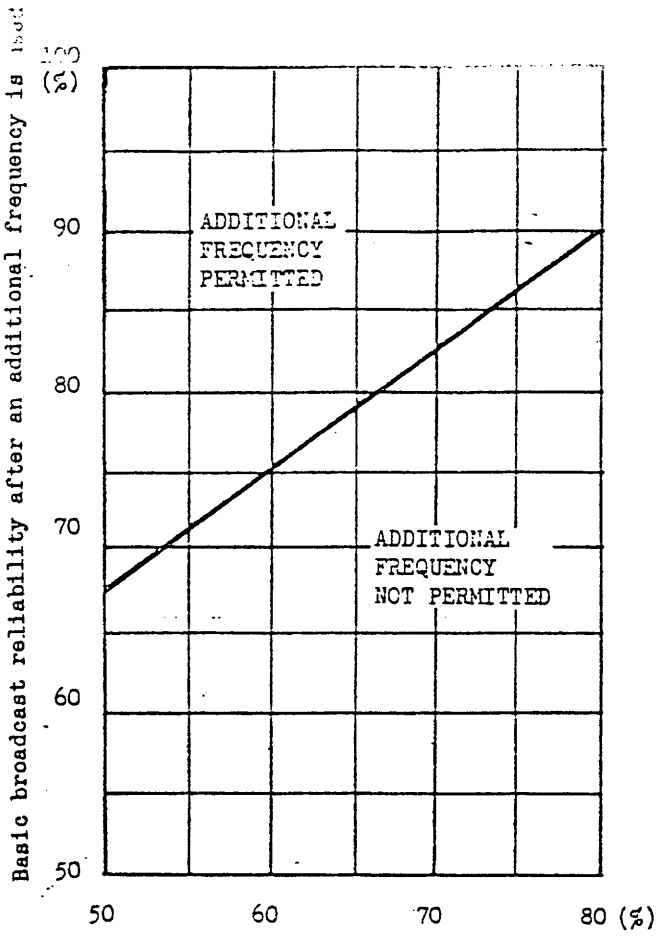
1 For calculation of the basic broadcast reliability, see paragraph IV.5.

2 The contents of this figure can be expressed by the following equation:

BBR (after) > 30 + .75*BBR (before)	additional frequency permitted
BBR (after) $\leq$ 30 + .75*BBR (before)	additional frequency not permitted.



Basic broadcast reliability before an additional frequency is to be used

FIGURE C-3

Limits for use of an additional frequency

VII. PERFORMANCE ASSESSMENT

[See Document 145.]

ANNEX 4

Draft section [1] HFBC requirements file

1. Administrations shall submit to the IFRB, their operational and projected broadcasting requirements in the bands allocated exclusively to the broadcasting service between 5 950 and 26 100 kHz. These requirements shall be entered in the HFBC requirements file[1] which shall contain:

- requirements which are to be used within the next [ ] years;
- all requirements taken into account in the preparation of a seasonal schedule or plan or during its operation;
- requirements used during the preceding [5] year period.

2. An entry in the HFBC requirements file shall be defined as a requirement indicated by an administration to provide a broadcasting service at specified periods of time to a specified reception area from a particular transmitting station.

3. Each requirement listed in the HFBC requirements file shall contain at least the basic characteristics listed in Appendix 2 together with the indication of the season(s) in which the requirement was or will be used.

4. Each seasonal schedule or seasonal plan to be established in accordance with [ ] shall cover one of the seasonal propagation periods indicated below. The month shown in the parentheses indicates the month to be used for the propagation prediction:

- Season D - November - February (January);
- Season M - March - April (April);
- Season J - May - August (July);
- Season S - September - October (October).

Each seasonal [plan or seasonal] schedule shall be implemented at 0100 UTC on the first Sunday of the season concerned.

5. Administrations shall notify the Board, using Appendix 2, of any addition, modification or deletion of a requirement in the HFBC requirements file. Additions, modifications or deletions notified to the Board for a given season shall be taken into account provided that following their examination by the Board they are considered complete.

6. Upon receipt of notices pursuant to paragraph 5 above, the Board shall ensure that the basic information listed in Appendix 2 is given and is correct and shall request the notifying administration to notify the correct or missing information. Following this examination the Board shall indicate those incompatibilities which can be identified without the need for detailed

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[1] The initial establishment of the requirements file will be in accordance with Resolution [COM5/1] and will not contain any history of frequency use prior to the establishment of the file.

calculations and shall inform the administrations concerned of the results obtained together with any recommendation that may assist in avoiding this incompatibility.

7. After the end of each seasonal period, the Board shall enter into the requirements file for each requirement the frequency or frequencies used, together with any indication from administrations on the actual use of the requirement. Requirements already used shall be kept in the HFBC requirement file for a period of five years. No priority shall be derived from this history of use.

8. (To be supplied by Drafting Group 6-1.)

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/67-E
2 March 1987
Original: English

AD HOC 5

REPORT OF THE CHAIRMAN OF THE DRAFTING GROUP ON REVISED ARTICLE 17 TO AD HOC 5

It was understood that this Drafting Group was established to simplify the proposed revision of Article 17.

Document 177 was used as a basis for the whole of the Group.

The recommended changes are contained in the annex to this report.

The Drafting Group re-examined the provisions in boxes 6-8 whereby the IFRB selects the frequencies on behalf of administrations. While it was noted that there would be a saving if this feature was deleted, it was recognized that administrations could request this same assistance under Article 10, No. 999.

During the consideration of the deletion of boxes 15-19 inclusive, it was recognized that this would save one round of consultation (perhaps two months) and reduce the burden on the IFRB. One administration, however, expressed a concern that, while the calculation of incompatibilities under box 22 would replace those previously carried out under box 18, the results would not be available as early.

Some delegates objected to additional requirements submitted after the publication of the seasonal schedule (see old box 21). This concern is reflected in the square brackets around box 16.

Another administration favoured the retention of the flow chart as contained on page 6 in Document 177 and in particular was of the view that boxes 14-19 provided more opportunities for the resolution of incompatibilities.

The Drafting Group realized that the recommended changes will not result in any reduction in the required software development by the IFRB.

E.D. DuCHARME
Chairman

Annex: 1

ANNEX

Proposed modifications to revised Article 17

1. Boxes 1-13 are unchanged except for the addition of Box 9A:

9A Those requirements that cannot be included in the seasonal schedule as a result of the Planning System are entered into the Article 17 process.

2. Boxes 14-23 are replaced by the following.

14. The Board publishes the seasonal schedule containing for each transmission:

- frequency;
- the notifying administration;
- identification number of the requirement in the requirements file;
- the transmitter site;
- the hours of operation, including specifics when not on a daily basis;
- the number of frequencies for the requirement;
- the required service area (see Document 161, paragraph 1.3);
- the transmitter power;
- antenna characteristics (see annex to Document 132).

Associated with the draft seasonal schedule, the Board will provide information on the frequency incompatibilities. In addition, the Board will provide, in a timely manner and on request, all other information deemed necessary by an administration.

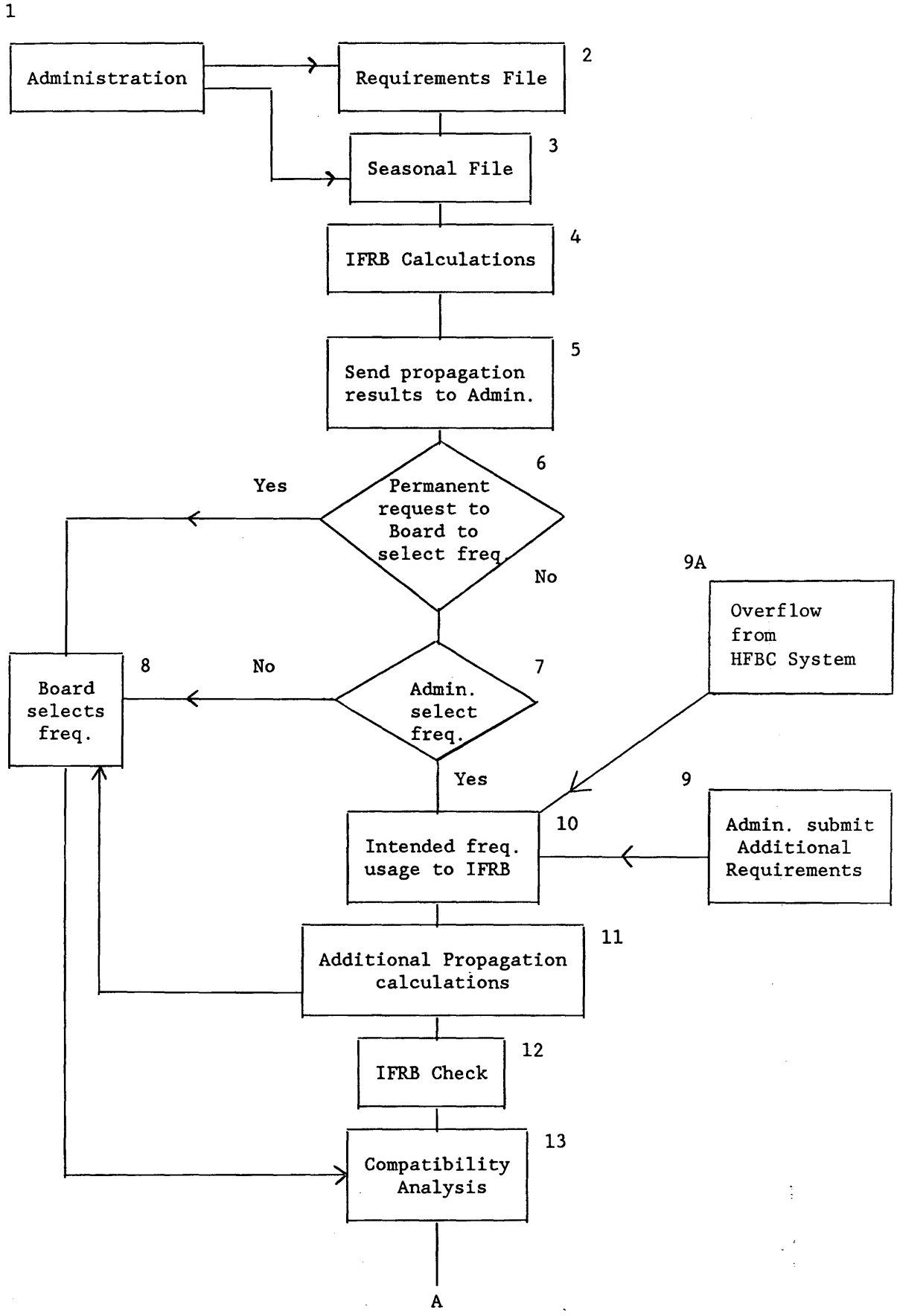
Administrations are urged to take all possible actions to resolve incompatibilities prior to the start of the season.

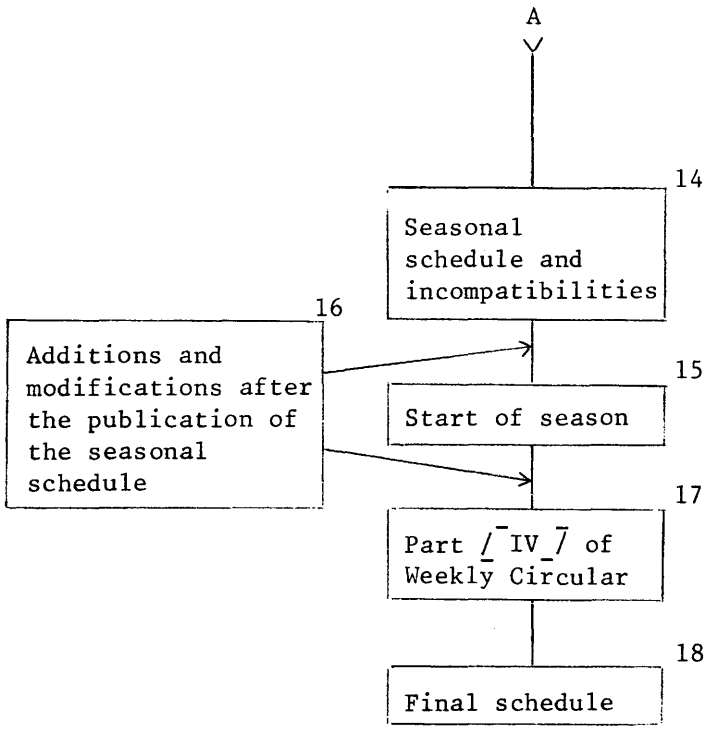
15. Start of season.

16. [Additions and modifications after publication of the seasonal schedule. Administrations are urged to refrain from submitting additional requirements at this stage. This should be done at box 9.]

17. IFRB publishes the information received under step 16 in part IV of the Weekly Circular. The Board will make an incompatibility analysis and publish the results with respect to the information received under step 16.

18. The final schedule is not needed to be published. However, the information on the frequency usage during the season may be made available upon request to an administration, on magnetic tape.


1
Administration
Requirements File
2
Seasonal File
3
IFRB Calculations
4
Send propagation results to Admin.
5
Permanent request to Board to select freq.
6
Yes
No
9A
Overflow from HFBC System
Board selects freq.
8
No
Admin. select freq.
7
Yes
9
Intended freq. usage to IFRB
10
Admin. submit Additional Requirements
Additional Propagation calculations
11
IFRB Check
12
Compatibility Analysis
13
A


A
14
Seasonal schedule and incompatibilities
16
Additions and modifications after the publication of the seasonal schedule
15
Start of season
17
Part /IV/ of Weekly Circular
18
Final schedule

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS
ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/68-E
2 March 1987
Original: English

5 AD HOC GROUP

REPORT OF THE CHAIRMAN OF THE DRAFTING GROUP ON THE HFBC PLANNING SYSTEM

The Drafting Group considered the proposed approach to planning consisting in entering a first requirement for each administration in the seasonal plan followed by a second requirement and so on until it is impossible to do so.

The Group concluded that this approach would require an administration to indicate some order of priorities as between its requirements.

While this approach will avoid suspensions because those requirements which cannot be included will automatically be accommodated under the Article 17 procedure, it was concluded that it may lead to difficulties for some administrations and would require significant changes to the software. Consequently the Group felt that it would be preferable to use the available software as far as possible to meet the same objective with only a limited degree of modification.

2. The alternative approach suggested by the Drafting Group would meet two basic objectives:

i) avoid elimination of requirements, and

ii) ensure equal treatment as between administrations.

In considering the alternative approach the Group encountered a significant difficulty in ensuring mandatory frequency continuity within the duration of a requirement while, at the same time, applying the transfer rules.

3. The proposed approach is briefly described below:

3.1 Administrations when submitting their requirements shall indicate which requirements should be planned and which should be accommodated under Article 17. In so doing the Administrations should preferably include in the Article 17 part those requirements for which frequency continuity is considered to be crucial.

3.2 The Administrations shall also indicate among the requirements to appear in the planned part those requirements for which Type 1 frequency continuity shall be applied in any case. In so doing the Administration will be deemed to have accepted that if in a given hour the requirement cannot be entered in the plan, the requirement through whole of its transmission period within the appropriate band will be transferred to the Article 17 procedure.

3.3 The HFBC Planning System shall be applied to those requirements which the Administration wishes to be accommodated in the planned part and the rules N_1 to N_4 will be applies as transfer rules from the HFBC Planning System to the Article 17 procedure and the rule N_5 will be applied, if required to the requirements which are not transferred. Consequently those requirements that cannot be satisfied by the Planing System will be transferred and treated under the Article 17 procedure.

3.4 Frequency continuity of Type 1 will be ensured for the requirements entered in the HFBC Planning System under the conditions specified in Document 198. However, where a transfer to Article 17 procedure occurs only during a part of the duration of the requirement, frequency discontinuity will be inevitable. In such a case the requirement will be transferred to the Article 17 procedure during its entire duration within the appropriate band if the Administration has indicated that frequency continuity is essential.

4. This approach represents the conclusions reached within the Drafting Group. However, some participants stated that this should not imply their agreement without reservation because of possible implications.

O.P.KHUSHU
Chairman of the Drafting Group

HFBC (2) INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/69-E
3 March 1987
Original: English

Source: Document 187

COMMITTEE 6

DRAFT

RESOLUTION COM6/1 (HFBC-87)

Procedure to be Applied by the IFRB in the Revision of Relevant Parts of its Technical Standards Used for HF Broadcasting

The World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service (Geneva, 1987),

considering

a) that it has examined in detail the technical parameters used for HF broadcasting;

b) that the planning exercises conducted by the IFRB in the intersessional period indicated that some of the technical parameters, such as used in the propagation prediction method, may need to be improved, and applied with some flexibility, depending on the results of the actual regular implementation of plans and the technical studies carried out by the CCIR;

c) that under No. 1001 of the Radio Regulations, the functions of the Board include the development of its Technical Standards;

d) that under No. 1454 of the Radio Regulations, the Technical Standards of the IFRB shall be based on:

- the relevant provisions of the Radio Regulations and the Appendices thereto,
- the decisions of administrative conferences of the Union, as appropriate,
- the Recommendations of the CCIR,
- the state of the radio art,
- the development of new transmission techniques,

taking into account exceptional propagation conditions which may prevail in certain regions [(for example, particularly pronounced ducting)];

e) that in accordance with [No. 1770 of the Radio Regulations], the Technical Standards of the IFRB shall be based on the above as well as on the experience gained by the Board in applying the periodic planning process;

f) that, with respect to the Technical Standards of the IFRB, the CCIR could provide competent advice on technical matters;

g) the importance of the active involvement of administrations in the process of revising the technical parameters,

resolves

1. that, following each CCIR Plenary Assembly, the IFRB shall review its Technical Standards relating to the technical parameters of HF broadcasting in the light of new or modified CCIR Recommendations, and shall circulate to all administrations the results of its review, indicating the reasons for its proposed actions;

2. that, whenever the IFRB considers it appropriate to review its Technical Standards relating to the technical parameters of HF broadcasting without departing from the decisions of this Conference, it shall circulate to all administrations the proposed changes and the reasons for them;

3. that, before implementing any changes, the IFRB shall request administrations to provide their comments on the subjects referred to in resolves 1 and 2 within 4 months, and shall take them into account unless it would be impractical to do so;

4. that the IFRB shall circulate a summary of comments received from administrations together with the Board's views thereon, indicating whether a meeting of experts is necessary or not, before a final decision is taken. If a significant number of replies subsequently received from administrations on such a meeting supports the action proposed by the Board, it shall proceed accordingly. If not, the Board shall inform the administrations accordingly and allow an appropriate period for further comments before implementing the proposed changes;

5. that if, on the subject referred to in resolves 1 and ensuing action under resolves 3 and 4, the IFRB Technical Standards are not modified, the IFRB shall prepare a contribution to the CCIR indicating the parts of the CCIR Recommendation that were not included in the IFRB Technical Standards, together with any information required for further study of the matter.

R. BLOIS
Chairman of Committee 6

HFBC (2) INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/70-E
4 March 1987
Original: English

COMMITTEE 6

DRAFT (Based on Resolution No. 90 (MOB-83))

RESOLUTION No. [91] (HFBC-87)

Revision, Replacement and Abrogation of Resolutions and Recommendations of the World Administrative Radio Conference, Geneva, 1979

The World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service (Geneva, 1987),

considering

its agenda as contained in Administrative Council Resolution No. 912, in particular agenda item 2.1.6 and the action taken on a number of Resolutions and Recommendations of the World Administrative Radio Conference, Geneva, 1979,

further considering

a) that the following Resolution[s] [and Recommendations] [has][have] been revised as indicated:

Resolution No. 641	Relating to the Use of the Frequency Band 7 000 - 7 100 kHz, by Resolution No. 641 (Rev. HFBC-87)

[Resolution No. ...];

[b) that the following Resolution and Recommendation have been superseded as indicated:];

c) that all necessary action has been taken on the following [Resolutions and] Recommendation[s]:

Recommendation No. 501	Relating to Studies for the Introduction of Single-Sideband (SSB) Techniques in the HF Bands Allocated to the Broadcasting Service, in Preparation for the World Administrative Radio Conference for HF Broadcasting,

resolves

that the said Resolution[s] and Recommendation[s] of the World Administrative Radio Conference, Geneva, 1979, listed under a) [, b)] and c) above, shall be abrogated.

R. BLOIS
Chairman of Committee 6

HFBC (2) INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS
ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/71-E
4 March 1987
Original: English

COMMITTEE 6

DRAFT RESOLUTION

The World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service, Geneva, 1987,

considering

a) that its First Session held from 10 January to 11 February 1984 adopted a planning method based on seasonal planning and charged the IFRB to prepare to this effect the appropriate computer software and to test it using variations of criteria;

b) the Report of the IFRB on the activities carried out since its First Session;

c) that the planning exercises demonstrated that the HFBC Planning System developed by the IFRB on the basis of the decisions of the First Session could not include in the seasonal plans all the requirements of administrations;

d) that with the view to permit Administrations to have all their HFBC requirements taken into account in the Radio Regulations the procedure of the current Article 17 should be improved and used in combination of a revised HFBC Planning procedure;

e) that the working assumptions used by the IFRB in the planning exercises were reviewed and the HFBC planning method was revised;

f) that consequently there is a need to modify the related software and to test the HFBC planning method before its final adoption by a competent World Administrative Radio Conference (see Resolution [...]).

resolves that the IFRB

1. shall base its post conference activities relating to the improvements to the software for the revised procedures contained in Annex 1 to this Resolution and relating to the planning procedure [Section —] and to the revised procedures based on consultation [Section -O-];

2. shall test the system and the procedure in the post-conference period using the requirements submitted by Administrations for the procedures currently in force to be completed if necessary by additional information that may be required for planning exercises;

3. the above test shall be carried out in the bands indicated in Annex 2 to this Resolution;

4. shall report to Administrations on a regular basis on the results of its post-conference work;

5. shall prepare a final report to Administrations containing the results of its post-conference at least [8] months prior to the competent World Administrative Radio Conference (see Resolution [..]).

R. BLOIS
Chairman of Committee 6

Annexes: 2

ANNEX 1

I. Requirements file (Document 211)

II. Results of Drafting Group 6-1 (Document 211 as modified by Document DT/67)

III. Results of Drafting Group 6-2 (Annexes 1 and 2 of Document 222 as modified by Document DT/68)

ANNEX 2

Annex 1 to Document DT/65.

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/72-E
5 March 1987
Original: French

BUDGET CONTROL COMMITTEE

Draft

REPORT OF THE BUDGET CONTROL COMMITTEE TO THE PLENARY MEETING

The Budget Control Committee held six 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, for the work immediately following the World Administrative Radio Conference HFBC(2), the Administrative Council, at its 41st session (1986), approved the extension of four posts until 30 June 1987, and the possible extension of these posts until 31 December 1987, subject to a decision by the Second Session of WARC-HFBC and the financial provisions approved by the Budget Control Committee.

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, and in particular the common services provided for the Conference, had been entirely satisfactory. The Committee also expressed its appreciation for the facilities made available by the IFRB to delegates at the Conference Centre in the form of special terminals linked to the ITU computer as well as the services of

engineers of the IFRB Specialized Secretariat, which had permitted delegates an insight into the complexity of the HFBC Planning System and had contributed to the better understanding of the problems the Conference had to deal with.

2. Conference budget

The Budget Control Committee examined the Conference budget, amounting to 2,210,000 Swiss francs, including IFRB post-conference work for 1987, which was approved by the Administrative Council at its 41st session (1986).

The Committee noted that the Conference budget did not comprise expenditure on common services supernumerary staff salaries, which are charged to a special section of the ordinary budget. This expenditure was estimated at 542,000 Swiss francs.

In addition, the Committee 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. As a result of these adjustments, the budget of the Conference stands at 2,061,000 Swiss francs, i.e. a decrease of 149,000 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 costs ... shall be decided by the Plenary Meeting of the conference or meeting."

As all the documents which can be used as a basis for the sales edition of the Final Acts of the Conference are prepared using word processing systems, no expenditure under this heading need be charged to the supplementary publications budget.

On the other hand, in accordance with the provisions of Nos. 119 and 122 of the Convention (Nairobi, 1982), the costs of translating the Final Acts of the Conference into the six official languages are charged to the Conference.

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 sub-heads and items as well as the actual expenditure incurred as at 23 February 1987. There is also an indication of the expenditure committed up to that date and an estimate of expenditure up to the close of the Conference's work.

The above statement shows that the total amount to be charged to the ordinary budget for WARC-HFBC(2) is estimated at 1,997,000 Swiss francs, i.e. 64,000 Swiss francs less than the amount allocated by the Administrative Council and adjusted under Resolution No. 647. It can therefore be assumed that Conference expenditure will remain within the limits laid down.

Annexes 2.1, 2.2 and 2.3 to this document show, for information, the situation of expenditure on preparatory work for the First Session of the WARC-HFBC, expenditure for the First Session, 1984, and intersessional work for 1985 and 1986.

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 work and intersessional work, in relation to the expenditure limit fixed for WARC-HFBC 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 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 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."

In this connection, it is recalled that, in the budget approved for 1987, the Administrative Council made provision for the possible extension of four P.4 posts for immediate post-conference work for the period from 1 July to 31 December 1987, the period up to 30 June 1987 being already covered by the budget of the Second Session of the Conference itself. Provision for the possibility of extending these posts was included in section 18 relating to expenditure concerning the "implementation by the IFRB of the decisions of administrative conferences" subject to a decision by the Second Session of WARC-HFBC and the financial provisions approved by the Budget Control Committee.

Having regard to that item of its terms of reference, the Budget Control Committee gave detailed consideration to the estimates of the resources needed for post-conference work, in particular:

- Document 191(Rev.1) prepared by the IFRB;
- Document 202 submitted by the Director of the CCIR;
- the recapitulation of additional costs submitted by the Secretary-General, setting out the financial implications of the IFRB and CCIR requirements as well as those relating to the computer and the Group of Experts (Document 209(Rev.1)). Extracts from these documents are found in Annexes 5, 6 and 7.

During the consideration of these estimates, several members of the Budget Control Committee expressed their concern and preoccupation at the high level of expenditure comtemplated. Some members considered that the estimates are unrealistic and could be reduced.

With regard to the limits set on expenditure by the Plenipotentiary Conference in Additional Protocol I, the Committee noted in particular that the estimates were substantially higher than the amounts authorized, namely:

Sections 11/17		
Limit on WARC-HFBC expenditure approved by the Nairobi Conference	10,000,000	
Balance available (estimate)		879,400
Expenditure contemplated		1,700,000
Section 18 - Implementation by the IFRB of Conference Decisions		
Limit approved by the Nairobi Conference	4,550,000	
Balance available (estimate)		1,165,000
Expenditure contemplated		2,300,000

It is up to the Plenary Meeting to give its opinion on this situation.

In accordance with No. 479 of the Convention, this report, after consideration and approval, will be transmitted to the Secretary-General, together with the observations of the Plenary Meeting, for submission to the Administrative Council at its next session.

* * *

The Plenary Meeting is requested to examine this report.

Dr. M.K. RAO
Chairman of the
Budget Control Committee

Annexes: 7

ANNEX 1

Position of WARC-HFBC 1987 accounts as at 23 February 1987

Heading	Budget approved by AC	Budget adjusted on 01.02.87	Expenditure at 23.02.87 actual committed	Expenditure at 23.02.87 estimated total	Expenditure at 23.02.87 total
col.	1	2	3	4	5
	thousands of Swiss francs				
Subheads II-IV - Work of the Conference					
Subhead II - Staff costs					
423.11 Salaries and related exp.	1326	1195	45	1110	1155
423.38 Recruit. travel costs	81	81	6	52	58
423.41 Insurance	35	35	7	35	42
	1442	1311	58	1197	1255
Subhead III - Premises and equipment costs					
433.61 Premises, furniture, machines	40	40	0	39	39
433.62 Document production	60	60	0	69	69
433.63 Office supplies & costs	50	50	3	33	36
433.64 PTT	50	50	25	23	48
433.65 Technical installations	4	4	0	4	4
433.69 Sundry & unforeseen	10	10	1	9	10
	214	214	29	177	206
Subhead IV - Other expenditure					
443.00 Final Acts of the Conference	54	54	0	54	54
Subhead VI - Post-Conference work					
461.11 Salaries & related exp.	103				0
461.12 Supernumerary staff	120	225	82	143	225
461.41 Insurance	20				0
461.50 Computer facilities	217	217	1	216	217
461.61 Premises, furniture, machines	40	40	4	36	40
	500	482	87	395	482
TOTAL SECTION 11.4	2210	2061	174	1823	1997
UNUSED CREDITS					64

Col. 2: Budget including additional credits to take account of changes in the common system of the United Nations and its specialized agencies.

ANNEX 2.1

Preparatory work in 1983 for the World Administrative Conference for HF Broadcasting

Items		Budget 1983	1983 Accounts
		- Swiss francs -	
Sub-head I - Staff expenditure			
11.401	Salaries and related expenses	205,700	198,773.40
11.402	Insurance	31,400	35,609.70
	Total, sub-head I	237,100	234,383.10
Sub-head II - Other expenses			
11.405	Document production	-	8,265.95
11.410	CCIR preparatory work	270,000	86,385.70
	Total, sub-head II	270,000	94,651.65
	Total expenditure, Section 11.4	507,100	329,034.75

ANNEX 2.2

World Radio Conference HFBC-84

Items		Budget 1984	Accounts 1984
		- Swiss francs -	
Sub-head 1 - IFRB preparatory work			
11.401	Salaries and related expenses	506,200	458,371.35
11.402	Initial installation expenses	105,000	116,736.05
11.403	Insurance	90,200	76,692.75
11.404	Office space, furniture	104,000	86,267.00
11.405	Electronic equipment	100,000	105,049.65
	Total for sub-head 1	941,400	843,116.80
Sub-head 2 - Staff expenditure			
11.421	Salaries and related expenditure	1,192,500	1,183,146.15
11.422	Travel - recruitment	92,000	78,254.85
11.423	Insurance	34,000	16,869.85
	Total for sub-head 2	1,318,500	1,278,270.85
Sub-head 3 - Premises and equipment			
11.431	Premises, furniture, machines	90,000	36,370.65
11.432	Document production	100,000	74,041.50
11.433	Office supplies and overheads	40,000	48,003.05
11.434	PTT	43,000	21,721.45
11.435	Technical installations	20,000	-
11.436	Sundry and unforeseen	10,000	7,016.65
	Total for sub-head 3	303,000	187,153.30
Sub-head 4 - Other expenses			
11.441	Report to the Second Session/ Final Acts	15,000	4,721.95
	Total, Section 11.4	2,577,900	2,313,262.90

ANNEX 2.3

World Radio Conference HFBC-84
intersessional work

Items		Budget 1985	Expenses 1985
		- Swiss francs -	
Sub-head I - IFRB preparatory work			
11.451	Salaries and related expenses	1,060,600	1,058,570.85
11.453	Insurance	214,600	195,782.55
11.454	Computer facilities	332,000	326,506.40
11.455	Offices, furniture, supplies	120,000	124,768.45
	Total, sub-head I	1,727,200	1,705,628.25
Sub-head II - CCIR preparatory work			
11.461	Salaries and related expenses and insurance	80,000	72,135.05
11.462	Document production	20,000	17,737.65
	Total, sub-head II	100,000	89,872.70
	Total, Section 11.4	1,827,200	1,795,500.95

ANNEX 3

Expenditure limit fixed by Additional Protocol I
to the Convention (Nairobi, 1982)

WARC-HFBC	Sections 11 and 17		
	Limit on expenditure Add. Prot. I	Actual or estimated expenditure	Difference
	- Swiss francs -		
Limit on expenditure	10,000,000		
1983: Preparatory work		403,000*	
1984: Preparatory work, cost of First Session, intersessional work		2,860,600*	
1985: Intersessional work		1,655,000*	
1986: Intersessional work		1,754,000*	
1987: Intersessional work, cost of Second Session, immediate post-Conference work		2,448,000**	
	10,000,000	9,120,600	879,400

The figures given in the table correspond to 1 September 1982 values.

---

* Actual expenses.

** Expenses provided for in the budget.

ANNEX 4

List of recognized private operating agencies and international organizations contributing to the work of the Conference

		No. of contributory units
I.	Recognized private operating agencies	
	None	
II.	International organizations	
II.1	United Nations	*)
II.2	Specialized agencies	
	International Civil Aviation Organization (ICAO)	*)
	World Meteorological Organization (WMO)	*)
II.3	Regional telecommunication organizations	
	Arab Telecommunication Union (ATU)	*)
II.4	Other international organizations	
	International Association of Broadcasting (IAB)	*)
	International Radio and Television Organization (OIRT)	*)
	Asia-Pacific Broadcasting Union (ABU)	*)
	Arab States Broadcasting Union (ASBU)	*)
	Union of National Radio and Television Organizations of Africa (URTNA)	*)
	European Broadcasting Union (EBU)	*)
	International Amateur Radio Union (IARU)	*)

*) Exempted from any contribution by Administrative Council Resolution No. 925.

Extract of Document HFBC(2)/191(Rév.1)-E

ANNEX 5

PRELIMINARY RESOURCE ESTIMATES FOR THE IMMEDIATE POST CONFERENCE WORK TO BE CARRIED OUT BY THE IFRB

1. INTRODUCTION

On the basis of the latest discussions held in various committees as well as on the basis of the "decisions" so far taken by the Conference, the Board has revised the preliminary resource estimates which are based on a new single scenario; the estimates are given in the Annex. An accurate assessment of the decisions of the Conference, can only be made, after a detailed study by the Board, after the Conference. The results of such a study will be communicated to the 42nd Session of the Administrative Council.

To carry on the software development work given in the Annex, a minimal periof of 2 1/2 years is necessary. Additional time periods will be required to:

i) allow the Board to undertake a detailed study of the decisions of this Conference;

ii) carry out the extensive tests of the integrated system once the software has been completed.

2. SCENARIO: COMBINATION OF THE IMPROVED HFBC PLANNING SYSTEM AND THE IMPROVED ARTICLE 17 PROCEDURE INTO A SINGLE INTEGRATED SYSTEM

The assumption is made that a combined HFBC Planning System/Article 17 represents the decision of the Conference as it would result from Documents DT/65, DT/67 and DT/68. The simplifications introduced permit the reduction of the required total effort. For this new integrated system to be developed the tasks listed below need to be executed. It should be noted that because of the introduction of the consultation phases, which were not present in the previous version of the HFBC Planning System, as well as the need to develop a system for implementation, it is of paramount importance to design the integrated system, with operational aspects in mind.

3. TASKS

The list of tasks given below is to be interpreted simply as an inventory of the different items that need to considered. These item are interlinked to the extent that the introduction or modifications of one of them has repercussions in all others. As an example, the addition of one or more test points will mean that virtually all the modules are affected and require change. Moreover the dimensions of the arrays in the various modules need to take into account the amount of available main computer memory. The introduction of new test points may lead to the total redesign of the modules (eg: GIR, frequency assignment) which require a large amount of main memory.

It should be also be understood that some of the tasks which are required such as frequency continuity of type 3, 4, 5 will necessitate a totally new approach to the design and operation of the integrated system.

3.1 Aspects that will require modifications of software up to, and including, the selection of appropriate band

a) Addition of new test points;

b) Antenna patterns (slewed, multiband, tropical and any other type);

c) Field strength calculations using the middle of the band in the planned portions, and the actual frequency in the coordinated portions;

d) Linked requirements (type 2 continuity);

e) Synchronized requirements;

f) Mandatory application of type 1 frequency continuity;

g) Application of frequency continuity of types 3, 4, 5, to the extent practicable;

h) New method for computation of BBR (second and third bands);

i) Use of a different value of Z for PRP;

j) Definition of appropriate band.

3.2 Aspects that will require modifications of software after the selection of appropriate band

a) Addition of test points;

b) Congestion and transfer rules;

c) Frequency assignment method;

d) Linked requirements;

e) Synchronized requirements;

f) Application of continuity of all types;

g) Calculation of S/I;

h) Software for performance assessment;

i) Linking the two procedures (Improved HFBC Planning System/Improved Article 17).

3.3 Other aspects

a) Operation of a requirement on one or more days in a week;

b) Impact of SSB on GIR, S/I, Frequency assignment (SSB-SSB, SSB-DSB, DSB-SSB).

3.4 Studies (engineering/software/operational)

a) frequency continuity;

b) synchronized requirements;

c) conversion of new antenna patterns into the reference set;

d) optimization of the GIR method;

e) optimization of the frequency assignment;

f) hour by hour processing versus 24 hours processing;

g) change of modules because of memory limitations;

h) further optimization of modules;

i) extremely large number of magnetic tapes, files;

j) linking of all modules, operational optimization of entire system;

k) implementation of the partition of the bands between the planned portions and the coordinated portions.

3.5 Work resulting from consultation process

- requirement to send propagation results to administrations leads to the development of special modules, publication, etc.;
- selection of frequencies by the administration requires separate modules, including a separate data capture module;
- submission of additional requirements or modifications before the publication of the tentative plan/schedule, requires separate modules;
- processing of additions and modifications after the publication of the final plan/schedule, including the selection of frequencies at this stage requires separate modules.

3.6 Design of reports/forms, documentation

- design of new form and corresponding software for data capture and validation system;
- documentation of all modules and particularly development and documentation of a stand alone field strength prediction program incorporating new antennas, E_{min}, BCR, appropriate band.

- design of new output layouts and corresponding software;
- revision of IFRB technical standards (eg: SSB);
- preparation for and participation in information meetings;
- statistical reports.

3.7 Administrative support

- circular-letters;
- correspondence;
- documentation of software;
- information meetings;
- new version of planning system/Article 17 improved;
- publication of output reports/microfiche, etc.;
- [- requirements for the application of the current Article 17?;]
- requirements for tests purposes.

4. SCOPE OF RESOURCE ESTIMATES

The preliminary resource estimates given in the Annex will be reviewed and submitted to the 42nd Session of the Administrative Council. They pertain only to the design, software development, testing of modules and testing of the integrated system with a requirements file, documentation and administrative support and do not reflect any recurrent yearly expenditure associated with the operation of the procedures that may be adopted.

The expenditures associated with office space, supplies and computer support/facilities, as given in Document 209, will need to be revised by the Secretary General, in the light of the estimates contained in the Annex.

The estimates do not include any expenditures associated with information meetings that may be held in Geneva.

PRELIMINARY ESTIMATES ON THE COMBINED IMPROVED HFBC PLANNING SYSTEM/IMPROVED ARTICLE 17
(based on Documents DT/65, DT/67 and DT/68)
(Minimum Calendar Time of 2 1/2 years)

ITEM	SOFTWARE DEVELOPMENT (m/m)	DOCUMENTATION (m/m)
- Requirements file	10	2 (design of new form)
- Propagation	6	6
- New antenna patterns	3	3
- Usable bands	3	
- Reliabilities	3	
- Appropriate band (Frequency continuity)	9	
- Assessment of congestion and transfer rules	9	
- Frequency assignment (Frequency continuity)	9	
- Modifications and new requirements	9	
- OBR/SI	6	
- Final Plan schedule/ Tentative Plan schedule	6	
- Overall redesign	18	
- Testing (all modules)	12	
- Special problems (Synchronized, linked requirements, multiband antennas)	9	
- Other modules (Statistical reports)	12	
- Administrative support		30
- Other administrative activities (Drafting of reports, publications, presentations at information meetings, circular-letters etc.)		18
- Technical standards		18
- Data capture	6	
- Operational resources for the testing and running of the integrated system with the requirements file	30	
SUB TOTALS	160 m/m 13 m/years	77 m/m 7 m/years
TOTAL	237 m/m or 20 m/years	

Extract of Document HFBC(2)/202-E

ANNEX 6

Work to be carried out by the CCIR after the WARC-HFBC

The following table shows the estimated supplementary costs involved for the execution of the above-mentioned updating work :

	- Swiss Francs -
Computer equipment	10,000
Editing work (1 man-month)	10,000
Document preparation (translation, typing and printing)	5,000
	25,000

Extract from Document 209(Rev.1)-E

ANNEX 7

ESTIMATE OF THE RESOURCES NEEDED FOR POST CONFERENCE WORK

A. PRELIMINARY RESOURCE ESTIMATES FOR THE IMMEDIATE POST CONFERENCE WORK TO BE CARRIED OUT BY THE IFRB

1.	Supernumerary staff:	
	Man months: P.4	160
	G.6	77
		Swiss francs
2.	Estimated cost of this supernumerary staff:	
	Cost per m/m P.4	10,000
	m/m G.6	5,500
3.	Total cost: P.4	1,600,000
	G.6	423,500
		2,023,500
	less the credit already entered in the budget approved by the Administrative Council under Section 18, i.e. 4 P.4, from 1.7.87 to 31.12.87	- 248,000
		1,775,500
4.	According to information supplied by the IFRB during the third meeting of Committee 3, the supernumerary staff is made up of officials who are already in service. The cost must therefore be increased by a sum estimated at:	130,000
5.	Repatriation costs:	180,000
6.	Estimated cost of the supernumerary staff:	2,085,500
	Total Swiss francs, value 1.1.1987	2,100,000

B. CCIR

Work to be carried out by the CCIR:
Estimate of expenditure:

Computer equipment	10,000
Editing work (1 man month)	10,000
Document preparation (translation, typing and printing)	5,000
	25,000

It will be up to the Administrative Council to decide how far these expenses may be absorbed by the credits for regular CCIR work. No credits are charged to the HFBC Conference in this estimate.

C. ADDITIONAL COSTS FOR THE GENERAL SECRETARIAT

C.1 Headquarters expenditure

The cost of the computer resources is estimated at:

Computer resources	
- 1987	100,000
- 1988	420,000
- 1989	420,000
	940,000
Supernumerary/software staff	
- 1987 (3 months)	30,000
- 1988	120,000
- 1989	120,000
	270,000
Total, 1987 - 1989	1,210,000
Document production and postage in connection with the revised Article 17	200,000
The following additional expenditure should also be considered:	
Premises - for 2 1/2 years	100,000
Furniture, supplies, etc.	80,000
Total	1,590,000

C.2 Group of Experts

Number of representatives:	25	
Number of meetings (for 2 years)	2	
Duration of meetings	1 week	
Average cost per representative (travel and per diem)	5,500	
Cost for two meetings for 25 representatives		275,000
Interpretation, etc. 2 meetings, 6 languages		240,000
		515,000

D. RECAPITULATION

A. IFRB	2,100,000
B. CCIR	p.m.
C. General Secretariat	
1. Headquarters	1,590,000*
2. Group of Experts	515,000
Sw.frs. value 1.1.1987	4,205,000
Sw.frs. value 1.9.1982	4,000,000

* including additional staff
(1 Professional, Computer Dept., P.3)

E. SITUATION AS REGARDS LIMITS ON EXPENDITURE

At its 41st session, the Administrative Council expressed the view that staff expenditure deriving from the decisions of WARC-HFBC should be regarded - up to 30 June 1987 - as expenditure to be charged to the accounts of the Conference.

The Administrative Council also decided that staff expenditure - as from 1 July 1987 - should be regarded as expenditure to be charged to Section 18 - Implementation by the IFRB of the decisions of administrative conferences.

On the other hand, expenditure relating to computer facilities is considered as charged to the Conference budget.

In accordance with the above, the situation is as follows:

1. Expenditure under Sections 11/17 - WARC-HFBC

Credit available within the limit on expenditure	879,400
Estimated expenditure (computer document production, postage, premises, etc., and Group of Experts)	1,700,000

2. Expenditure under Section 18 - Implementation by the IFRB of the decisions of conferences

Credit available within the limit on expenditure	1,165,000
Estimated expenditure (staff costs, including supernumerary staff, for the computer)	2,300,000

HFBC (2)

INTERNATIONAL TELECOMMUNICATION UNION
WARC FOR THE PLANNING OF THE HF BANDS
ALLOCATED TO THE BROADCASTING SERVICE
SECOND SESSION, GENEVA, February-March 1987

Document DT/73-E
6 March 1987
Original : English

Note for Information

STRUCTURE OF FINAL ACTS

PREAMBLE

PARTIAL REVISION OF THE RADIO REGULATIONS

- Modifications to Article 17
- Modifications to Article 30
- Modification to Appendix 2, Form of Notice for Submission of Information to the IFRB for High Frequency Broadcasting Requirements. Appendix 2 Rev.
- Modification to Appendix 7
- ADD Appendix 45

  Definitions and Technical Parameters Relating to the Use of the HF Bands Allocated Exclusively to the Broadcasting Service

RESOLUTIONS

RECOMMENDATIONS

DECLARATIONS

R.E. BUTLER
Secretary-General