Documents of the World Administrative Radio Conference for Space Telecommunications

(Geneva, 1971)

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SPACE
CONFERENCE

Document No. 101-E
1 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

UNITED STATES OF AMERICA

A STUDY OF INTERNATIONAL AERONAUTICAL COMMUNICATIONS/ NAVIGATION SATELLITE SYSTEM-CHANNEL/SPECTRUM REQUIREMENTS

(1 535-1 660 MHz)

The United States has proposed certain changes to Article 5 to the allocations between 1 535 and 1 660 MHz, reference proposal USA/28/56, pages 24 and 25, as amended by an associated Corrigendum.

In this connection, the attached paper stating the aviation requirements is submitted for the information of the Conference.

Annex : 1

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ANNEX

A STUDY OF INTERNATIONAL AERONAUTICAL COMMUNICATIONS/ NAVIGATION SATELLITE SYSTEM-CHANNEL/SPECTRUM REQUIREMENTS

(1 535-1 660 MHz)

The aeronautical air-ground communications system has evolved into a highly disciplined system utilizing single channel simplex operations with random access to designated channels. This system consists essentially of two primary sub-divisions; namely, Air Traffic Control (ATC) and airline company communications (also known as operational control). It is envisioned that any future satellite system must discretely accommodate both of these sub-systems on independent channels to insure safety, regularity and efficiency of air operations.

To determine the number of channels required for the future aeronautical satellite system, which must operate double channels (separate frequencies for aircraft-satellite and satellite-aircraft) consideration must be given to the projected maximum number of aircraft in flight within the control or communications area, the percentage of the total communication traffic which must be accommodated, and the operational requirements of each sub-division.

ATC communications will consist of both voice and digital channels. Air traffic control voice channels are required for air-ground air-communication related to non-routine information such as altitude changes, diversion, urgent communications directly between the pilot and the controller. These are assigned to Area Control Centres (ACCs). ATC voice channels would be supplemented by 1200 bit rate digital communications channels to be used for routine information exchange. This data function is anticipated to support reduced separations between aircraft and is closely associated with the cost benefit considerations in congested international air routes. This function will eventually prove necessary whether the position information is derived from onboard navigation systems or from an independent radiodetermination system.

Operational control channels are used to exchange information which permits airline management access to vital enroute information concerned with the efficient and economical operation of the aircraft, improved maintenance efficiency, aircraft utilization and schedule performance, reducing the workload for both flight crews and ground personnel. Such operational control traffic is not necessarily confined to a particular region (ACC). Additionally, on international flights, the inflight transmission of data necessary to immigration, customs, and public health clearance, is required to facilitate pre-arrival planning and the clearance of passengers through increasingly congested terminal airports. In view of the foregoing, it is envisioned that discrete voice and digital operational control channels will be required for system improvement.

Incidental to the channel utilization for space techniques, it is envisioned that the terrestrial environment would also require UHF (1 535-1 660 MHz) channels to complement a transoceanic crossing and to provide a transition into the land areas without the necessity to carry other (VHF) equipment, thus providing increased economy for aircraft operators.

In order to determine the number of channels which may be required, the maximum peak (busy) hourly aircraft traffic has been estimated and projected to the year 2000 in Appendix 1. The North Atlantic and Caribbean projections were derived from statistics submitted to the I.C.A.O. ASTRA IV Meeting, and the Special I.C.A.O. NAT Meeting 1971. The information for the Pacific and Indian Ocean areas was obtained from an earlier independent study.

Based on the aforementioned analysis, the forecast peak hourly aircraft traffic is :

	1985	1990	2000
NAT/CAR	592	729	1003
PAC	225	275	375
SEA/MID	110	135	185
AFI/SAM	105	130	180

With respect to channel requirements, it has been estimated that approximately 55% to 70% of all traffic will lend itself to digital transmission. The number of aircraft that can be accommodated on one 1200 bit/sec data channel will vary (30 to 100 aircraft) depending on the rate with which the aircraft must be interrogated in order to satisfy the air traffic control and operational requirements. Further, it is anticipated that one reliable voice channel can accommodate the residual voice communications for 30 to 40 aircraft while recognizing that some pre-operational experience is necessary to determine the exact trade-offs between voice and digital transmission.

Based upon the foregoing, the aircraft per channel requirements, the peak hourly traffic forecasts, and recognizing that every air traffic control centre will require at least one reliable voice channel, the following number of equivalent (voice or data) channels are required for a fully implemented world-wide system :

	1985			Total 1985	Expansion	Total year 2000
	Voice	Digital	Peak load reserve			
NAT/CAR	54	30	20	104	71	175
PAC	38	14	14	66	45	111
SEA/MID	36	10	12	58	39	97
AFI/SAM	53	9	14	76	53	129
Total	181	63	60	304	208	512

Thus, based upon the above assumptions, the total number of channels which may be required for the future international aeronautical mobile (R) service is : 304 for the year 1985
512 for the year 2000.

An aeronautical channel must have allowances for Doppler shift in addition to the usual provisions for oscillator drift and filter shape inherent in other communication services. Furthermore, allowances must be made at the band edges to provide mutual protection between adjacent channels. Additionally, the aeronautical community must have a satellite communication link at least equal to the present terrestrial system in transmission quality. On this basis, a channel width of at least 50 kHz is assumed.

Air traffic control radiodetermination function

A satellite system of radiodetermination using ranging techniques should be accommodated within this band. The C.C.I.R. S.J.M. has concluded that a total of 2 MHz (1 MHz at each end of the band) should be able to take care of experimentation and the eventual implementation of either a range or range-rate system.

Bandwidth required for the space function

In order to accommodate the 304 communications channels (50 kHz) for the year 1985 world-wide implementation, 15.2 MHz is required in each direction. The radiodetermination function requires an additional 1 MHz, totalling 16.2 MHz in each direction.

For the expansion to the year 2000, 512 communications channels are needed. These would require 25.6 MHz in each direction; when the radiodetermination requirement is added, a total of 26.6 MHz are needed in each direction.

It should be noted that the air traffic estimate on which the requirements are based include only commercial airline traffic (not general aviation, company and executive aircraft). Also, historically air traffic projections have been vastly under-estimated. It is also probable that the air traffic projections for the years 1985, 1990 and 2000 will fall below the actual traffic that will be encountered for those years. Thus, the traffic projections as well as the channel requirements are a very conservative estimate.

Possible requirements for satellite operations in this band for the two continental European (EUM) and North American (NAM) I.C.A.O. regions have not been considered, since there is no immediate need to supplement the existing terrestrial system by satellite techniques. However, the possibility for such a need arising cannot be ignored.

This study has not considered communication channels which may be required to accommodate a future passenger communication service.

Appendices : 3

Appendix I

Projected peak hourly airborne traffic in the major world ocean areas

Table 1

Projected peak hourly airborne - Atlantic

Route (see Figure 1)	1985	1990	2000
1	18	22	30
2	278	338	463
3	6	7	10
4	12	14	19
5	59	72	99
6	18	22	30
7	6	7	10
8	36	44	60
9	95	117	148
10	65	80	108
Total (95% all traffic in region shown)	592	729	986

Table 2

Pacific

Route (see Figure 3)	1985	1990	2000
1	113	138	188
2	11	14	19
3	4	5	7
4	8	11	16
5	18	22	30
6	4	5	7
7	33	39	56
8	4	5	7
9	11	14	19
10	6	8	12
Total (95% of all traffic in region shown)	225	275	375

Table 3

Indian Ocean

Year	Number
1985	110
1990	135
2000	185

Appendix II

ATC requirements

The following ATC channel requirements are based on the assumption that the peak hourly traffic is evenly distributed throughout the area and that ATC centres will require additional channels in the ratio of 30 aircraft per voice channel and 100 aircraft per digital channel or fraction thereof except in higher density air traffic areas where 40 A/C per digital channel is assumed.

NAT/CAR

ATC centre	Route Nos.	Traffic count		Year 1985			Total 1985	Additional for year 2000 expansion	Total year 2000
		1985	2000	Voice	Digital	PLR*)			
GANDER	1 & 2	148	247	5	3	2	10	7	17
NEW YORK	5,8,9,10	128	208	4	3	2	9	6	15
MIAMI				1	1	1	3	2	5
SAN JUAN	6,9,10	89	143	3	1	1	5	4	9
SHANWICK	2	139	232	4	2	1	7	5	12
SANTA MARIA				1	1	0	2	2	4
REYKJAVIK				1	1	0	2	1	3
OTHER CENTRES				15	3	5	19	13	32
	Total			34	15	11	60	40	100

*) Peak load reserve

PAC

ATC centre	Route Nos.	Traffic count		Year 1985			Total 1985	Additional for year 2000 expansion	Total year 2000
		1985	2000	Voice	Digital	PLR*)			
OAKLAND	1,2	62	104	2	1	1	4	3	7
HONOLULU	1,5,6,10	71	119	3	1	1	5	4	9
ANCHORAGE				1	0	0	1	0	1
GUAM				1	0	0	1	0	1
TOKYO	2,3,5,7	33	56	2	1	1	4	3	7
HONG KONG	7,8	19	32	1	1	1	3	2	5
MANILA				1	0	0	1	0	1
SYDNEY				1	0	1	2	1	3
OTHER CENTRES				18	4	5	27	19	46
	Total			30	8	10	48	32	80

SEA/MID

ATC centre	Year 1985			Total 1985	Additional for year 2000 expansion	Total year 2000
	Voice	Digital	PLR*)			
CAIRO	2	1	1	4	3	7
SINGAPORE	2	0	1	3	2	5
BOMBAY	2	1	1	4	3	7
BANGKOK	1	0	0	1	0	1
KARACHI	2	0	1	3	3	6
TEHRAN	2	1	1	4	3	7
BEIRUT	1	0	0	1	0	1
BAGHDAD	1	0	0	1	1	2
OTHER CENTRES	19	4	5	28	18	46
Total	32	7	10	49	33	82

*) Peak load reserve

AFI/SAM

ATC centre	Year 1985			Total 1985	Additional for year 2000 expansion	Total year 2000
	Voice	Digital	PLR*)			
LIMA	1	1	1	3	2	5
MONTEVIDEO	1	0	0	1	1	2
SANTIAGO	1	0	0	1	1	2
SAO PAULO	1	0	0	1	1	2
EZEIZA	1	0	0	1	0	1
CASA BLANCA	1	0	0	1	1	2
TUNIS	1	0	0	1	1	2
CAPETOWN	1	0	0	1	0	1
RIO DE JANEIRO	2	0	1	3	2	5
OTHER CENTRES	39	5	10	54	38	92
Total	49	6	12	67	47	114

*) Peak load reserve

Appendix III

Operational control requirements

Based on the projected traffic estimates and recognizing that operation control traffic is not directly related to ACC's, but to peak traffic volume over oceanic areas, the following channel requirements have been developed based on 40 aircraft per digital channel and 30 aircraft per voice channel.

	1985					
	Voice	Digital	Peak load reserve (25%)	Total 1985	Add. for yr. 2000 expan.	Total year 2000
NAT/CAR	20	15	9	44	31	75
PAC	8	6	4	18	13	31
SEA/MID	4	3	2	9	6	15
AFI/SAM	4	3	2	9	6	15
Total	36	27	17	80	56	136

SPACE CONFERENCE

1971

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

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PLENARY MEETING

UNITED STATES OF AMERICA

INFORMATION DOCUMENT

ARTIFICIAL SITE SHIELDING

Introduction

The purpose of this paper is to review and summarize various aspects of artificial site shielding which may be pertinent to satellite system planning. The possibility of artificially shielding an electronic facility from potential interferers (or from interfering with others) has been recognized for a long time. This paper will consider primarily the more recent information and that information applicable to earth stations in a satellite communications system operating at frequencies between 2-20 GHz.*)

General Considerations

It is well known that natural obstacles, such as mountains, between a transmitting and receiving facility, attenuate the radio frequency transmission. Assuming the receiving facility does not wish to receive such a transmission (i.e., the particular transmission would be interfering with another desired transmission at the same radio frequency), this attenuation is considered as an isolation or shielding value.

Natural obstacles are the primary method currently used to shield communications-satellite earth stations operating in the 4/6 GHz bands from radio relay transmitters and receivers sharing these bands. Such earth stations, characteristically, have large (30 metre) diameter antennae and operate with geostationary satellites.

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*) Below this range, propagation effects such as ducting may have to be considered; above this range, techniques beyond those considered herein may be applicable.

It is fundamental to recognize that shielding, whether accomplished by natural or artificial obstacles, places an elevation angle restraint on the shielding facility. In the limit, no shielding is possible at 0° elevation angle and, as described subsequently, its usefulness at low (below 5°) elevation angles is questionable.

Artificial site shielding

Early*) investigations [1][2] of the use of artificial site shielding for earth stations in a communications-satellite system established the general feasibility of this technique and the loss of shielding advantage as the elevation angle becomes less than 15°. This latter point is also shown by a recent analysis [3] and artificial shielding below an earth station elevation angle of 5° may not be effective.

Interest in the use of artificial site shielding increased in the late 1960's due to the combination of the following reasons :

1. The development in communications-satellite systems, particularly regional/domestic ones, of satellites which permit the use of smaller (10m) diameter earth station antennae. It appears economically unattractive to shield artificially much larger diameter antennae due to the physical problems involved.

2. The possibility in regional/domestic communications-satellite systems for use of a restricted portion of the orbital arc such that all (or most) of the earth stations would have high (e.g., greater than 15°) elevation angles. [4]

3. The need in a regional/domestic communications-satellite system to employ numerous earth stations over a defined area and to locate these earth stations close to the points of service (e.g., medium size communities). Since the points of service often have co-located potentially interfering radio relay facilities and since many areas of the world have flat terrain (consequently affording no natural site shielding possibilities), it would be necessary in many cases to situate the earth station relatively far from the point of service unless artificial site shielding could be employed. This could have severe economic consequences.**)

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*) 1961-1963

**) If an earth station of the type envisioned for domestic service [4] were located over 60 km from the point of service, it would appear that the cost of interconnection would exceed the cost of the earth station.

Site shielding demonstrations

The technique and magnitude of site shielding has been analytically and experimentally demonstrated by Lucia /5//6//7/ during the 1969-1970 period. The technique involved the design of a pit for a 10 metre diameter antenna which :

1. maximized shielding at all horizon angles of arrival;

2. minimized the amount of excavation required;

3. allowed the antenna boresite to be moved over the visible synchronous orbit arc as low as an earth station elevation angle of 20°.

Measurements over the 4 and 6 GHz bands, over a one year period and over the synchronous arc down to 20° earth station elevation angle have been made and correlated with an analytical model. The results show that such a pit provides a minimum shielding advantage of 25 db. Ancillary data on construction, cost, lip sensitivity, etc., were also obtained.

Use of artificial site shielding

Artificial site shielding would not normally be used when natural site shielding is available, since the cost of the shielding must be considered.*) To obtain an estimate of the applicability of artificial site shielding, an interference coordination analysis with 4/6 GHz radio relay facilities was made for the 118 largest cities in the contiguous 48-United States. The analysis showed that earth stations located near approximately one-third of these cities**) would require artificial site shielding if the average interconnection distance desired between the earth station and point of service in the city was to be 20 km or less.

Alternate designs of pits appear possible to cope with extreme ranges of soil conditions (e.g., stone to sand) and with severe environments (e.g., heavy snow). It is also possible to use shielding fences to replace a portion (or portions) of the pit or, in the extreme, the whole pit. The latter possibility does not look economically attractive in general due to the physical dimensions involved. /5/ As mentioned in the introduction, the technique and results are believed applicable over at least the 2-20 GHz bands.

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*) The minimum cost for favourable United States locations has been estimated at $5,000.

**) Mainly in the southern and central areas which have flat terrain.

Future possibilities

It appears that future work may improve the amount of isolation which could be provided by artificial site shielding, at least for elevation angles greater than 15°. These improvements fall into two categories.

The first category is a potential gain in isolation of from 5-10 db by use of a different frontal pit lip. A double ridged pit lip or slotted diffraction fences (or combinations thereof) appear promising. The second category is the use of a short section of fence in front of the pit lip at the azimuths of a particular interfering path. This possibility results from the previously mentioned interference coordination analysis where it was noted that the final earth station siting was generally constrained by one radio relay interfering path. In such cases, a section of fence centered at those azimuths may provide an additional 5-10 db isolation with minimum increase of site shielding cost.

It is also noted that diffraction fences and other types of microwave "spoilers" can be implemented more easily as the wavelength is decreased.

Conclusions

The use of artificial site shielding is feasible for communications-satellite systems employing earth stations having antennae of approximately 10 metres diameter or less and operating at elevation angles of 15° or greater. Under such conditions with synchronous satellites, earth station isolation by pit shielding of at least 25 db has been demonstrated at both 4 and 6 GHz.*) It appears that such isolation can be achieved in at least the 2-20 GHz frequency range and might be improved 5-10 db by further development.

Isolations of 25 db by artificial site shielding generally allow the siting of small diameter antenna earth stations much closer to the points of service. For cases where equivalent natural shielding is unavailable, this technique reduces the cost of interconnection between the earth station and points of service, but increases the cost of the earth station by the amount of expenditure for the artificial shielding.

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*) This is the difference in decibels between the actual antenna pattern envelope when located outside the pit and when located inside the pit. The equivalent to this isolation in terms of distance between the earth station and a radio relay interferer is a factor of 18 (i.e., one-eighteenth of the distance).

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1. LUTZ, S.G., and WILLIAMS, D.D. — "Pit Protection of Satellite Communication Terminal Antennas From Surface Radio Interference", Report SRS-420, Hughes, Aircraft Company, Culver City, California (February 1, 1961).

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PLENARY MEETING

UNITED STATES OF AMERICA

INFORMATION DOCUMENT

SIGNAL LEVELS IN THE REAR SECTION OF AN OPERATIONAL EARTH STATION ANTENNA

SIGNAL LEVELS IN THE REAR SECTOR OF AN OPERATIONAL EARTH STATION ANTENNA

Introduction

Signal levels have been measured in the rear sector of an operational earth station antenna of large $D/\lambda \approx 600$ and the results are described in this paper.

Procedure

An e.i.r.p. of +85 dBW was transmitted by the earth station at 6110 MHz without modulation. Measurements were made in the rear sector of the antenna at ground level at a number of locations. These locations were limited by site configuration and antenna operating angles. During the measurements, the receiving antenna was moved at each specific location to obtain the maximum power signal in the vicinity.

Instrumentation

Figure 1 is a general block diagram of the measurement set-up. Basically, a standard gain horn and a narrow bandwidth receiver were used with an approximate tangential sensitivity of -90 dBm. The instrumentation is considered conventional.

Observations

The measured signal level was very sensitive to placement of the receiving antenna. Slight changes in location could result in a 5-20 dB level change as expected from measured far field patterns. Several measurements were made in each location to insure repeatability once the maximum had been found. Changes in polarization for the receiving antenna made little difference in received level. The polarization was changed a number of times and in no case was a difference greater than 1 dB noted.

Results

Figure 2 indicates the region of measurement. The figure shows a cone whose surface intersects the circumference of both the antenna subreflector and main reflector. The vertex of the cone lies on the boresite axis. Measurements were made within the frustrum formed by the intersection of the main reflector and the cone. The subreflector is not visible from within the frustrum. The angle α in Figure 2 is the off-boresite axis angle. Figure 3 shows a plan view of measurement locations. Figure 4 indicates the range of measured values taken on an arc 100 feet behind the antenna. Figure 5 relates the measured values to the off-boresite axis angle α.

Conclusions

1. Polarization is not an important factor since readings taken at different polarizations appeared to have the same approximate maximum.

2. Gains measured behind the antenna were typically 20 to 30 dB below the isotropic level.

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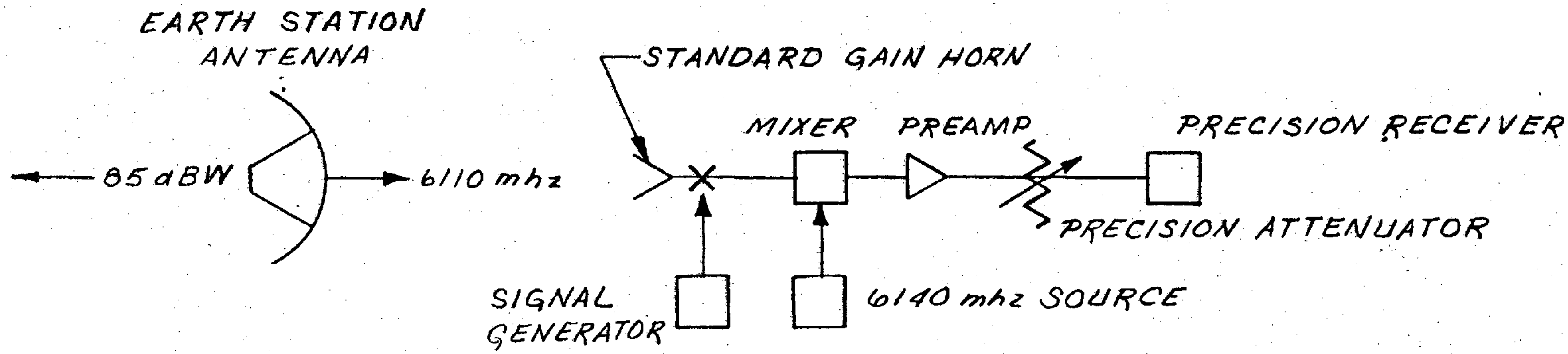

BLOCK DIAGRAM OF MEASUREMENT SET UP

FIGURE 1

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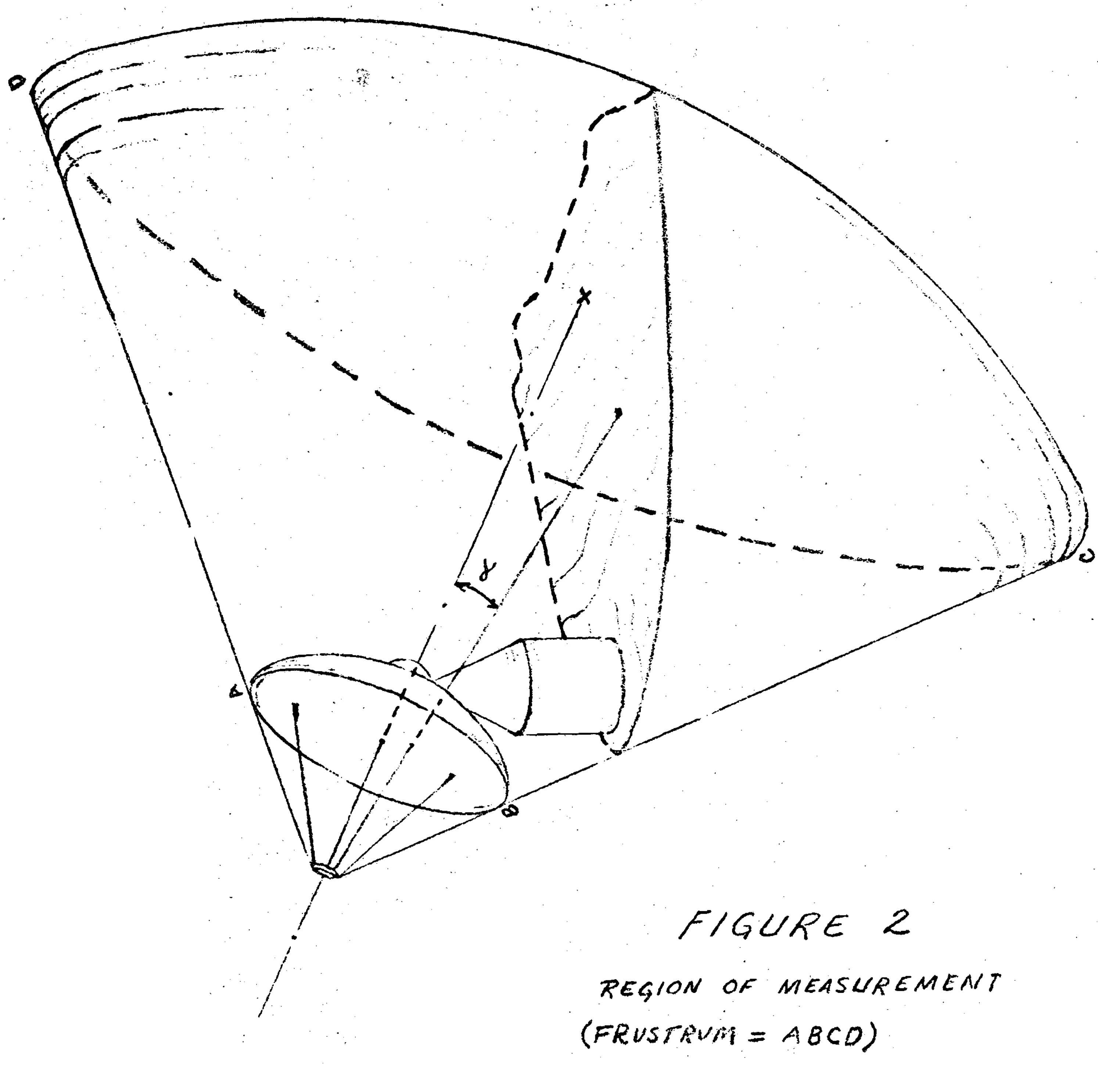

FIGURE 2

REGION OF MEASUREMENT
(FRUSTRUM = ABCD)

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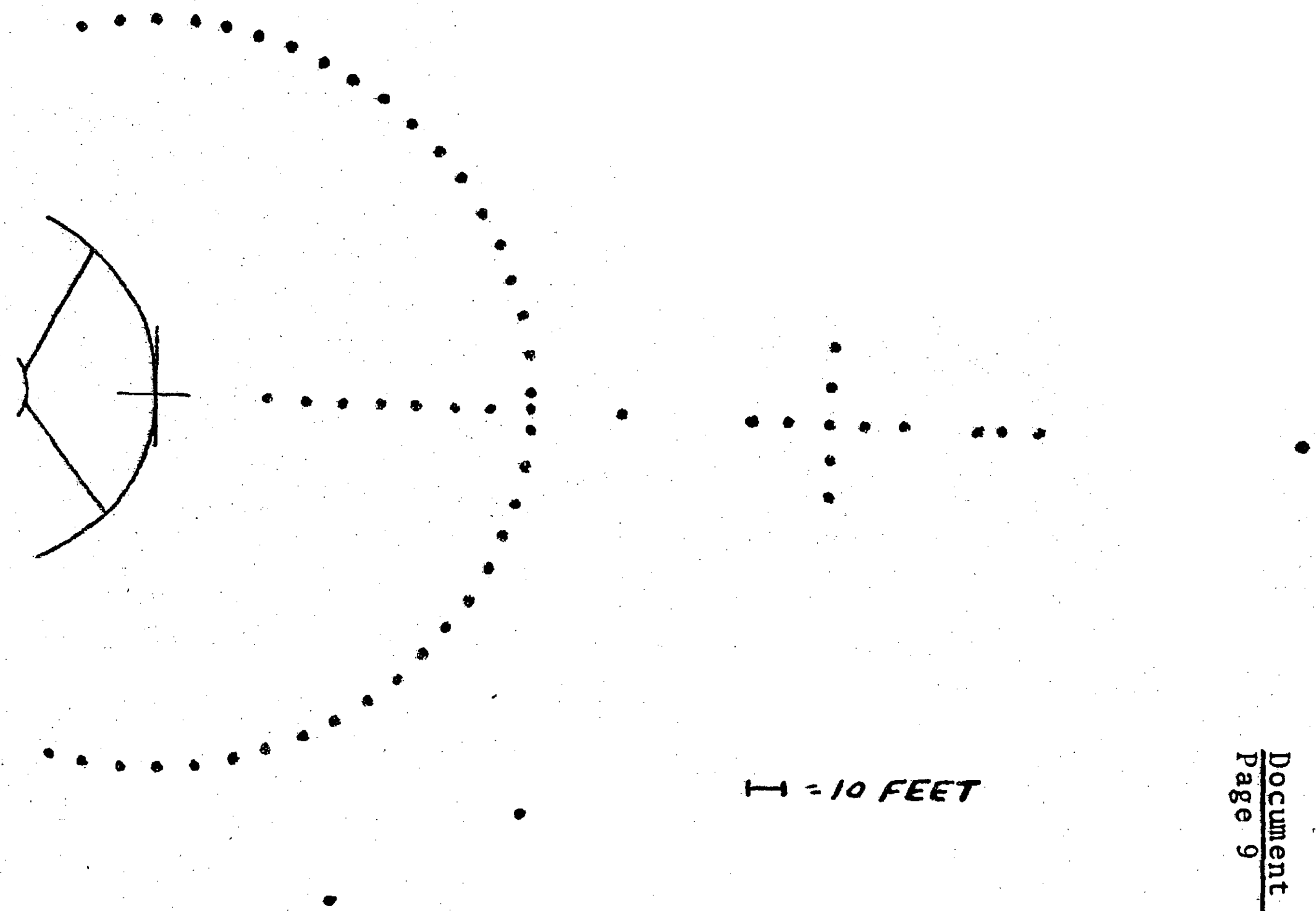

LOCATION OF MEASUREMENT POINTS
FIGURE 3

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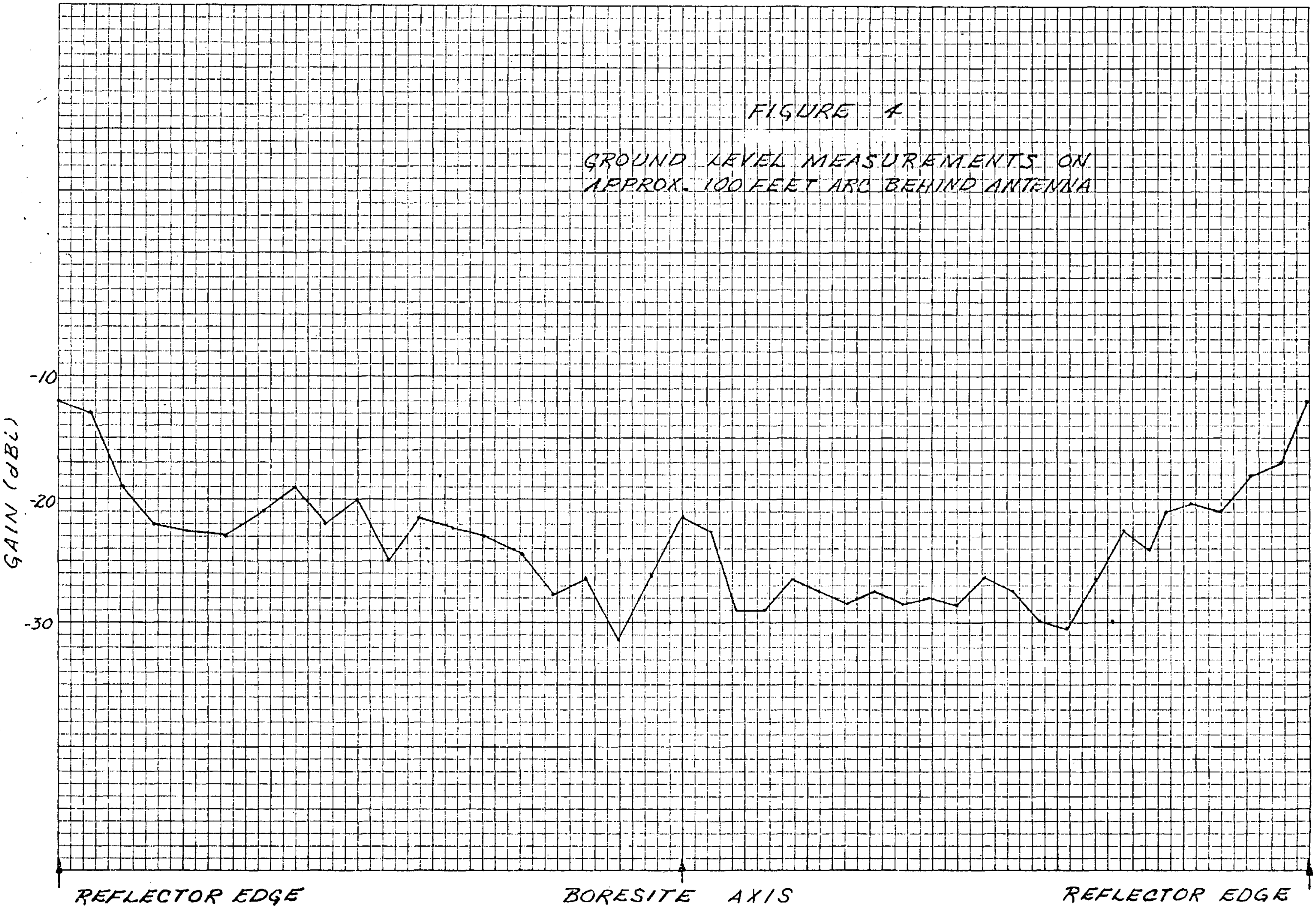
FIGURE 4
GROUND LEVEL MEASUREMENTS ON
APPROX. 100 FEET ARC BEHIND ANTENNA
-10
-20
-30
GAIN (dBi)
REFLECTOR EDGE
BORESITE AXIS
REFLECTOR EDGE

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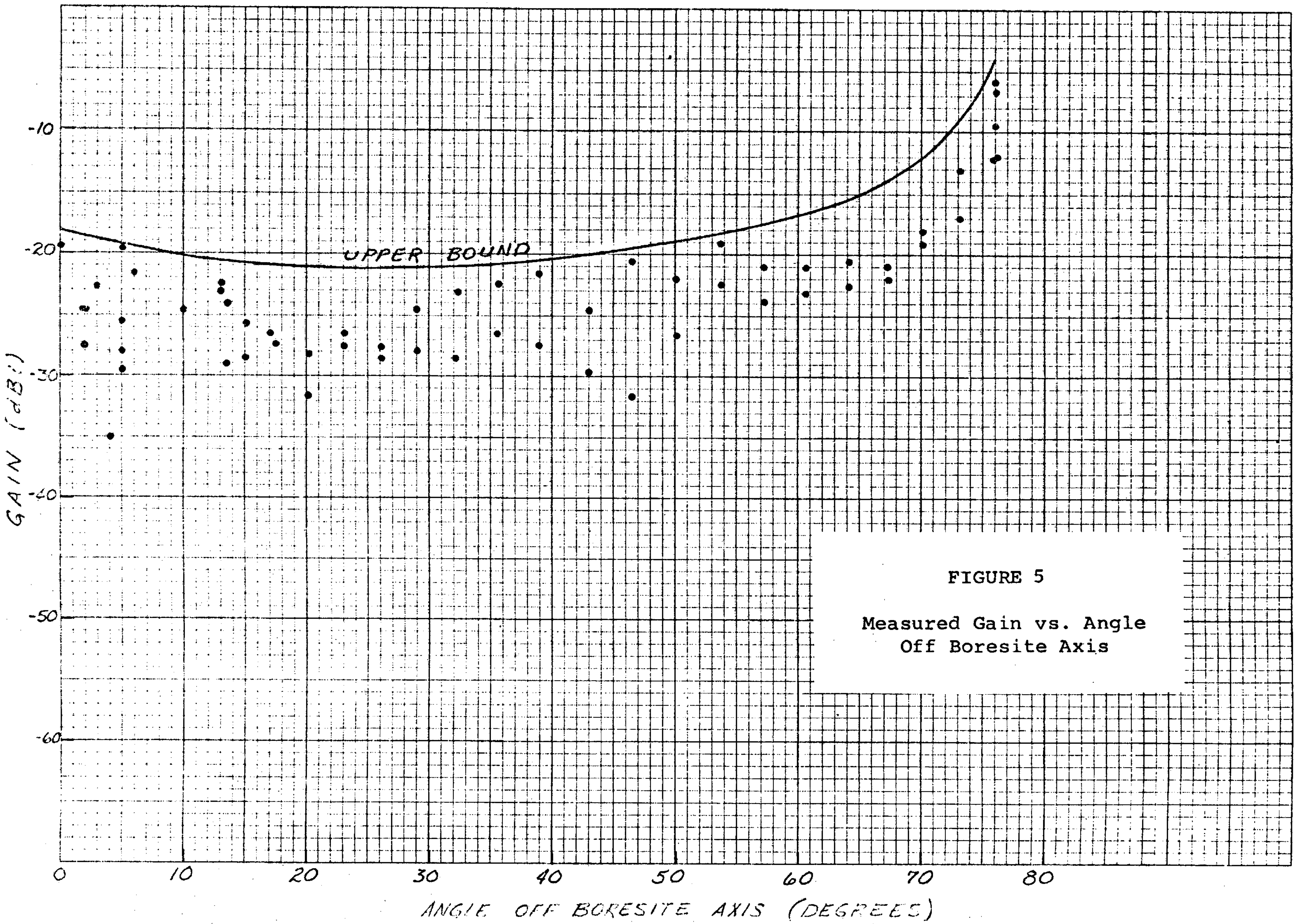

FIGURE 5

Measured Gain vs. Angle Off Boresite Axis

SPACE
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PLENARY MEETING

MEXICO*)

AMATEUR SERVICE

Ref.

MEX/104/40 1. Since the first Space Conference (Geneva, 1963), amateurs have been showing interest in the use of space techniques in the frequency bands allocated to that service. Although that Conference acknowledged the valuable service rendered by amateurs, particularly in contributing to the advancement of radio techniques in the help they give in emergencies, the only provision made was in a footnote to the effect that artificial satellites may be used in the 144 to 146 Mc/s band allocated exclusively to the amateur service on a world-wide basis.

2. Their interest in space techniques has been increasing and the following two facts have encouraged the amateurs to press their claim:

a) The availability of more reliable telecommand equipment.

b) The successful use of satellites by amateurs, especially Oscar V, launched in January 1970.

3. Having examined the situation, we consider that space techniques might be used in this service if, in the Table of Frequency Allocations, specific bands were allocated exclusively to that service on a world-wide basis. With respect to the amateurs' wish that no limit be placed on the transmission power of amateurs' satellites, the Conference should use the utmost caution and in reaching its decisions it should consider whether control devices could be used effectively to eliminate the harmful interference that may be caused by the operation of a satellite in this service.

*) Other proposals are contained in Documents Nos. 77 and 78.

Ref.

MEX/104/40 (cont.) 4. The Mexican Administration has also considered the matter of the control of satellites in the amateur service, which in our opinion should not be carried out by a national Administration or organization but by some international body composed of amateurs who are nationals of the countries (i.e. administrations) concerned, who should have equal rights regardless of the number of amateurs nationals of a country (Administration) represented in that international organization.

5. To sum up, this Administration considers that the use of space techniques by the amateur service should be based on the following principles:

a) Use of exclusive bands allocated throughout the world and situated in regions of the spectrum in which useful information could be obtained for the study of space radio propagation.

b) Free access on a non-discriminatory basis, in accordance with the principles of international law and the terms of the Treaty on principles governing the activities of States in the exploration and use of outer space, including the moon and other celestial bodies.

c) Availability of means for the effective control of emissions in order to put an end promptly to harmful interference, this control to be carried out by international agreement.

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PLENARY MEETING

MEXICO

SURVEY OF EARTH RESOURCES

Ref.

MEX/105/41 1. For many years now, great concern has been felt with the increasing difficulty of feeding mankind, owing to the steady growth in population and because it is felt that the natural resources at present being exploited will soon be inadequate to meet needs unless steps are taken to boost food production or restrain the rate of population increase, or at least keep the latter down to a level consistent with the obtainable increase in food production.

2. Many countries and international organizations, it is true, have advocated birth control to prevent the food problem from reaching catastrophic proportions but it is considered that mankind should find the resources to secure an adequate food supply, since even in present conditions the food scarcity is particularly severe in certain parts of the world. Better knowledge and management of the earth's resources would help considerably in attaining this end.

3. This problem is already under study by the United Nations but it should also be mentioned that, at the XXIst Congress of the International Astronautical Federation held at Constance, Germany, in October 1970, specific proposals were made for the establishment of satellite-borne laboratories for surveying and managing the earth's resources; it was also proposed that these laboratories be placed under United Nations control. This project aroused great interest, especially among the representatives of the space communication powers, and definite reference was made to the need to set up a United Nations agency for the survey of the earth's resources.

Ref.

MEX/105/41 (cont.) 4. Since a project of the type mentioned in the foregoing paragraph will depend to a large extent on the radiocommunication facilities at its command, the World Administrative Radio Conference for Space Telecommunications (WARCST) will have to provide suitable frequency bands for the surveying of the earth's resources. The Mexican Administration has accordingly introduced the definition of an "Earth resource survey service" in its proposals to the WARCST and intends to press for the allocation of frequency bands specifically for this service.

5. In view of the aims of these surveying activities, the I.T.U. will have to adopt or recommend measures which will offer all countries an opportunity of making a contribution to these projects, in the form of equipment, experiments, funds or staff, and which will ensure that the results of the surveys will be made available to interested countries without any discrimination whatever.

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 106-E
5 June 1971
Original : Spanish

PLENARY MEETING

MEXICO

SATELLITE BROADCASTING

Ref.

MEX/106/42 1. The development of space techniques is bringing us closer to a time when the use of satellites for broadcasting will be an accomplished fact. The Mexican Administration has long shown an interest in the development of this system (cf. article on "SARIT - Artificial satellite of the Inter-American telecommunication network" published in issue No. 14 of the journal "Comunicaciones y Transportes", Mexico, September-October, 1961). Owing to the complexity of the technical, political, economic and other problems involved in the establishment and operation of a service of this kind, the United Nations is engaged in a study of the matter through its Committee on the Peaceful Uses of Outer Space.

2. At the meeting held in Geneva from 28 July to 7 August 1969 by the Working Group on Direct Broadcasting Satellites set up pursuant to General Assembly Resolution 2453 B (XXIII), were raised the most important questions to be faced as regards direct broadcasting from satellites and it was stressed that such means of communication should be used for the benefit of the whole of mankind, on the basis of international cooperation and in accordance with the principles of international law, the United Nations Charter and the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

At this meeting, Mexico submitted a document setting out, inter alia, the following principles, which still apply :

a) Direct broadcasting from satellites, its application to underdeveloped areas and its use for educational purposes are features meriting special attention;

Ref.

MEX/106/42 (cont.)

b) The WARCST should appoint a group which would try to find solutions to the following problems :

- Coverage zone of broadcasts;
- signal strength required at ground level;
- number of video and sound channels for satellite broadcasting;
- international control of satellites from the standpoint of both technical performance and nature of broadcasts;
- technical characteristics of earth stations;
- frequency range to be employed;
- programme for satellite use by countries or groups of countries.

It was also proposed that, should the WARCST fail to settle these matters, a special United Nations conference should be held at which agreement would be reached on global solutions, both technical and political, which would establish the basis for using direct broadcasting.

Attention was also drawn to the advisability of directing initial efforts towards a "semi-direct broadcasting" stage that would be intermediate between present systems and direct broadcasting, in which receiving points and low-cost facilities would be selected to serve as distributing centres for signals from satellites.

3. A large part of the plans suggested by Mexico at this meeting (Geneva, 1969), still hold good. However, we have been able to reflect in the meantime on the procedures which the I.T.U. might adopt to ensure that its decisions will facilitate the development of satellite broadcasting without giving rise to any legal or other problems, either domestic or international.

Ref.

MEX/106/42 (cont.) To this end, the Mexican Administration has proposed to the WARCST that the "satellite broadcasting service" should be defined on the basis of the term given in No. 28 of the Radio Regulations, and that reference should be made to the use of space techniques. While this would rule out the possibility of using "semi-direct broadcasting" in the intermediate stage mentioned in the preceding paragraph; such a formulation would maintain the traditional concept of a broadcasting service.

Collective or community reception could be permitted by the addition of a footnote stating that, in the satellite broadcasting service bands, the links between the satellites and the distribution centres may be used during the intermediate stage by prior agreement between the administrations concerned. The detailed conditions and relevant requirements can be discussed by the WARCST.

4. Our Administration considers, moreover, that in view of the wide coverage of such broadcasts and their power of penetration, broadcasting from satellites should be regulated in accordance with the principles of international law and the decisions of the United Nations Conference on the Peaceful Exploration and Use of Outer Space. From the technical standpoint, this Conference should come to a decision concerning the use of exclusive bands on the basis of world-wide allocation and free access, without discrimination, to the available frequencies and satellite positions.

SPACE CONFERENCE

1971

Document No. 107-E(Rev.)
7 June 1971
Original: Russian

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

Note by the Secretariat

PROGRAMME OF WORK FOR THE CONFERENCE AS RECOMMENDED BY THE MEETING OF HEADS OF DELEGATIONS

7 - 11 June	Plenary meetings, meetings of Committees 2, 4, 5 and 6 to enable them to organize their work and meetings of working groups.
14 - 18 June	A meeting of Committee 3 Meetings of Committees 2, 4, 5 and 6 and their working groups.
21 - 25 June	A plenary Meeting to examine progress Meetings of Committee 4 as required Meetings of Working Groups of Committees 5 and 6 Final meeting of Committee 2
28 June - 2 July	Meetings of Committee 4 as required Meetings of Working Groups of Committees 5 and 6
5 - 9 July	Final meetings of Committees 3, 4, 5 and 6 Plenary meetings as required, to examine "blue" and "pink" texts
12 - 16 July	Plenary meetings

The Meeting of Heads of Delegations also recommended that Committee 1 meet at an appropriate time each Thursday afternoon for an exchange of views on progress and to establish the programme for the following week.

It is understood that Committee 7 will start meeting as soon as texts become available from Committees 4, 5 and 6.

E Doc. 107

SPACE
CONFERENCE

H/D-1 (Rev)

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Original: English

AGENDA

MEETING OF HEADS OF DELEGATIONS

Monday, 7 June 1971, at 0930 hrs, in Room B

		Document No.
1.	Proposals for Chairman and Vice-Chairmen of the the Conference	–
2.	Committee structure and organization of the work of the Conference	65, DT/3
3.	Proposals for Chairmen and Vice-Chairmen of Committees	–
4.	Constitution of the Conference Secretariat	–
5.	Admission of international organizations	93
6.	Date by which the Credentials Committee must reach its conclusions	–
7.	Working hours of the Conference	–
8.	Programme of meetings for the period 8 – 10 June	–
9.	Draft Agenda for the 1st Plenary Meeting	DT/4
10.	Miscellaneous	

SPACE CONFERENCE

1971

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 107-E
7 June 1971
Original : English

PLENARY MEETING

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SPACE CONFERENCE

Document No. 108-E
7 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

UNITED KINGDOM

PROPOSALS FOR FREQUENCY ALLOCATIONS TO THE MARITIME MOBILE SERVICE USING SPACE COMMUNICATION TECHNIQUES AT FREQUENCIES OF THE ORDER OF 450-600 MHz

Proposed changes to Article 5

Ref.

MHz

Region 1	Region 2	Region 3
460-470		
	FIXED MOBILE Meteorological-satellite 318A 318B 318C	

G/108/321 ADD 318B — From 1 January 1975 the band 464-464.25 MHz is allocated on a primary basis to the maritime mobile service for the use of space techniques in the space-to-earth direction. From that date the allocations to the fixed service and to other mobile services in this band will be on a secondary basis.

G/108/322 ADD 318C — The band 468-470 MHz is also allocated to the maritime mobile service for the use of space techniques in the space-to-earth direction on a secondary basis.

Ref.

MHz

<table>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td>470-582

BROADCASTING</td><td rowspan="5">470-890

BROADCASTING

332 <u>326A</u></td><td rowspan="2">470-585

BROADCASTING

335</td></tr>
<tr><td rowspan="2">582-606

BROADCASTING
RADIONAVIGATION

325 326 327
328 329</td></tr>
<tr><td>585-610

RADIONAVIGATION

336 337 <u>326A</u></td></tr>
<tr><td>606-790

BROADCASTING

326 329 330
330A 331 332
<u>326A</u></td><td rowspan="2">610-890

FIXED
MOBILE
BROADCASTING

332 338 339
<u>326A</u></td></tr>
<tr><td>790-890

FIXED
BROADCASTING

329 331 333
334</td></tr>
</table>

G/108/323 ADD 326A

From 1 January 1975 the bands 607-607.25 MHz and 611-613 MHz are also allocated to the maritime mobile service for the use of space techniques in the earth-to-space direction. From that date the allocation to the broadcasting service in the band 606-614 MHz will be on a secondary basis.

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 109-E(Rev.)
8 June 1971
Original : French

PLENARY MEETING

Memorandum by the Secretary-General

ASSIGNMENT OF PROPOSALS

At the request of the Steering Committee, I have the honour to submit to the Conference the proposed plan for the assignment of proposals to the various Committees which is annexed hereto.

Mohamed MILI
Secretary-General

Annex : 1

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PAGE LAISSEE EN BLANC INTENTIONNELLEMENT

SUGGESTION DE REPARTITION ENTRE LES COMMISSIONS 4, 5 ET 6 DES DISPOSITIONS DU REGLEMENT DES RADIOCOMMUNICATIONS (ARTICLES ET APPENDICES) ET DES RESOLUTIONS ET RECOMMANDATIONS A L'EGARD DESQUELLES LES PROPOSITIONS ONT ETE PUBLIEES JUSQU'AU DOCUMENT N° 99 INCLUS

SUGGESTED DISTRIBUTION AMONG COMMITTEES 4, 5 AND 6 OF THE RADIO REGULATIONS (ARTICLES, APPENDICES, RESOLUTIONS AND RECOMMENDATIONS) FOR WHICH PROPOSALS HAVE BEEN PUBLISHED UP TO DOCUMENT N° 99

SUGESTIÓN DE DESTRIBUCIÓN DEL REGLAMENTO DE RADIOCOMUNICACIONES (ARTÍCULOS, APÉNDICES, RESOLUCIONES Y RECOMENDACIONES) ENTRE LAS COMISIONES 4, 5 Y 6, PARA EL QUE SE HAN PUBLICADO PROPOSICIONES HASTA EL DOCUMENTO N.° 99 INCLUSIVE

Art.	Comm. 4	5	6
1	x	x	x
2	x		
3		x	
4		x	
5 (+RR640)		x	
6		x	
7	x		
8			x
9			x
9A			x
14			x
15			x
20			x
41	x		
App.			
1	x		x
1A	x		x
ADD 1B	x		x
3	x		
4	x		
5	x		
ADD 28	x		
ADD 29	x		

Res.	Comm. 4	5	6
Spa 1			x
Spa 3	x		
Mar 14		x	
Rec.			
16	x		
Spa 1	x		
Spa 3	x		
Spa 4	x		
Spa 5	x		
Spa 6	x		
Spa 7		x	

Répartition préliminaire - Preliminary distribution -
Distribución preliminar

Art. 1 : Section I/Sección I, IIB, III - COM 4

Section II/Sección II, IIA - COM 5

Section III/Sección III - COM 6

(Après examen par la COM 4/Secondary after examination by COM 4/ previo examen por la COM 4)

Les mesures nécessaires de coordination incomberont aux Présidents

Necessary coordination will be made among the Chairmen

Los Presidentes se encargarán de la coordinación necesaria

App. 1, 1A, 1B - à examiner en premier lieu par la COM 6, ensuite par la COM 4/COM 6 to see first and later by COM 4/primer examen por la COM 6, y lueg por la COM 4.

PROP. N°	4	5	6	OBSERVATIONS REMARKS OBSERVACIONES
DNK/3/1		x		
D /4/1-35	x			
D /5/36		x		D/5/36-39
D /5/37	x			
D /5/38-97		x		+ CORR + CORR 2
Doc 6 P1				Doc 6 P1
S /7/1-21		x		COR
NOR/8/1-18		x		
AUS/9/1	x			
AUS/10/2-57) AUS/10/4A-4B)		x		+ CORR + CORR 2
AUS/11/58	x			
CAN/12/1-11	x	x	x	REV
CAN/13/12-22	x			REV.
CAN/14/23-100		x		CAN/14/77-79 REV CORR
CAN/15/101-124	x			REV
CAN/16/125-130			x	REV
CAN/17/131-165			x	REV
CAN/18/166			x	REV
CAN/19/167			x	REV
CAN/20/168	x		x	REV
ARG/21/1-6	x			
ARG/22/7-51		x		+ CORR = SUP ARG/22/39-46
ARG/23/52-55	x			
ARG/24/53A-54A			x	COR
ARG/25/55A-56	x			N° 55 ditto CORR
ARG/26/57-58			x	
ARG/27/59-60	x			N° 422
USA/28 Pt. I-V	x	x	x	

PROP. N°	4	5	6	OBSERVATIONS REMARKS OBSERVACIONES
USA/28/1-7	x			
USA/28/8-126		x		
USA/28/127-154	x			
USA/28/155-244			x	
USA/28/245			x	
USA/28/246-252	x		x	
USA/28/253-263	x			
USA/28/264		x		
USA/28/265			x	
USA/28/266-267	x			
USA/28/268		x		
J/29/1-3A	x			
J/30/4-24		x		CORR
J/31/25-43	x			CORR
J/32/44			x	
J/33/45-50			x	
J/34/51		x		
IND/35/1-7		x		+ CORR IND/35/7
IND/36/8			x	
IND/37/9	x	x		Para 4 Com 4
IND/38/10-27	x			
IND/39/28-34		x		COR
F/40/1-32	x			Rev F/83/263-277
F/41/33-140		x		Voir - See - Véase F/84/278-279
F/42/141		x		Voir - See - Véase F/85/280
F/43/142-176	x			COR
F/44/177-210			x	Voir - See - Véase F/87/314-315
F/45/211-259			x	

PROP. N°	4	5	6	OBSERVATIONS REMARKS OBSERVACIONES
F/46/260			x	COR
F/47/261			x	
F/48/262			x	
HOL/49/1-79		x		
G/51/1-2		x		
G/51/3	x	x		
G/51/4-9		x		
G/51/10-13			x	
G/51/14-16	x			
G/52/17	x			G/55/162-164
G/53/18-25	x			
G/54/26-126		x		
G/55/127-164	x			Voir - See - Véase Doc G/52/17 re G/55/162-164 Voir - See - Véase G/81/227-273
G/56/165-214			x	(NOC = Props)
G/57/215		x		
Doc 58 PL				
URS/59/1-30		x		
AUS/60/59-72		x		
Doc. 61				Voir annexe ci-jointe - See annex hereto véase el anexo adjunto
NZL/62/1-66		x		
Doc. 63 Sweden		x		Voir - See - Véase G/54 F/41, USA/28, S/68
Doc. 64 CCIR	x			
Doc. 65 Comm.				
NZL/66/67-72		x		
AUS/67/73-80	x			
S/68/22-24		x		Art 5
Doc. 69 Brazil	x	x	x	
B/70/1-30	x			Art 1

PROP. N°	4	5	6	OBSERVATIONS REMARKS OBSERVACIONES
B/71/31-97		x		Art 5
B/72/98-129	x			Art 7
B/73/130			x	Art 8
B/74/131-132			x	Art 9
B/75/133-145			x	Art 9A
B/76/146			x	Art 14
MEX/77/1-38	x			Art 1
MEX/78/39	x			Art 2
G/79/216	x		x	
G/80/217-226	x		x	App 1A
G/81/227-273	x			Art 7
CHN/82/1-41	x			
F/83/263-277	x			Art 1; Voir - See - Véase F/40/1-32
F/84/278-279		x		Art 5; Voir - See - Véase F/41/33-140
F/85/280		x		Art 6; Voir - See - Véase F/42/141
F/86/281-313	x			Art 7
F/87/314-315			x	Art 9A
F/88/316-317	x			ADD AP.
F/89/318	x			
F/90/319			x	
Docs 91-94 SG				
G/95/274-320	x		x	Art 9A (319 et 320 form IV)
G/96/321	x			
J/97/52	x			Art 1 84AT (MOD)
J/98/53-91		x		Art 5
J/99/92-108	x			Art 7

PROP. N°	4	5	6	OBSERVATIONS REMARKS OBSERVACIONES
	x	x x	x	Art 5: Voir - See - Véase Props US/28/60-65:SUP USA/28/39+42+89+92 Voir - See - Véase USA/28/82-83:ADD new Props 10.7-11.7 Gc/s
	x			Art 7: Voir - See - Véase Props USA/28/127-154
			x	Art 9: ADD Props RR486.4 RR503A
			x	Art 9A: Voir - See - Véase USA/28/174,176,181,193,204,244,247, 252 etc.
USA Corrigendum Doc. 28	x			ADD APP28
	x		x	ADD APP 29
	x			ADD Res
	x			ADD Res
	x			ADD Res
	x			ADD Res
	x			ADD Res

Doc. No. 61 I.F.R.B.	4	5	6	OBSERVATIONS REMARKS OBSERVACIONES
Para				
1	x	x	x	Introduction-Introducción
2	x	x	x	
3.1	x			Observations-Comments-Observaciones Art 1
3.2	x			Observations-Comments-Observaciones Art 2
3.3		x		Observations-Comments-Observaciones Art 5
3.4.1	x		x	Observations-Comments-Observaciones Arts 7, 9 & 9A
3.4.2	x		x	
3.4.3	x		x	Observations-Comments-Observaciones
3.4.4			x	Observations-Comments-Observaciones
3.5	x			Observations-Comments-Observaciones Art 7
3.6			x	Observations-Comments-Observaciones Art 9
3.7			x	Observations-Comments-Observaciones Art 9A
3.8			x	Observations-Comments-Observaciones APP 1
3.9			x	Observations-Comments-Observaciones App 1A
3.10			x	Observations-Comments-Observaciones APP 10 Service Documents
3.11			x	Observations-Comments-Observaciones Res N° Spa 1
3.12		x		Observations-Comments-Observaciones Rec N° Spa 7
Annex 1		x		Voir - See - Véase (para 3.3.3)
Annex 2			x	Forms of Notice - Formulaire de Notification - Formulario de Notificación

PROP. N°	4	5	6	OBSERVATIONS REMARKS OBSERVACIONES

SPACE CONFERENCE

1971

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 109-E
7 June 1971
Original : French

PLENARY MEETING

Memorandum by the Secretary-General

ASSIGNMENT OF PROPOSALS

At the request of the Steering Committee, I have the honour to submit to the Conference the proposed plan for the assignment of proposals to the various Committees which is annexed hereto.

Mohamed MILI
Secretary-General

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SUGGESTED DISTRIBUTION AMONG COMMITTEES 4, 5 AND 6 OF THE RADIO REGULATIONS (ARTICLES, APPENDICES, RESOLUTIONS AND RECOMMENDATIONS) FOR WHICH PROPOSALS HAVE BEEN PUBLISHED UP TO DOCUMENT N° 67

SUGESTIÓN DE DESTRIBUCIÓN DEL REGLAMENTO DE RADIOCOMUNICACIONES (ARTÍCULOS, APÉNDICES, RESOLUCIONES Y RECOMENDACIONES) ENTRE LAS COMISIONES 4, 5 Y 6, PARA EL QUE SE HAN PUBLICADO PROPOSICIONES HASTA EL DOCUMENTO N.° 67 INCLUSIVE

Art.	Comm.		
	4	5	6
1	x		
2	x		
3		x	
4		x	
5 (+RR640)		x	
6		x	
7	x		
8			x
9			x
9A			x
14			x
15			x
20			x
41	x		
App.			
1	x		x
1A	x		x
ADD 1B	x		x
3	x		
4	x		
5	x		
ADD 28	x		
ADD 29	x		

Res.	Comm.		
	4	5	6
Spa 1			x
Spa 3	x		
Mar 14		x	
Rec.			
16	x		
Spa 1	x		
Spa 3	x		
Spa 4	x		
Spa 5	x		
Spa 6	x		
Spa 7		x	

PROP. N°	4	5	6	OBSERVATIONS REMARKS OBSERVACIONES
DNK/3/1		x		
D /4/1-35	x			
D /5/36		x		D/5/36-39
D /5/37	x			
D /5/38-97 Doc 6 P1		x		+ CORR + CORR 2 Doc 6 P1
S /7/1-21		x		COR
NOR/8/1-18		x		
AUS/9/1	x			
AUS/10/2-57) AUS/10/4A-4B)		x		+ CORR + CORR 2
AUS/11/58	x			
CAN/12/1-11	x	x	x	REV
CAN/13/12-22	x			REV
CAN/14/23-100		x		CAN/14/77-79 REV CORR
CAN/15/101-124	x			REV
CAN/16/125-130			x	REV
CAN/17/131-165			x	REV
CAN/18/166			x	REV
CAN/19/167			x	REV
CAN/20/168	x		x	REV
ARG/21/1-6	x			
ARG/22/7-51		x		+ CORR = SUP ARG/22/39-46
ARG/23/52-55	x			
ARG/24/53A-54A			x	COR
ARG/25/55A-56	x			N° 55 ditto CORR
ARG/26/57-58			x	
ARG/27/59-60	x			N° 422
USA/28 Pt I-V	x	x	x	

PROP. N°	4	5	6	OBSERVATIONS REMARKS OBSERVACIONES
USA/28/1-7	x			
USA/28/8-126		x		
USA/28/127-154	x			
USA/28/155-244			x	
USA/28/245			x	
USA/28/246-252	x		x	
USA/28/253-263	x			
USA/28/264		x		
USA/28/265			x	
USA/28/266-267	x			
USA/28/268		x		
J/29/1-3A	x			
J/30/4-24		x		CORR
J/31/25-43	x			CORR
J/32/44			x	
J/33/45-50			x	
J/34/51		x		
IND/35/1-7		x		+ CORR IND/35/7
IND/36/8			x	
IND/37/9	x	x		Para 4 Com 4
IND/38/10-27	x			
IND/39/28-34		x		COR
F/40/1-32	x			Rev F/83/263-277
F/41/33-140		x		Voir - See - Véase F/84/278-279
F/42/141		x		Voir - See - Véase F/85/280
F/43/142-176	x			COR
F/44/177-210			x	Voir - See - Véase F/87/314-315
F/45/211-259			x	

PROP. N°	4	5	6	OBSERVATIONS REMARKS OBSERVACIONES
F/46/260			x	COR
F/47/261			x	
F/48/262			x	
HOL/49/1-79		x		
G/51/1-2		x		
G/51/3	x	x		
G/51/4-9		x		
G/51/10-13			x	
G/51/14-16	x			
G/52/17	x			G/55/162-164
G/53/18-25	x			
G/54/26-126		x		
G/55/127-164	x			Voir - See - Véase Doc G/52/17 re G/55/162-164 Voir - See - Véase G/81/227-273
G/56/165-214			x	(NOC = Props)
G/57/215		x		
Doc 58 PL				
URS/59/1-30		x		
AUS/60/59-72		x		
Doc. 61				Voir annexe ci-jointe - See annex hereto véase el anexo adjunto
NZL/62/1-66		x		
Doc. 63 Sweden		x		Voir - See - Véase G/54 F/41, USA/28, S/68
Doc. 64 CCIR	x			
Doc. 65 Comm.				
NZL/66/67-70		x		
AUS/67/73-80	x			
S/68/22-24		x		Art 5
Doc. 69 Brazil	x	x	x	
B/70/1-30	x			Art 1

PROP. N°	4	5	6	OBSERVATIONS REMARKS OBSERVACIONES
B/71/31-97		x		Art 5
B/72/98-129	x			Art 7
B/73/130			x	Art 8
B/74/131-132			x	Art 9
B/75/133-145			x	Art 9A
B/76/146			x	Art 14
MEX/77/1-38	x			Art 1
MEX/78/39	x			Art 2
G/79/216	x		x	
G/80/217-226	x		x	App 1A
G/81/227-273	x			Art 7
CHN/82/1-41	x			
F/83/263-277	x			Art 1; Voir - See - Véase F/40/1-32
F/84/278-279		x		Art 5; Voir - See - Véase F/41/33-140
F/85/280		x		Art 6; Voir - See - Véase F/42/141
F/86/281-313	x			Art 7
F/87/314-315			x	Art 9A
F/88/316-317	x			ADD AP.
F/89/318	x			
F/90/319			x	
Docs 91-94 SG				
G/95/274-320	x		x	Art 9A (319 et 320 form IV)
G/96/321	x			
J/97/52	x			Art 1 84AT (MOD)
J/98/53-91		x		Art 5
J/99/92-108	x			Art 7

PROP. N°	4	5	6	OBSERVATIONS REMARKS OBSERVACIONES
	x	x x	x	Art 5: Voir - See - Véase Props US/28/60-65:SUP USA/28/39+42+89+92 Voir - See - Véase USA/28/82-83:ADD new Props 10.7-11.7 Gc/s
	x		 x x	Art 7: Voir - See - Véase Props USA/28/127-154 Art 9: ADD Props RR486.4 RR503A Art 9A: Voir - See - Véase USA/28/174,176,181,193,204,244,247,252 etc.
USA Corrigendum Doc. 28	x x x		 x 	ADD APP28 ADD APP 29 ADD Res
	x x			ADD Res ADD Res
	x x			ADD Res ADD Res

Doc. No. 61 I.F.R.B.	4	5	6	OBSERVATIONS REMARKS OBSERVACIONES
Para				
1	x	x	x	Introduction-Introducción
2	x	x	x	
3.1	x			Observations-Comments-Observaciones Art 1
3.2	x			Observations-Comments-Observaciones Art 2
3.3		x		Observations-Comments-Observaciones Art 5
3.4.1	x		x	Observations-Comments-Observaciones Arts 7, 9 & 9A
3.4.2	x		x	
3.4.3	x		x	Observations-Comments-Observaciones
3.4.4			x	Observations-Comments-Observaciones
3.5	x			Observations-Comments-Observaciones Art 7
3.6			x	Observations-Comments-Observaciones Art 9
3.7			x	Observations-Comments-Observaciones Art 9A
3.8			x	Observations-Comments-Observaciones APP 1
3.9			x	Observations-Comments-Observaciones App 1A
3.10			x	Observations-Comments-Observaciones APP 10 Service Documents
3.11			x	Observations-Comments-Observaciones Res N° Spa 1
3.12		x		Observations-Comments-Observaciones Res N° Spa 7
Annex 1		x		Voir - See - Véase (para 3.3.3)
Annex 2			x	Forms of Notice - Formulaire de Notification - Formulario de Notificación

PROP. N°	4	5	6	OBSERVATIONS REMARKS OBSERVACIONES

SPACE
CONFERENCE

1971

Document No. 110-E
8 June 1971
Original : Spanish

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

CHILE

PROPOSED AMENDMENT CONCERNING THE AERONAUTICAL MOBILE SERVICE

Reference: Proposed amendment to Article 5 of the Radio Regulations

Proposal : Revised allocation of the band 132-136 Mc/s

Mc/s

Region 1	Region 2	Region 3
132-136	132-136	
AERONAUTICAL MOBILE (R)	AERONAUTICAL MOBILE (R) ~~FIXED~~ ~~MOBILE~~	
273A 274 275	273A 277 ~~276~~ ~~278~~ ~~279~~	

NOC 273A

SUP 276
278
279

MOD 277 In Regions 2 and 3, in the band 132-136 Mc/s, exclusively allocated to the aeronautical mobile (R) service, stations in the fixed and mobile services may continue to use this band until 1 January 1976. Until that date frequency assignments to stations in the aeronautical mobile (R) service shall be coordinated between administrations concerned and shall be protected from harmful interference.

Reason : In Regions 2 and 3 the channel requirements for Air Traffic Control in the band 132-136 Mc/s, accorded priority in Notes 276 and 277 to the Regulations, have grown so rapidly that there is already difficulty in making channels available.

In the case of Region 2, which comprises and concerns Chile, the particular reasons justifying this new allocation of the band 132-136 Mc/s are:

1. The higher flight altitudes and speed of present aircraft make it necessary to use a larger number of different frequencies in the mobile aeronautical (R) service band to ensure the safety of the flight under control and avoid interference.

2. The new extended range VHF communication systems also call for a larger number of frequencies for their efficient operation.

3. Future experiments in satellite aeronautical communication and its use for long-range Air Traffic Control will require the use of new frequencies in the band in question.

4. The advantages of bringing the allocation in Region 2 into line with that in Regions 1 and 3 to ensure uniformity and world-wide coordination of the band 132-136 Mc/s for the exclusive use of the aeronautical mobile (R) service.

Corrigendum No. 1 to
Document No. 111-E
14 June 1971
Original : English

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

REPUBLIC OF INDIA

In Document No. 111 submitted by the Republic of India to the WARC-ST on 8 June 1971, please make the following amendments :

A. On page 2, paragraph 7, first line, replace existing equation by

$$F_{est} = F_{ssp} - D_s - D_t - D_{sr} - E_d.$$

B. On page 3, paragraph 9, replace 5th line by

$$F_{est} = (-113 - D_t - D_s - D_{sr} - 24)\ \mathrm{dbw/m^2/4kHz}.$$

SPACE
CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 111-E
8 June 1971
Original : English

PLENARY MEETING

REPUBLIC OF INDIA*)

LIKELIHOOD OF INTERFERENCE TO THE RECEIVERS OF TROPOSPHERIC SCATTER LINKS OPERATING OVER THE FREQUENCY BAND 845-935 MHz IN REGIONS 1 AND 3 FROM THE EMISSIONS OF AN INDIAN BROADCASTING SATELLITE PROPOSED TO BE LOCATED AT LONGITUDE 79 DEGREES EAST IN THE GEOSTATIONARY ORBIT

1. In Document No. 39 of WARC-ST, India has made a proposal (No.IND/39/30) for allocation of the frequency band 845-935 MHz in Region 3 for satellite broadcasting to be shared with fixed and mobile services.

2. The band 845-935 MHz is extensively used for tropospheric links all over the world. The links likely to be affected by interference from a broadcasting satellite located at 79 degrees east longitude in the geostationary orbit are those which are located in Regions 1 and 3.

3. A survey of frequency registrations with I.F.R.B. for tropospheric scatter links indicate that such links operating in the band 845-935 MHz are existing in Iceland, Denmark, United Kingdom, France, Germany, Belgium, Spain, Portugal, Italy, Greece, Turkey, Cyprus, Malta, Morocco, Libya, Tanzania, Uganda, Mozambique, Hong Kong and Philippines. Particulars indicated against the registrations provide valuable information (e.g. antenna gain, direction of maximum directivity, location of link terminals, etc.) about the tropo-links.

4. Consideration of such data available from the I.F.R.B. register show that the terminals of tropolinks operating in the band 845-935 MHz and located in Iceland, Portugal, Spain, Morocco and United Kingdom are outside the range of visibility of a geostationary broadcasting satellite located at 79 degrees east longitude.

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*) Other proposals are contained in Documents Nos. 35 to 39.

5. In respect of the remaining registered tropolink terminals of Regions 1 and 3, an attempt has been made to estimate the likelihood of interference to the tropolink receivers from the proposed Indian broadcasting satellite.

6. The concept of "equivalent direct entry flux-density" produced by the satellite at the tropolink terminals has been introduced for this purpose. This "equivalent direct entry flux-density" is defined as that flux-density, which, entering the tropolink antenna from the direction of its maximum directivity, would produce the same interference power at the input of the tropolink receiver as that actually produced by the emissions of the satellite under consideration.

7. It may be seen that $F_{est} = F_{ssp} - D_t - D_{sr}$,

F_{est} = Equivalent power flux-density produced at the tropolink terminal by a given satellite (in dbW/m^2/4 kHz).

F_{ssp} = Actual power flux-density produced by the satellite at the sub-satellite point assumed to be in the direction of maximum radiation from satellite antenna (dbW/m^2).

D_t = Discrimination in dbs of the tropolink antenna towards the direction of the satellite.

D_s = Discrimination in dbs of the satellite antenna towards the direction of tropolink terminal.

D_{sr} = Differential path loss in dbs for satellite emission between the sub-satellite point and the location of the tropolink terminal.

E_d = Reduction in dbs of the maximum value of power in any 4 kHz band of satellite emission from its total power due to use of energy dispersal technique.

8. From considerations of the relative geometry of the satellite in relation to the location of the tropolink and standard radiation patterns established by S.J.M. for dish-antennae the values of D_{sr}, D_t and D_s can be calculated. A value of 24 dbs for E_d may be assumed corresponding to the use of symmetric triangular dispersal wave from producing a peak-to-peak deviation of one MHz in the satellite emission.

9. For a satellite of 50 dbW e.i.r.p. in the direction of its main beam;

$$F_{ssp} = 50 - 163 = -113 \text{ dbW/m}^2$$

Hence

$$F_{est} = -113 - D_t - D_s - D_{sr} - 24 \text{ dbW/m}^2/4 \text{ kHz}$$

$$= -(137 + D_t + D_s + D_{sr}) \text{ dbW/m}^2/4 \text{ kHz.}$$

10. Based on the above, the values of equivalent power flux-density produced at the different registered tropolink terminals of Regions 1 and 3 operated in the band 845-935 MHz by a geostationary broadcasting satellite located at 79 degrees longitude and using the same frequency band have been calculated. An e.i.r.p. of 50 dbW and antenna gain of 35 dbs (half power beamwidth = 3.5 degrees) have been used for this purpose. The results have been tabulated country-wise in the annexure to this document.

11. It will be seen that the equivalent power flux-density produced by the satellite at various tropolink terminals in all cases, except two, is less than -191.5 dbW/m^2/4kHz which is the figure worked out by S.J.M. for the maximum allowable value of direct entry power flux-density produced by a communication satellite at a tropolink terminal (2 GHz). Calculations indicated in a companion Indian document (WARC Document No.) show that many tropolinks operating in 800 and 2000 MHz bands can tolerate much higher direct entry flux-densities up to -168 dbW/m^2/4kHz. Even in the cases of two exceptions indicated above, the figures for equivalent direct entry power flux-density are very much lower than -168 dbW/m^2/4 kHz.

12. Thus it can be seen that the likelihood of interference to the receivers at the terminals of registered tropolinks of Regions 1 and 3 in the band 845-935 MHz from the broadcasting satellite is negligible.

Appendix : 1

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APPENDIX

EQUIVALENT DIRECT ENTRY POWER FLUX-DENSITY PRODUCED AT THE TERMINALS OF TROPOSPHERIC SCATTERING LINKS OPERATING IN THE BAND 845-935 MHz AND REGISTERED WITH THE I.F.R.B. BY AN INDIAN GEOSTATIONARY BROADCASTING SATELLITE LOCATED AT LONGITUDE 79°E WITH e.i.r.p. OF 50 dbW AND ANTENNA GAIN OF 35 dbs (HPBW = 3.5 DEGREES)

Serial No.	Tropolink terminal	Geographic coordinates of the terminal		Gain of the tropolink antenna dbs	Azimuthal direction of the main beam of the tropolink antenna degrees E of N	Direction of arrival of the satellite emission at the tropolink terminal		Angle between the direction of arrival of satellite emission and that of the main beam of the tropolink antenna deg.	Discrimination provided by the tropolink antenna for the satellite emission dbs	Angle between the main beam of satellite antenna and the direction of the tropolink terminal deg.	Discrimination provided by satellite antenna in the off axis direction of the tropolink terminal dbs	Differential path loss due to slant range variation	Equivalent *) direct entry flux-density produced by satellite at the tropolink terminal dbW/m²/4 kHz
		Longitude	Latitude			Azimuth degrees E of N	elevation deg.						
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Tropolink terminals located in Belgium													
1	Flobeck	3E	50N	38	309	99	0	210	43	8.7	21dB	1.3	-202.3
Tropolink terminals located in Cyprus													
1	Kili	32E	34N	43	272	117	27	144	48.0	7.75	19.5	.7	-205.2

*) Use of energy dispersal technique producing 24 dbs reduction in a 4 kHz band below the total power level assumed.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Tropolink terminals located in Denmark													
1		9E	55N	40	206	107	3	99	45	8.68	20.5	1.2	-203.7
Tropolink terminals located in France													
1	Pierresurh	3E	45N	40	132	100	2	32	39.5	8.7	20.5	1.2	-198.2
2	Purresurh	3E	45N	40	360	100	2	260	45	8.7	20.5	1.20	-203.7
3	Rohrbuch	7E	49N	40	263	104	3	159	45	8.7	20.5	1.25	-203.75
4	Mt. Aout	3E	48N	40	181	101	3	80	45	8.7	20.5	1.25	-203.75
5	Mt. Aout	3E	48N	40	80	101	3	21.5	35.1	8.7	20.5	1.25	-193.85
6	Mt. delac	3E	43N	40	314	101	3	213	45	8.7	20.5	1.25	-203.75
7	Mt. delac	6E	43N	40	75	101	3	26.5	37.8	8.7	20.5	1.25	-196.55
8	Mt. Hovent	2E	49N	40	355	99	0	256	45	8.7	20.5	1.3	-203.8
9	Mt. Hovent	2E	49N	40	62	99	0	37	41	8.7	20.5	1.3	-199.8
Tropolink terminals located in Germany													
1	Roetgen	6E	50N	40	13	103	2	90	45	8.7	20.5	1.25	-203.75
2	Roetgen	6E	50N	40	245	103	2	142	45	8.7	20.5	1.25	-203.75
3	Aurich	7E	53N	40	194	104	2	90	45	8.7	20.5	1.25	-203.75
4	Aurich	7E	53N	40	24	104	2	80	45	8.7	20.5	1.25	-203.75
Tropolink terminals located in Greece													
1	Ziros Mare	26E	35N	40	90	113	21	31	39	8.1	20	.9	-196.9

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Tropolink terminals located in Hong Kong													
1	CD Aguila	114E	22N	45	88	243	43	131	50	4.6	13.8	.45	-201.25
Tropolink terminals located in Italy													
1	Mt. Limbara	9E	40N	45	40	103	7	63	50	8.6	20.5	1.15	-208.65
2	Mt. Termin	13E	42N	29	315	105	8	210(150)	34	6.6	20.5	1.15	-192.65
3	Milano	9E	45N	29	141	104	5	37	31	8.7	20.5	1.2	-189.7
4	Mt. Giono	10E	44N	40	150	105	6	45	43.5	8.7	20.5	1.2	-199.2
5	Mt. Gino	10E	44N	40	258	105	6	153	45	8.7	20.5	1.2	-203.7
6	Ctregrot	14E	37N	40	30	105	11	76.5	45	8.5	20.5	1.18	-203.7
7	Ischia	13E	40N	40	314	105	8	209(151)	45	8.6	20.5	1.15	-203.7
8	Mt. Argenta	11E	42N	40	225	104	7	121	45	8.6	20.5	1.15	-203.7
9	Mt. Argenta	11E	42N	29	225	104	7	121	34	8.6	20.5	1.15	-192.65
10	Ischia	13E	40N	40	132	105	8	27	37.8	8.6	20.5	1.15	-196.45
11	Cavaneu	12E	45N	40	256	106	7	150	45	8.3	20.5	1.15	-203.75
12	Mt. Settep	8E	44N	29	91	103	5	13	18.8	8.6	20.5	1.20	-177.5
13	Mt. Cineone	10E	44N	29	273	105	6	168	34	8.7	20.5	1.2	-192.7
Tropolink terminals located in Libya													
1	Sirte	16E	31N	42	73	104	14	34	42.3	8.4	20	1	-200.3
2	Sirte	16E	31N	35	314	104	14	212(148)	40	8.4	20	1	-198
3	Benghazi	20E	32N	42	253	107	17	143	47	8.3	20	.95	-204.95

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Tropolink terminals located in Malta													
1	Malta	14E	35N	42	196	105	12	91	47	8.5	20.3	1.05	-205.35
2	Malta	14E	35N	42	29	105	12	76	47	8.5	20.3	1.05	-205.35
Tropolink terminals located in Mozambique													
1	Malvernia	31E	22S	43	177	71	31	104	48	7.5	19	.64	-204.64
2	Malvernia	31E	22S	43	39	71	31	43.5	46	7.5	19	.64	-202.64
3	Mt. Xiluvo	34E	19S	43	218	73	33	133	48	7.3	19	.6	-204.6
4	Mt. Bonduini	31E	25S	43	357	69	30	285(75)	48	7.5	19	.66	-204.66
Tropolink terminals located in Philippines													
1	Vigan	120E	15N	47	2	253	39	255.5 (104.5)	52	6.75	17.8	.5	-207.3
Tropolink terminals located in Tanzania													
1	Dodoma	35E	6S	42	325	83	37	248(112)	47	6.9	18	.53	-202.53
2	Bukoba	31E	1S	36	138	89	35	57.5	41	7.1	18	.56	-196.56

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Tropolink terminals located in Turkey													
1	Persembo	37E	41N	40	87	126	25	45.5	43.5	7.9	19.5	.76	-200.76
2	Kusakaya	32E	41N	40	221	121	22	99	45	8.1	19.5	.83	-202.33
3	Karacaag	39E	37N	40	291	126	30	140	45	7.5	19	.66	-201.66
4	Dijarbou	39E	37N	41	255	126	30	124	46	7.5	19	.66	-202.66
5	Elmadgi	33E	39N	34	50	122	25	119	39	7.9	19.5	.76	-196.26
6	Bespinarte	27E	38N	34	266	116	22	143	39	8.1	19.5	.83	-196.33
7	Elmadgi	33E	39N	40	112	122	25	27	38.8	7.9	19.5	.76	-196.06
8	Elmadgi	33E	39N	40	260	122	25	132	45	7.9	19.5	.76	-202.26
9	Samsun	36E	41N	41	243	125	25	114	46	7.9	19.5	.76	-203.26
10	Izmir	27E	38N	41	30	116	22	86	46	8.1	19.5	.83	-203.33
11	Adana	35E	36N	41	315	122	27	151	46	7.8	19.5	.72	-203.22
12	Samsun	36E	41N	41	93	125	25	40	43	7.9	19.5	.76	-203.26
13	Koca Yunus	35E	40N	34	240	123	25	114	38	7.9	19.5	.76	-195.26
14	Pinarbasy	36E	38N	40	292	124	27	151	45	7.8	19.5	.72	-202.22
15	Kutahya	29E	39N	40	80	118	22	43	42.5	8.1	19.5	.83	-199.83
16	Pazar	40E	41N	40	269	119	21	144	45	8.1	19.5	.86	-202.36
17	Kutahya	29E	39N	40	40	118	22	79	45	8.1	19.5	.84	-202.34
18	Pinarbasi	36E	38N	40	111	124	27	29	39	7.8	19.5	.72	-196.22
Tropolink terminals located in Uganda													
1	Konge	32E	0N	42	171	90	46	84	47	6.1	16.5	.38	-201.38

SPACE CONFERENCE

1971

Document No. 112-E
8 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

REPUBLIC OF INDIA*)

REVISION OF ARTICLES 5 AND 7 OF THE RADIO REGULATIONS

Permissible levels of direct entry interference to the receivers of transhorizon radio systems from satellite emissions operating in the 800 MHz and 2 GHz bands

1. Introduction

In the WARC-ST documents received so far, a number of Administrations have proposed frequency allocations for satellite broadcasting in the 800 MHz and 2 000 MHz frequency bands. No doubt, while considering the various proposals, the WARC-ST will take into account the sharing feasibility between the satellite services and fixed services worked via transhorizon radio links, as indicated in the report of the C.C.I.R. Special Joint Meeting held in February-March 1971.

2. The calculations made by the C.C.I.R. S.J.M. regarding maximum allowable power flux-density for direct entry interference to transhorizon system receivers are based on the performance characteristics of only two systems both working at 2 GHz. The C.C.I.R. S.J.M. have however stated that the conclusions may be generally more applicable.

3. Transhorizon systems working at frequencies in the 800 MHz band are also in extensive use. In the annexure to this document, calculations have been given for estimating the maximum allowable power flux-density for direct entry interference to transhorizon system receivers working in both 800 MHz and 2 000 MHz bands from satellite (FM) transmissions. The transhorizon system parameters, on which the calculations are based, were obtained from technical literature (1, 2, 3, 4) describing them in detail.

*) Other proposals are contained in Documents Nos. 35 to 39.

4. It will be seen that the values of maximum allowable power flux-density for direct entry interference varies with the parameters of the transhorizon system considered. In the six cases covered in the annexure, the variation is between -168 dbW/4KHz/m^2 and the -191.5 dbW/4KHz/m^2.

5. It is hoped that this supplementary data regarding the tolerable level of interference to transhorizon radio system receivers operating in 800 MHz and 2 000 MHz bands would be of use in the deliberations of Technical Committee and Allocations Committee of the WARC-ST in considering proposals for revision of Articles 5 and 7 of the Radio Regulations.

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2. "TROPOSCATTER SYSTEM" by Yashihisa Ishi Kawu Shoji Kimto (Microwave Seminar of I.T.U., Tokyo, 1968).

3. "MOUNTAIN DIFFRACTION SYSTEM" by Dr. Yoshihisa Okumara (Microwave Seminar of I.T.U., Tokyo, 1968).

4. "THINLINE TROPOSPHERIC SCATTER" by A. D. Currah (Point to Point Communication, July 1968).

Annexes : 2

ANNEX 1

Sharing of the 800 MHz band between transhorizon links and satellite services. Allowable upper limit of PFDs for satellite emissions interfering with transhorizon links used for relaying television signals

A.	T/H link identification	Oura-Naza (Japan)
B.	Frequency band	800 MHz
C.	Nature of service	TV relay (Deviation 4 MHz peak to peak)
D.	Path length	341.5 kms
E.	Median value of signal at input to receiver	-89 dbW
F.	Feeder loss (total)	3.8 dbs
G.	Effective area of antenna sq. metres expressed in dbs	21 dbs
H.	Protection ratio required	36 dbs
I.	Allowable upper limit of PFD of satellite emission, which could be tolerated	-144.1 dbW/m^2
J.	Spectral distribution of PFD of satellite emission, assuming a value of 24 dbs for the reduction due to use of energy dispersal	-168.1 dbW/4 KHz/m^2

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A N N E X 2

Sharing of 2 000 MHz and 800 MHz bands between transhorizon links and satellite services.
Allowable upper limits of PFDs for satellite emission interfering with transhorizon links of differing characteristics

T/H link identification	Japan-Korea	Oura-Naza (Japan)	S.J.M.-system A	S.J.M.-system B	Marconi thin line tropo
A. Frequency band	2 000 MHz	2 000 MHz	2 000 MHz	2 000 MHz	800 MHz
B. Nature of service	M.C. telephony	M.C. telephony	M.C. telephony	M.C. telephony	M.C. telephony
C.	256.5 km	341.5 km	500 km		176 km
D. Antenna gain	>47.5 dbs	48.5 dbs	53 dbs	43 dbs	35 dbs
E. Feeder loss (total)	4 dbs	4.5 dbs	3 dbs	5 dbs	4.0 dbs
F. Receiver M.F.	2.5 dbs	5 dbs	3 dbs	8 dbs	6.5 dbs
G. Level of thermal noise at input to receiver in a 4 KHz band	-165.7 dbW	-163.2 dbW	-165.2 dbs	-160.2 dbs	-161.7 dbs
H. Median value of thermal noise in the worst voice channel	26 pWp	300 pWp	2 000 pWp	1 000 pWp	1 000 pWp
I. Antenna diameter in square metres (dbs)	21.5 dbs	21.5 dbs	25 dbs	15.5 dbs	15 dbs
J. Allowable PFD of direct entry interference cause extra noise of 1 000 pWp (median value) in the telephone channel (dbW/4 KHz/m²)	-169	-177	-191.5	-173	-175

SPACE
CONFERENCE

1971

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 113-E
8 June 1971
Original : English

PLENARY MEETING

A PAPER SUBMITTED BY THE SECRETARIAT OF THE UNITED NATIONS
EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION

FREQUENCY ALLOCATIONS FOR SPACE COMMUNICATION

The importance for UNESCO's objectives of the World Administrative Radio Conference for Space Telecommunications was brought to the attention of the Organization's Member States in August 1970 in a communication from the Director-General. An accompanying Aide-Memoire, prepared with the assistance of the Secretariat of the International Telecommunication Union, explained the background of UNESCO's interest and urged that consideration be given to the needs of education, science, culture and information when determining national and regional requirements for space frequency allocations. The present paper is based on that Aide-Memoire and the responses received to it.

The significance of the World Administrative Radio Conference for UNESCO, is its relevance to the organization's objectives of promoting the free flow of information, the spread of education and greater cultural exchange. Modern technologies are opening up great new possibilities of reforming the whole process of education, of removing the barriers which have stood in the way of equality of access to education and retarded the social and economic progress of two thirds of the world's population.

Space communication is one of these new technologies. A Report from UNESCO prepared for the Extraordinary World Administrative Radio Conference in 1963, stated : "Space communication techniques may well permit developing countries to by-pass some of the intermediate steps which have hitherto been necessary in establishing a communication system, and thus have at their disposal within a relatively short span of time, more plentiful and versatile communication facilities than would have seemed possible even a decade ago". The problems raised are as crucial today as they were in 1963, and decisions taken during this Conference will profoundly affect the development of systems of communication and education which can influence the quality of life of millions of people throughout the world.

The United Nations Working Group on Direct Broadcast Satellites, reporting at its first session, on the likely time-scale for achievement of community reception, stated that "direct broadcasting into community receivers could be close at hand. Technology currently under development might allow this in the mid-70's". It is this phase of community reception which has particularly interested UNESCO, and it has been assumed that frequencies for this purpose will be accommodated in the "broadcasting satellite service".

While up to now, satellites have been used mainly for international communication, it may well be that during the next decade, one of their main applications will be at the national or regional level, and particularly for education. It is significant that the first use of a satellite for direct broadcasting - the Indian experiment in 1974, under a bilateral agreement with the United States - will be for an educational purpose. The word education is used in its widest sense. We refer not only to lessons in the classroom by radio and television - important as these are - but also to programmes for adult audiences. Education is recognized as a life-long process; it is relevant to man's daily life; it may help him to be a better farmer, to maintain better standards of health for himself and his family; to learn new skills; to participate in the development of his community and the making of his nation; to enjoy the cultural riches of his society.

The great significance of space communication, in its phase of direct broadcasting to community receivers, is its ability to deliver programmes far beyond the range of the terrestrial television systems which, in most cases, serve only the centres of major population. Furthermore, a satellite can provide great advantages in time, because it can anticipate, in some cases by decades, the slow extension of ground based telecommunication networks capable of relaying television programmes to remote areas. Indeed, a space system may be the only economic option available to secure 100% coverage of dispersed populations.

Studies which UNESCO has made have pointed to the fact that educational television by satellite, is potentially the most promising way to improve both the spread and the quality of education in the rural areas.

It probably constitutes the best practical solution to one of the most perplexing and crucial problems of the countries in development - the ever widening gap between the educational levels and opportunities of the rural and urban populations.

Space communication systems devised for direct community reception may be used flexibly for school broadcasts at all levels, for "open university" courses, for adult literacy, for the training of teachers and other vocations, for programmes for adults on agriculture, health, family planning or similar development topics, and on current affairs and cultural subjects.

UNESCO's concern is that the Conference, in its assessment of long-term needs, will make adequate provision for the likely future requirements for space frequencies of education, information, science and culture.

When considering the appropriate allocation of frequency bands for the broadcasting satellite service, and bearing in mind the special problems and needs of developing countries, account should be taken of the following factors:-

1. The United Nations General Assembly has resolved that "communication by means of satellite should be available to the nations of the world as soon as practicable on a global and non-discriminatory basis" (Resolution 1721(XVI)). Endorsing this pronouncement, the Plenipotentiary Conference of the International Telecommunication Union in 1965, called upon its members to promote the principle that "all countries should have equal opportunity to use space telecommunication facilities".

2. In the latter half of the present decade, the ability of developing countries to establish a satellite system, broadcasting to community receivers, will depend on economic rather than technical consideration. The frequency band available for use will be a crucial factor in determining whether a system can be economic or indeed whether it can be established at all. The proposals of some governments for allocations in the lower frequency bands may, therefore, be of critical importance, because of the bearing this has on the cost of receiving equipment, on good propagation conditions and on the much greater difficulties imposed on developing countries in the manufacture of the highly sophisticated equipment required if the upper spectrum is used.

3. Many developing countries are only just beginning to consider the potentialities of space communication for education and development. Though they may not see any likelihood of launching their own satellite for domestic purposes, they may well have opportunity in the future, of participating in a communication satellite system shared by a number of countries. At the present moment, however, they do not know precisely what their requirements may be in the next ten years. Their concern is that the "first come first served principle" might preclude the possibility of obtaining an appropriate frequency assignment when, in due course, they need one. To minimize this risk, the allocation of frequency bands for use by the broadcasting satellite service on a primary basis, rather than a shared or secondary basis would be very desirable. The interests of these countries would also be served if formal procedures could be established to ensure coordinated frequency planning in all regions, which would take into account future needs as well as present demands for utilization of those parts of the spectrum allocated to broadcasting - both terrestrial and space.

The trend toward a regional approach to space communication problems, is illustrated by the requests received by UNESCO from a number of its Member States, to carry out studies on the potentialities of space communication for education and development. A survey among a number of Latin American countries in 1969 was followed by a mission to the Arab States region in 1970, and a preliminary study is now being made on the possibilities of a regional communication satellite system for Africa. All these surveys have been undertaken in collaboration with the International Telecommunication Union.

The initial Latin American mission led to a request by eight countries for a feasibility, planning and pre-investment study of a South American regional system, using advanced communication technology including satellites, for purposes of education, culture and development. The United Nations Development Programme is financing the study, for which UNESCO has been appointed the Executing Agency, in association with the International Telecommunication Union. The draft Plan of Operations for this project has been prepared and the team of international experts to carry out the study is in course of recruitment. Several of the key experts are already working on the preliminary phase and are preparing a tentative model of the system, which would be wholly controlled by the participating countries.

While the fullest possible use would be made of terrestrial communications, it is foreseen that a satellite will prove to be the most economical way of distributing television programmes to the 40% of population .

of the region, residing in rural areas. The theoretic model, which will later be examined critically in the field, sees the need to provide for the simultaneous use of four television channels to serve the whole region. Programmes would be educational and cultural and cover current affairs and would cater for schools, universities and adult groups.

If the envisaged system proves to be feasible and the countries in the region desire to implement it, it could be in operation in 1976. Obviously, a basic requirement would be adequate bandwidth at a suitable frequency, taking into account the additional needs of other countries in the same region.

In this paper, reference has been made so far, only to the broadcasting satellite service. It is not intended to imply that the communication satellite service does not have very important education and information applications. A rapidly rising demand for telecommunications for the mass media and for education will reach great proportions, particularly in advanced countries, during the next decade. Depending on the available communication networks, use may be made of satellites for relays of radio and television programmes; transmission of news and photographs for newspapers and news agencies; facsimile transmission; retrieval and transmission of scientific data; exchanges between universities; computer assisted instruction.

In many cases, however, these services will be provided on demand by the Telecommunications administrations, and requirements of the media and of educational institutions will have been taken into account in their assessment of frequency needs for the communication satellite service.

UNESCO has noted the proposals of many I.T.U. members for frequency allocations for the communication and broadcasting satellite services which would accommodate the various educational uses of space systems. The need has been widely recognized; the problem is to find sufficient bandwidth for all these important purposes.

It is acknowledged, of course, that as the radio spectrum is a scarce resource, it is not possible to make all the frequency allocations requested by the various services. The Conference will be faced with the task of meeting as many of the stated needs as possible and of reserving the spectrum for the most important uses.

In the communication field, terrestrial telecommunications in the first place, will no doubt be fully exploited. But for many developing countries, space communication may provide the only option, for decades to come, of reaching the millions of rural and isolated people, whose need is greatest, with the most powerful available tool of development. In this Second Development Decade this is a high priority objective, and one in which the present Conference can play an important role.

SPACE CONFERENCE

1971

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 114-E
8 June 1971
Original : Spanish

PLENARY MEETING

MEXICO

PROPOSED AMENDMENTS TO CHAPTER II. (FREQUENCIES)

Preamble

One of the most important tasks to which the Conference will have to give special attention is unquestionably the revision of the Table of Frequency Allocations, and the decisions taken on that subject will determine the future development of the various services which will make use of space techniques.

Although the Mexican Administration does not intend before the Conference to submit concrete proposals on the allocation of frequency bands to the various services, it thinks that the general principles set forth below should be borne in mind during the discussions on the Table.

1. Principles governing frequency allocation

1.1 In allocating frequency bands, it is necessary to seek a compromise between present needs for specific bands for the establishment and development of space systems and future needs in the short and medium-term, at the same time ensuring that the decisions of the Conference do not create serious obstacles to later development, when technology and material resources will make it feasible to establish new systems not at present foreseen or which can only be foreseen as long-term targets.

1.2 In the light of the most recent developments in space radiocommunications, it is to be expected that the seventies will see many new achievements in this field and it is already probable that a new space conference will have to be held before the end of this decade.

1.3 In these circumstances, this Conference will have to strike a balance between the advantages of allocating frequencies in bands up to the EHF range (and even up to the decimillimetric wave range), thus from the outset channelling the expansion of the space services into certain ranges, and the advantages of limiting allocations for the moment to the SHF bands and below, leaving a future conference free to plan allocations in higher bands when the results of research now in progress (or planned for the next few years) are known.

2. Principles governing frequency sharing

2.1 The demand for new terrestrial radio links increases daily; most of the new links, mainly for technical and economic reasons, use frequencies in the 1 - 10 Gc/s range. But a considerable part of the spectrum in this range is shared between the fixed and mobile terrestrial services and the space services.

2.2 The existing provisions governing frequency sharing (Article 5), the power limits imposed on terrestrial services (Article 7, Section VII) sharing frequency bands with space services with equal rights and the obligation to effect coordination before the establishment and notification of stations in the cases referred to in No.492A (Article 9), entail serious limitations or obstacles to the establishment of terrestrial radio relay systems. An administration which has already given its consent to the request of another administration for coordination under Article 9A will in fact have difficulty in establishing new terrestrial links in the same band, or in expanding existing links, because it will have to take into account the coordination effected.

2.3 This situation gives rise to certain hesitations (or even opposition) in accepting further coordinations, especially in the case of administrations whose microwave networks are still being built up, or whose facilities are incomplete, or of insufficient capacity to meet their requirements and need to be expanded if they are to satisfy present and future demand.

3. Principles governing the use of frequencies by the space services

3.1 The design, development and operation of space telecommunication services require technical and economic resources which are not normally available to new or developing countries, and even to certain countries which do not fall within those categories.

3.2 Countries which find themselves in this position are greatly concerned by the uncertainty as to whether the bands allocated to these services will still have channels available to meet their needs by the time they are in a position to set up services using space techniques because as things stand at the moment, there are no provisions on that point in the Radio Regulations, but merely very general recommendations (see Recommendation No. Spa 10) to the effect that the utilisation and exploitation of the frequency spectrum for space communication be subject to international agreements based on principles of justice and equity.

3.3 The anxiety felt by these countries leads them to adopt an attitude of opposition to the opening up or sharing of new frequency bands for the space services or for services employing space techniques, an attitude which would be abandoned if provisions were to be adopted offering those countries some guarantee that they will have access to the bands in question when they actually need to use them for establishing space services or services using space techniques.

3.4 To facilitate the work of the Conference in this field, the Mexican Administration wishes to record the view first, that provisions should be adopted guaranteeing that frequencies will be available to countries when they are in a position to establish services using space techniques and, second, that no decisions should be taken enabling

Ref.

the more developed countries to saturate the bands in question from the outset, but that steps should be taken to ensure that the frequencies which are now used in those bands do not have a "status" equivalent to full recognition to the detriment of other countries which are in a less favourable position.

Conclusions

4. On the basis of the above considerations, the Mexican Administration has arrived at the following conclusions :

MEX/114/43 4.1 Principles governing the allocation of frequency bands

This Conference should allocate frequency bands only up to 40 Gc/s and, in exceptional cases, above that limit only for the purpose of promoting research into and the development of space techniques.

MEX/114/44 4.2 Principles governing frequency sharing

A further extension of frequency sharing between terrestrial and space services below 10 Gc/s is not advisable. Above that limit, allocations should be made exclusively to terrestrial or to space services and sharing should only be permitted between services of the same category.

4.3 Principles governing the use of frequencies by the space services

This Conference should direct its work towards the following objectives :

MEX/114/45 a) Planning certain bands (e.g. those of the broadcasting satellite service) with provision for the allocation of frequencies to the various countries.

Ref.

MEX/114/46

b) Adopting provisions ensuring that all countries, without discrimination and on the basis of principles of justice and equity, can use and share the frequency bands which are assigned to services using space techniques, having regard to the relevant United Nations resolutions.

MEX/114/47

c) Ensuring that the entries of frequency notifications in the bands referred to in b) above are merely for information purposes, except in the case of the bands referred to in a), which are subject to planning.

Having set forth the above general principles, Mexico confines itself, for the moment, to proposing the two following amendments to this Chapter :

MEX/114/48 MOD 116A

In application of the provisions of No.116, ~~For the purpose of resolving cases of harmful interference,~~ the radio astronomy service shall be ~~treated as a radiocommunication service.~~ ~~However,~~ afforded protection from services in other bands ~~shall be afforded the radio astronomy service~~ only to the extent that such services are afforded protection from each other.

Reason : To accord with the Mexican proposals for Article 1 (ADD 21A).

MEX/114/49 MOD 422

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. This prohibition applies also to broadcasting stations on board satellites or space objects, when their installation and utilization is not in conformity with the provisions of these Regulations.

Reason : To extend the provision to cover broadcasting from satellites or space objects.

SPACE CONFERENCE

Document No. 115-E
8 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

International Press Telecommunications Council

THE TRANSMISSION OF NEWS BY SATELLITE

1. It has been generally recognized that the free flow of information between peoples and nations leads to better understanding, lessening of tensions and thereby to the promotion of world peace and the betterment of mankind.

A major element in the flow of information is the transmission of news.

2. At the first Space Conference, the press representative drew attention to the important contribution which the scheduled radio-communication service made to the transmission of news, especially to those parts of the world where land communications are at present not fully developed. Particulars of the scheduled radiotelecommunications service are to be found in Article 85 of the Telegraph Regulations.

This service, which is usually in the form of 50-baud telegraphy, enables press agencies to make regular newscasts which can be received by newspapers on their own receivers or via the P.T.T. There is, for example, a regular newscast to the West Indies which keeps the islands' newspapers, many of which have a limited circulation, supplied with up-to-date information on world events. There are similar newscasts to other areas.

The newscasts are also received by TV and radio organizations, which use them in the preparation of news broadcasts. The contribution which they make to the flow of information is therefore even greater than might, at first, appear.

3. Although the scheduled radiocommunication service thus plays an important and unique part in reducing the isolation of remote places, it has one serious disadvantage. Fading of the radio signal may, and indeed frequently does, interrupt the message or, what is perhaps more dangerous, distort it and cause errors.

Because of this instability, the press representative at the first Space Conference went on to express the hope that "to facilitate the flow of information and the progress of international understanding, technical studies may be put in hand to examine the feasibility of making use of satellite systems for the scheduled radiocommunication service".

4. During the eight years which have elapsed since the first Space Conference, considerable progress has been made with the development of distribution satellites. The early dream of reliable newscasts from space has now become a possibility. On behalf of newspaper readers throughout the world, the I.P.T.C. asks the second Space Conference to turn the dream into reality by making suitable provisions in its regulations and in its frequency allocations.

5. The I.P.T.C. would also draw the attention of the Conference to another major improvement in the transmission of news which has become possible since the first Space Conference. This is the use of broadcasting satellites to bring the printed word directly into the home by connecting to a television set, or by incorporating within it, a facsimile printing apparatus or similar device.

Newspapers, with their sophisticated and well-tried methods of news preparation and editing and with their incomparable experience of news preparation are ideally equipped for undertaking this important development in the distribution of news.

The I.P.T.C. therefore asks the Conference to make provision also in its regulations and frequency allocation for the direct distribution of news into the homes of the people in the form of home newspapers.

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 116-E
8 June 1971
Original : English

PLENARY MEETING

Note by the Secretariat

COMMITTEE STRUCTURE

(As approved at the first Plenary Meeting)

COMMITTEE 1 : Steering Committee

Chairman : Mr. Gunnar PEDERSEN (Denmark)

Vice-Chairmen : Mr. A. BADALOV (USSR)
Mr. Robert C. TYSON (United States)

Secretary : Mr. C. STEAD

COMMITTEE 2 : Credentials Committee

Chairman : Mr. C.L. MARTINEZ (Venezuela)

Vice-Chairman : Mr. N.P. KAMGA (Federal Republic of Cameroon)

Secretary : Mr. W.W. SCOTT

Terms of Reference : (cf. Chapter 5 of the General Regulations)

COMMITTEE 3 : Budget Control Committee

Chairman : Mr. L. CONSTANTINESCU (Socialist Republic of Roumania)

Vice-Chairman : Mr. A. ZAIDAN (Kingdom of Saudi Arabia)

Secretary : Mr. R. PRELAZ

Terms of Reference : (cf. Rule 5 of the Rules of Procedure of Conferences)

COMMITTEE 4 : Technical Committee

Chairman : Mr. E. SANDBACH (Commonwealth of Australia)

Vice-Chairman : Mr. J. HERNANDEZ (Mexico)

Secretary : Mr. I. DOLEZEL

Terms of Reference : To consider, revise and supplement, as necessary, the existing provisions of the Radio Regulations pertaining to the technical criteria applicable for frequency sharing between space and terrestrial services, and to establish technical criteria for frequency sharing between space systems, taking into account, inter alia, the results of the technical studies made by the C.C.I.R.

COMMITTEE 5 : Allocation Committee

Chairman : Mr. H.A. KIEFFER (Confederation of Switzerland)

Vice-Chairman : Mr. J. MARSIČEK (Czechoslovak Socialist Republic)

Secretary : Mr. A.A. MATTHEY

Terms of Reference : To consider, revise and supplement, as necessary, the existing Table of Frequency Allocations in the Radio Regulations for radiocommunication services, in so far as they may use space radio techniques, and the radio astronomy service.

COMMITTEE 6 : Regulations Committee

Chairman : Mr. S.H. BUTLER (Republic of Liberia)

Vice-Chairman : Mr. M.K. BASSU (Republic of India)

Secretary : Mr. W. GARCIA-RIOS

Terms of Reference : To consider, revise and supplement, as necessary, the existing administrative provisions of the Radio Regulations pertaining to the coordination, notification and registration procedures as well as the other related provisions.

COMMITTEE 7 : Editorial Committee

Chairman : Mr. F. JOB (France)

Vice-Chairmen : Mr. D. BAPTISTE (United Kingdom of Great Britain and Northern Ireland)

Mr. B.A. DURAN (Spain)

Secretary : Mr. R. MACHERET

Terms of Reference : (cf. Rule 21 of the Rules of Procedure of Conferences)

PLENARY MEETING

U.S.S.R.

DRAFT RESOLUTION No. Spa . F

on the use by all countries with equal rights of frequency bands for space services

The World Administrative Radio Conference for Space Communications, Geneva, 1971,

considering

that all countries have equal rights in the use of both the radio frequencies, allocated to various space services, and the geostationary satellite orbit for these services;

taking into account

that radio frequency spectrum and the geostationary satellite orbit are limited natural resources and should be most effectively and economically used;

having in mind

that the use of the allocated frequency bands and definite fixed satellite positions in the geostationary orbit by individual countries or groups of countries can start at various dates depending on requirements and readiness of technical facilities of countries;

decides

1) that the registration in the I.T.U. of frequency assignments for space services and their use should not provide any permanent priority for any individual country or groups of countries and should not create an obstacle to the establishment of space systems by other countries;

2) that, in this connection, a country or a group of countries, having registered in the I.T.U. frequencies for their space services, should take all necessary measures in order to realize the possibility of the use of new space systems by other countries or groups of countries so desiring

and

3) that the provisions contained in items 1 and 2 of this Resolution should be taken into account by the Administrations and the permanent organs of the Union.

SPACE CONFERENCE

1971

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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

U.S.S.R.

DRAFT RESOLUTION No. Spa

on the use by all countries with equal rights of frequency bands for space services

The World Administrative Radio Conference for Space Communications, Geneva, 1971,

considering

that all countries have equal rights in the use of both the radio frequencies, allocated to various space services, and the geostationary satellite orbit for these services;

taking into account

that radio frequency spectrum and the geostationary satellite orbit are limited natural resources and should be most effectively and economically used;

having in mind

that the use of the allocated frequency bands and definite fixed satellite positions in the geostationary orbit by individual countries or groups of countries can start at various dates depending on requirements and readiness of technical facilities of countries;

decides

1) that the registration in the I.T.U. of frequency assignments for space services and their use should not provide any permanent priority for any individual country or groups of countries and should not create an obstacle to the establishment of space systems by other countries;

2) that, in this connection, a country or a group of countries, having registered in the I.T.U. frequencies for their space services, should take all necessary measures in order to realize the possibility of the use of new space systems by other countries or groups of countries so desiring

and

3) that the provisions contained in items 1 and 2 of this Resolution should be taken into account by the Administrations and the permanent organs of the Union.

SPACE CONFERENCE

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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS - GENEVA - 1971

COMMITTEE 4

Note by the Secretariat

STRUCTURE OF THE WORKING GROUPS OF COMMITTEE 4

(As approved at the first Meeting of Committee 4, held on Tuesday, 8th June, 1971, at 15.30 hrs.)

Chairman of the Committee: Mr. E. SANDBACH (Commonwealth of Australia) Box No. 304

Vice-Chairman of the Committee: Mr. J. HERNANDEZ (Mexico) Box No. 483

WORKING GROUP 4A:

Chairman: Mr. P. THUE (France) Box No. 398

Secretary: Mr. V. QUINTAS Box No. 450

Terms of reference: Consideration of proposals concerning definitions. (Article 1, Sections I, IIB and III).
Note: Definitions contained in Section III to be considered first by Committee 4 and later by Committee 6.

WORKING GROUP 4B:

Chairman: Mr. G.C. BROOKS (Canada) Box No. 189

Secretary: Mr. M. D. SANT Box No. 451

Terms of reference: Consideration of proposals concerning:

- Power limits for stations of the terrestrial services and earth stations, including those for the protection of the geostationary satellite orbit.
- Angular limitations for stations of terrestrial services and earth stations, including those for the protection of the geostationary satellite orbit.
- Limitations of the power flux-density produced by the space stations at the earth's surface.
- Other technical criteria.

WORKING GROUP 4C:

Chairman: Mr. M.A. DEL MORAL (Argentina) Box No. 516

Secretary: Mr. L. SONESSON Box No. 452

Terms of reference: Consideration of the co-ordination distance procedure as given in Recommendation No. Spa 1 and revised by the C.C.I.R.

WORKING GROUP 4D:

Chairman: Mr. K. S. JOWETT (United Kingdom) Box No. 85

Secretary: Mr. I. DOLEZEL Box No. 448

Terms of reference: Technical criteria related to sharing between space systems.

WORKING GROUP 4E:

Chairman:
Secretary: } To be designated.

Terms of reference: To be decided later.

Relevant provisions of the Radio Regulations and the distribution of proposals to each Working Group are shown in the Annex.

ANNEXE - ANNEX - ANEXO

LISTE DES DISPOSITIONS DU REGLEMENT DES RADIOCOMMUNICATIONS

LIST OF PROVISIONS OF THE RADIO REGULATIONS

LISTA DE DISPOSICIONES DEL REGLAMENTO DE RADIOCOMUNICACIONES

Art.	Res.
1	Spa 3
2	
7	
41	Rec.
	16
App.	Spa 1
1 *	Spa 3
1A*	Spa 4
ADD 1B*	Spa 5
3	Spa 6
4	
5	
ADD 28	
ADD 29	

* To be considered first in Committee 6 and thereafter in Committee 4.

Liste des documents

List of documents

Lista de documentos

PROP. N°	Com. 4	4A	4B	4C	4D	4E	Observations Remarks Observaciones
D/4/1,2,3		x					
D/5/37	x						
AUS/11/58			x				
CAN/12/1-11	x						
CAN/13/20-22		x					
CAN/15/101-118			x				
CAN/15/119-124			x		x		
CAN/20/168						x	
ARG/21/1-6		x					
ARG/23/52,53			x				
ARG/23/54,55			x		x		
ARG/25/55A-56	x						Art. 41
ARG/27/59-60	x						Rec. 16
USA/28 Pt I-V	x						
USA/28/7		x					
USA/28/127-154			x				
USA/28/246-252						x	
USA/28/253-260	x						App. 3
USA/28/261				x			
USA/28/262					x		
USA/28/263	x						Res. A *)
USA/28/266	x						Res. Spa 3
USA/28/267				x			
J/31/25-43			x				
IND/37/9	x						
IND/38/24,25,27		x					

*) Projet - Draft - Proyecto

PROP. N°	Com 4	4A	4B	4C	4D	4E	Observations Remarks Observaciones
F/40/31,32		x					
F/43/142-170			x				
F/43/171-176			x		x		
F/45/211-259						x	
F/46/260						x	
G/51/3	x						
G/51/14-16	x						
G/52/17					x		
G/53/22-25		x					
G/55/127-161			x				
G/55/162-164			x		x		
Doc. 69 Brazil	x						
B/70/7-30		x					
B/72/98-129			x				
MEX/77/5,16,38		x					
MEX/78/39	x						Art.2
G/79/216					x		
G/80/217-226						x	
G/81/227-268			x				
G/81/269-273			x		x		
CHN/82/1-5,36-41		x					
F/83/263-277		x					
F/86/281-313			x				
F/88/316-317				x			
F/89/318			x				
G/95/319-320						x	
G/96/321	x						*)
J/99/92-108			x				
USA/28Cor/269-323			x				
USA/28Cor/324-338			x		x		
USA/28Cor/339-340			x				
USA/28Cor/341			x		x		

*) Projet de Rec. - Draft Rec. - Proyecto de Rec.

Doc. N° 61 I.F.R.B.	4	4A	4B	4C	4D	4E	Observations Remarks Observaciones
Para							
1	x						
2	x						
3.2	x						Art. 2
3.4.1			x				
3.4.3				x			
3.4.4	x						*)
3.5			x				
3.8						x	
3.9						x	

Doc. N° 64 C.C.I.R.	4	4A	4B	4C	4D	4E	Observations Remarks Observaciones
Para							
1.1		x					
1.2		x					
2.4			x				
3.4			x				
4.5			x				
5.1.3			x				
5.2.3			x				
6.1.3			x				
6.2.3			x				
7.3			x				
8.1			x				
8.2				x			
9.1					x		
9.2					x		
9.3					x		
10				x			

*) Observations sur les brouillages nuisibles - Comments on harmful interference - Observaciones sobre la interferencia perjudicial

SPACE
CONFERENCE

1971

Document No. 119-E
9 June 1971
Original : Spanish

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

ARGENTINA

PROPOSED AMENDMENT TO ARTICLE 5
OF THE RADIO REGULATIONS*)

1. Proposal ARG/22/38 (Document No. 22) is withdrawn.

2. New proposals.

Ref.

Mc/s

Ref.	Region 1	Region 2	Region 3
ARG/119/61	1 535-1 537.5 ~~SPACE (Telemetering)~~ ADD MOBILE MARITIME ~~350A~~ ~~351~~ 352 352C 352EB		
	1 537.5-1 540 ~~SPACE (Telemetering)~~ ADD MOBILE AERONAUTICAL (R) ~~350A~~ ~~351~~ 352 352C 352E 352EA		

*) See also Document No. 22

Ref.

Mc/s

Ref.	Region 1	Region 2	Region 3
ARG/119/62	1 540-1 557.5 ~~AERONAUTICAL RADIONAVIGATION~~ ADD AERONAUTICAL MOBILE (R) ~~351~~ 352 ~~352A~~ ~~352B~~ 352D 352E 352EA		
	1 557.5-1 637.5 AERONAUTICAL RADIONAVIGATION ~~351~~ 352 352A 352B 352D		
	1 637.5-1 657.5 ~~AERONAUTICAL RADIONAVIGATION~~ ADD AERONAUTICAL MOBILE (R) ~~351~~ 352 ~~352A~~ ~~352B~~ 352D 352F 352FA		
	1 657.5-1 660 ~~AERONAUTICAL RADIONAVIGATION~~ ADD MARITIME MOBILE ~~351~~ 352 ~~352A~~ ~~352B~~ 352D 352G		

ARG/119/63 MOD 350A

Space stations employing frequencies in the band 1 525-~~1 540~~-1 535 Mc/s for telemetering purposes may also transmit tracking signals in the band.

ARG/119/64 SUP 351

Reason : Outdated.

Ref.

ARG/119/65 MOD 352A	The bands ~~1 540-1 660~~ 1 557.5-1 637.5 Mc/s, 4 200-4 400 Mc/s, 5 000-5 250 Mc/s and 15.4-15.7 Gc/s are reserved, on a world-wide basis, for the use and development of airborne electronic aids to air navigation and any directly associated ground-based or satellite-borne facilities.
ARG/119/66 MOD 352B	The bands ~~1 540-1 660~~ 1 557.5-1 637.5 Mc/s, 5 000-5 250 Mc/s and 15.4-15.7 Gc/s are also allocated to the aeronautical mobile (R) service for the use and development of systems using space communication techniques. Such use and development is subject to agreement and coordination between administrations concerned and those having services operating in accordance with the Table, which may be affected.
ARG/119/67 ADD 352E	Limited to transmissions from satellite-borne stations to stations of the aeronautical mobile (R) service for purposes of communication and/or radiodetermination. Direct transmissions from terrestrial aeronautical stations to aircraft stations of the aeronautical mobile service are also permitted when the former are used to strengthen links and/or make contact between satellite and aircraft.
ARG/119/68 ADD 352EA	Transmissions from earth stations to satellite stations are also authorized on a primary basis in the band 1 537.5-1 557.5 Mc/s when the said satellite stations are directly associated with an aeronautical mobile service operating on the same frequency.

Ref.

ARG/119/69 ADD 352EB

Limited to transmissions from satellite stations to stations in the maritime mobile service for purposes of communication and/or radiodetermination.

ARG/119/70 ADD 352F

Limited to transmissions from stations in the aeronautical mobile (R) service to satellite-borne stations for purposes of communication and/or radiodetermination. Transmissions from aircraft stations of the aeronautical mobile (R) service to terrestrial aeronautical stations are also permitted when the latter are used to strengthen links and/or make contact between aircraft and satellite.

ARG/119/71 ADD 352FA

Transmissions carried out in the band 1 637.5-1 657.5 Mc/s from satellite stations to earth stations are also authorized on a primary basis when the latter are directly associated with an aeronautical mobile service operating on the same frequency.

ARG/119/72 ADD 352G

Limited to transmissions from stations in the maritime mobile service to satellite stations for purposes of communication and/or radiodetermination.

Reason : Account has been taken of the reports prepared by the permanent organs of the I.T.U. and by Member countries and of the suggestions that have been made for maximum coordination of the mobile services in the field of space communications.

Although communications in the maritime and aeronautical mobile services have a common origin, the technical and operational standards for these services have developed along different lines and this differentiation still exists.

Ref.

ARG/119/72 (cont.)

It is considered that the combinations established correspond to the general phases of space technology and that from the functional point of view points of common interest may be found in the specific fields of emergency and rescue.

In accordance with this approach, the band originally allocated for the development of the aeronautical navigation systems should be used basically for the completion of these systems and secondarily for air-ground communications.

It is also proposed, still with the intention of facilitating the operations of other mobile services, that reservations be made in parts of the band for :

a) the common purpose systems as indicated above, and

b) the maritime communications which may reasonably be foreseen from the point of view of their initial development. This consideration is based on the fact that there are other bands which may be used for the maritime or land service in accordance with the existing regulations.

Comment

In the event of a need arising for coordination between the maritime mobile and the aeronautical mobile services via satellite, this would only be applicable for purposes of search and rescue. In such cases, the parts of the band between 1 535-1 537.5 Mc/s and 1 657.5-1 660 Mc/s will be used. Our aim has been to bring the text into line with the guidelines prepared by I.C.A.O.

SPACE
CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 120-E
9 June 1971

COMMITTEE 5

STRUCTURE OF THE WORKING GROUPS OF COMMITTEE 5
(as approved at the first meeting of Committee 5)

Ad hoc group : Definitions (Article 1 – Sections II and IIA)

Chairman : Mr. A. PETTI (Italy)

Working Group 5A : Communication satellite service

Chairman : Mr. L.C. BAHIANA (Brazil)

Working Group 5B : Space research service, radio astronomy service, telemetry, telecommand, tracking

Chairman : Mr. B. DESTA (Ethiopia)

Working Group 5C : Meteorological – satellite service, earth resources satellites (ERS), standard frequency and time signals, amateur service

Chairman : Mr. K. OLMS (Federal Republic of Germany)

Working Group 5D : Mobile services and radiodetermination

Chairman : Mr. M. CHEF (France)

Working Group 5E : Broadcasting-satellite service

Chairman : Mr. R. GALIĆ (Yugoslavia)

SPACE CONFERENCE

Document No. 121-E
10 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

BRAZIL

DRAFT RECOMMENDATION H

relating to technical standards for the assessment of interference in the frequency bands above 28 Mc/s

The World Administrative Radio Conference for Space Telecommunications, Geneva, 1971,

considering

a) that the definition of harmful interference (R.R. No. 93), of a qualitative nature, leads to a purely subjective estimation of the nuisance;

b) that, for the accomplishment of its regulatory tasks, the I.F.R.B. has adopted in its technical standards, for the frequency bands below 28 Mc/s, values for the ratio between the wanted signal and the interfering signal, below which harmful interference may be expected;

c) that "harmful interference" implies a degree of interference or a probability of interference which is considerable;

d) that the assessment of interference must be related to percentages of time during which the interfering signal affects the desired signal beyond specified limits;

e) that, as consequence, a definition of "permissible interference" is desirable, which might be understood as the effect of any emission, radiation or induction that does not affect a radiocommunication service beyond specific limits established for its performance with regard to the quality and reliability required by the nature of the service;

and, noting

a) that the I.F.R.B. has been considering the permissible values of interference given in the pertinent C.C.I.R. Recommendations, as values which ensure a satisfactory service;

b) that, however, the I.F.R.B. does not possess data on the increases of these recommended values and on the associated percentages of time affecting a service beyond the specific limits established for its performance with regard to the quality and reliability required by the nature of the service;

invites the C.C.I.R.

to study the technical aspects of the problem in order to permit the I.F.R.B. to issue technical standards for the frequency bands above 28 Mc/s, used for space, radioastronomy, and terrestrial services,

and invites the I.F.R.B.

to issue technical standards for the frequency bands above 28 Mc/s, based upon the relevant provisions of the Radio Regulations and Appendices thereto, decisions of Administrative Conferences of the Union as appropriate, the Recommendations of the C.C.I.R., the state of the radio art and the development of transmission techniques that may allow either the I.F.R.B. or the Administration to reach qualified favourable or unfavourable findings concerning notifications or coordination procedures for these frequency bands.

Reason : To help the Administrations and the I.F.R.B. in reaching favourable or unfavourable findings either in coordination procedures or notifications. The need for such a help is explained in Document No. 61 submitted to the WARC by the I.F.R.B.

SPACE CONFERENCE

Document No. 122-E (Rev.)
11 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 6

STRUCTURE OF THE WORKING GROUPS OF COMMITTEE 6

(as approved at the first meeting of Committee 6,
held on Wednesday, 9 June 1971, at 1600 hrs)

Acting Chairman of the Committee : Mr. M.K. BASU (India) Box No. 509

Working Group 6A :

Chairman : Mr. P.E. WILLEMS (Netherlands) Box No. 50

Secretaries : Mr. W. GARCÍA-RIOS Box No. 446
Mr. R. PLUSS Box No. 449

Terms of reference : To consider, revise and supplement, as necessary, the provisions of Articles 9, 9A, Appendices 1 and 1A and Resolution Spa 1.

Working Group 6B :

Chairman : Mr. S. ARITAKE (Japan) Box No. 214

Secretary : Mr. J.-J. BOZONNET Box No. 454

Terms of reference : To consider, revise and supplement, as necessary, the provisions of Articles 8, 14, 15 and 1 (Section III)

The distribution of proposals to each Working Group is shown in the Annex.

M. K. BASU
Chairman of Committee 6

Annex : 1

Annexe au Document Nº 122-F (Rev.)
Annex to Document No. 122-E (Rev.)
Anexo al Documento N.º 122-S (Rev.)

Liste des documents
List of documents
Lista de documentos

PROP. No.	6A	6B	Observations Remarks Observaciones
CAN/12/1-11 REV	X		
CAN/16/125-130 REV	X		
CAN/17/131-165 REV	X		
CAN/18/166 REV		X	
CAN/19/167 REV		X	
CAN/20/168 REV	X		
ARG/24/53A-54A COR		X	
ARG/26/57-58	X		
USA/28/I-V	X		
USA/28/155-244	X		
USA/28/245		X	
USA/28/246-252	X		
USA/28/265	X		
J/32/44		X	
J/33/45-50	X		
IND/36/8	X		
F/44/177-210	X		Voir-see-véase F/87/314-315
F/45/211-259	X		
F/46/260 COR	X		
F/47/261	X		Rec. A
F/48/262	X		Rec. B
G/51/10-13	X		
G/56/165-214	X		Voir-see-véase G/95/274-32C
Doc. 69 Brazil	X	X	

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PROP. No.	6A	6B	Observations Remarks Observaciones
B/73/130		X	
B/74/131-132	X		
B/75/133-145	X		
B/76/146		X	
G/79/216	X		Rec. C
G/80/217-226	X		
F/87/314-315	X		
F/90/319, 320	X		
G/95/274-320	X		Rpl G/56/174-214
USA/Corrigendum) Doc. 28)	X		
MEX/104/40	X		
MEX/114/45-47	X		
Doc. 117 URS	X		
Doc. 121 Brazil	X		
<u>Art. 1, Section III</u>			
CAN/13/22		X)	
USA/28/7		X)	
IND/38/24		X)	
F/40/31, 32		X)	
G/53/22-25		X)	voir-see-véase Doc. 109 rev. (p. 4)
CCIR/64/para.1.2		X)	
B/70/23-30		X)	
MEX/77/38		X)	
CAN/82/36-41		X)	

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PROP. No.	6A	6B	Observations Remarks Observaciones
Doc. No. 61 I.F.R.B. Paras. 1 2 3.4.1 3.4.2 3.4.3 3.4.4 3.6 3.7 3.8 3.9 3.10 3.11 Annex 2	X		
Note Nota - Eventuellement IND/39/29 selon décision de la Commission 5 - Eventually IND/39/29 according to decision taken by Committee 5 - Eventualmente IND/39/29 conforme a la decisión de la Comisión 5	X		

SPACE CONFERENCE

Document No. 122-E
10 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 6

STRUCTURE OF THE WORKING GROUPS OF COMMITTEE 6
(as approved at the first meeting of Committee 6,
held on Wednesday, 9 June 1971, at 1600 hrs)

Acting Chairman of the Committee : Mr. M.K. BASU (India) Box No. 509

Working Group 6A :

Chairman : Mr. P.E. WILLEMS (Netherlands) Box No. 50

Secretaries : Mr. W. GARCÍA-RIOS Box No. 446
Mr. R. PLUSS Box No. 449

Terms of reference : To consider, revise and supplement, as necessary, the provisions of Articles 9, 9A, Appendices 1 and 1A and Resolution Spa 1.

Working Group 6B :

Chairman : Mr. S. ARITAKE (Japan) Box No. 214

Secretary : Mr. J.-J. BOZONNET Box No. 454

Terms of reference : To consider, revise and supplement, as necessary, the provisions of Articles 8, 14, 15 and 1 (Section III)

The distribution of proposals to each Working Group is shown in the Annex.

M. K. BASU
Chairman of Committee 6

Annex : 1

Annexe au document No.122-F
Annex to Document No.122-E
Anexo al Documento No.122-S

Liste des documents
List of documents
Lista de documentos

PROP. No.	6A	6B	Observations Remarks Observaciones
CAN/12/1-11 REV	X		
CAN/16/125-130 REV	X		
CAN/17/131-165 REV	X		
CAN/18/166 REV		X	
CAN/19/167 REV		X	
CAN/20/168 REV	X		
ARG/24/53A-54A COR		X	
ARG/26/57-68	X		
USA/28/I-V	X		
USA/28/155-244	X		
USA/28/245		X	
USA/28/246-252	X		
USA/28/265	X		
J/32/44		X	
J/33/45-50	X		
IND/36/8	X		
F/44/177-210	X		Voir-see-véase F/87/314-315
F/45/211-259	X		
F/46/260 COR	X		
F/47/261	X		Rec. A
F/48/262	X		Rec. B
G/51/10-13	X		
G/56/165-214	X		Voir-see-véase G/95/274-320
Doc. 69 Brazil	X		

PROP. No.	6A	6B	Observations Remarks Observaciones
B/73/130		X	
B/74/131-132	X		
B/75/133-145	X		
B/76/146		X	
G/79/216	X		Rec. C
G/80/217-226	X		
F/87/314-315	X		
F/90/319, 320	X		
G/95/274-320	X		Rpl G/56/174-214
USA/Corrigendum) Doc. 28)	X		
<u>Art. 1, Section III</u>			
CAN/13/22		X)	
USA/28/7		X)	
IND/38/24		X)	
F/40/31, 32		X)	voir-see-véase Doc. 109 rev. (p. 4)
G/53/22-25		X)	
CCIR/64/para. 1.2		X)	
B/70/23-30		X)	
MEX/77/38		X)	
CAN/82/36-41		X)	

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PROP. No.	6A	6B	Observations Remarks Observaciones
Doc. No. 61 I.F.R.B. Paras.			
1			
2			
3.4.1			
3.4.2			
3.4.3			
3.4.4	X		
3.6			
3.7			
3.8			
3.9			
3.10			
3.11			
Annex 2			
Note Nota			
- Eventuellement IND/39/29 selon décision de la Commission 5 - Eventually IND/39/29 according to decision taken by Committee 5 - Eventualmente IND/39/29 conforme a la decisión de la Comisión 5	X		

Document No. 123-E
15 June 1971
Original : English

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

REPUBLIC OF INDIA*)

SATELLITE INSTRUCTIONAL TELEVISION EXPERIMENT (SITE)

Information Document

1. As a first step to the use of television for a large area coverage in a short period of time, based on the joint study groups recommendations /1/, the Department of Atomic Energy entered into an agreement with the National Aeronautics and Space Administration of U.S.A. to conduct a joint satellite television experiment using the ATS-F satellite to be launched by NASA around 1973.

2. The space segment of this system would consist of the ATS-F satellite positioned within effective operational view of India, for the purpose of this experiment, in synchronous equatorial orbit, with a 30-foot parabolic antenna pointed generally toward the centre of India. An FM transmitter operating in the 800-900 MHz frequency range, with an RF bandwidth of approximately 30 MHz, will provide adequate power (80 Watts) for transmitting TV programme material and two audio channels to augmented conventional TV receivers.

3. In this experiment the up-link transmission to the ATS-F satellite would be in the 6 GHz band. The experimental satellite communication earth station at Ahmedabad will be used for transmitting ITV programme material to the satellite and for monitoring these transmissions and the performance of the satellite during the duration of this experiment. Augmented conventional TV receivers would be capable of receiving monochrome TV transmission from the satellite and one of two audio channels transmitted. For this purpose, the conventional receivers would be augmented by a front-end, viz., a small parabolic receiving antenna (7-10 feet in diameter) and a preamplifier FM to AM converter of sufficient quality to receive transmissions from the satellite. In high village density areas, transmission from the satellite could be received for rediffusion from VHF TV transmitters

*) Other proposals are contained in Document Nos. 111 (+ Corr.) and 112.

to conventional TV receivers located in villages. An additional receive-only facility, using a 20 to 30 foot parabolic antenna is required near the VHF TV transmitter. The experiment envisages the test of a hybrid system involving both direct reception by augmented TV receivers as well as rebroadcast to conventional TV receivers. About 2000 direct reception sets and 3000 conventional sets will be located in 5000 villages. The direct reception sets will be located in clusters of about 400 sets each in various parts of the country, while the conventional sets will be located in villages around the existing and planned terrestrial TV transmitters in the larger cities.

4. The basic purpose of this experiment is to test out a hybrid system of direct broadcast reception and receive-redistribute. The objectives of this experiment are given below.

5. General objectives

The general objectives of the experiment will be to :

- gain experience in the development, testing and management of a satellite based instructional television system, particularly in rural areas and to determine optimal system parameters;

- demonstrate the potential value of satellite technology in the rapid development of effective mass communications in developing countries;

- demonstrate the potential value of satellite broadcast TV in the practical instruction of village inhabitants;

- stimulate national development in India, with important managerial, economic, technological and social implications.

6. Specific objectives

Indian instructional objectives

Primary

- contribute to family planning objectives;

- improve agricultural practices;

- contribute to national integration.

Secondary

- contribute to general school and audit education;
- contribute to teacher training;
- improve other occupational skills;
- improve health and hygiene.

7. Indian technical objectives

Provide a system test of broadcast satellite TV for national development.

Enhance capability in the design, manufacture, deployment, installation, operation, movement and maintenance of village TV receivers.

Gain experience in the design, manufacture, installation, operation and maintenance of broadcast and/or distribution facilities to the extent that these are used in the experiment.

Gain an opportunity to determine optimum receiver density, distribution, and scheduling, techniques of audience attraction and organization, and to solve problems involved in developing, preparing, presenting and transmitting TV programme material.

8. United States technical objectives

Test the design and functioning of an efficient, medium power, wideband space-borne FM transmitter, operating in the 800-900 MHz band and gain experience on the utility of this space application.

9. Community TV receiving equipment

The equipment necessary to receive the satellite signals in the Indian villages consists of the antenna, the TV receiver, and the power source for operating the receiver. The selected characteristics of each of these elements are described in this section.

10. Antenna

A techno-economic study /2/ has shown that for an operating frequency range of 790 to 890 Mc/s, a parabolic type of antenna with a diameter of 4 to 10 feet having a gain of 17 to 25 db would provide adequate signal for direct reception. The summary of the selected antenna characteristics are given in Table 1.

TABLE 1

Receiving antenna characteristics

Gain	17-25 db
HPBW	8 - 20°
Mount pointing error allowed	2°
Frequency	790 MHz - 890 MHz
Efficiency	40%
Temperature	180°K
Polarization	Right circular
Wind velocity	Greater than 50 m.p.h. (withstand)
Minimum life	7 years

Easily erected on inexpensive mount.

11. Television receiver

The community TV receiver consists of a front-end electronics attachment and a conventional TV receiver. The front-end attachment is required because the downlink signals are frequency modulated. Therefore, they have to be converted into a suitable signal for use directly in the conventional receiver. Studies conducted on the type of receiver chosen for community viewing have resulted in recommending a solid state receiver fully ruggedized with low power consumption. The receivers will be ruggedized in the sense that they have to be designed with protective measures to withstand the extremes of the Indian environment. The ruggedization will increase the set cost marginally but has the potential of saving a far larger sum by reducing maintenance and extending set life. A summary of the receiver characteristics is given in Table 2.

TABLE 2

UHF receiver characteristics

Frequency range	845 - 935 MHz
Modulation (video and audio)	FM
Noise figure	6 db
Bandwidth per channel	30 MHz
Applicable standards	CCIR-B
Number of video channels	Select 1
Number of audio channels	Select 1 from 2
Prime power dissipation	50 Watts
Screen size	23 in. diagonal
Battery/line operated	12/24 VDC, or 230 V 50 Hz AC
Reliability	2000 hr MTBF
Minimum operational life	7 years

12. Power source

At present less than 20 per cent of the villages in the country are electrified. This obviously means that, in order to provide television in every village of the country, one has to think of alternate power sources for this purpose. Studies conducted on this aspect have resulted in three possible receiver power sources for the community receivers. In these studies, it has been postulated that the power consumption of the TV set would be minimized and if this is agreed to, then the following three alternatives exist as possible approaches :

- wherever possible, use should be made of existing power distribution lines; where a village is situated within 2 miles of existing lines, extensions to the villages should be made;
- for distances greater than 2 miles from a power source, engine/generators should be used for central battery charging with capacity great enough to service villages within distances up to 5 miles;

- to service all villages with battery operated sets at distances greater than 5 miles, an engine/generator in each village would be economical.

13. The augmented receiver described earlier has been made of a front-end converter to form an attachment to the conventional receiver for direct reception from the satellites. If we make the assumption that the village community TV receiver is meant exclusively for reception from satellites then a considerable simplification is possible and this would result in cost savings. Recognizing the importance of this, studies conducted on this problem, have resulted in a "direct receiver" which is described below.:

From a study of the operation of the front-end converter, one observes that it would be possible to feed the video signals of this unit, after proper amplification, direct to the video amplifier in a TV set. This obviously means that the RF, IF and detector circuits could be bypassed and as such their presence is redundant. So, replacing these circuits by the electronics of the front-end converter and integrating it with the remaining portion of the TV receiver would result in a simplified and cheaper direct receiver and a block schematic of this receiver is given in Figure 1. Results of a study /_2_/ on this aspect of the problem show that there could be a saving per set of about $28 in a total cost, as compared to the cost of the independent converter attached to a TV set. In a national system, when one is considering more than half a million sets, the integrated direct receiver approach could result in a saving as high as $14 million (about Rs.10 crores). Further, the simplification introduced would result in additional savings, particularly in set maintenance and operation (through savings in power).

14. Limited rebroadcast

The purpose of rediffusion is to reduce ground equipment costs in small areas (300 square miles) with high village (receiver) densities by using one ground transmitter installation in place of an antenna for each of the many direct broadcast community antennae. The concept will also be advantageous in cities where the high electrical noise would require large, expensive receiving antennae.

15. In any given area, there will be a certain number of villages (and therefore TV sets). Every community receiver needs a UHF receiving antenna for reception of the satellite signal. For reception from terrestrial

VHF transmitters, a UHF converter and a VHF receiving antenna are required for the solid state UHF television receiver to be used in rural areas. For reception by conventional VHF television receivers in the cities, only the antenna is needed. This leads to the conclusion that, comparing the cost of rediffusion versus direct reception, there is a density of villages high enough that would make the cost for reception in that high density area less for rediffusion than for direct reception. Thus, a trade-off is possible here and will result in a cost reduction.

These two new concepts would also be tried during the experiment so that the results will be incorporated in the follow-up national system.

16. Developmental tasks involved

During the analysis of various requirements for SITE experiment, the following problems are identified and these have to be tackled almost immediately so that they could be incorporated into the total system before the start of the experiment.

17. Multiple sound transmission

It is proposed in the experiment that there will be two sound channels accompanying one video channel. This being different from the conventional VHF broadcast of one video and one sound, calls for development work in incorporating suitable modifications to the transmitters and receiving equipment.

18. Since the satellite transmission, particularly for direct broadcast, consists of one video and two audio channels, obviously calls for a provision to be made in the direct receivers to enable them to select any one of the sound channels. This development work also has to start side by side. In addition, modifications in the receiving earth stations should also be incorporated so that they will have a choice for selecting any one of the sound channels for rebroadcast purposes.

19. In order to establish the exact diameters of the transmit-receive and receive-only earth stations at various locations; one should have complete information on the noise conditions in and around the site chosen. In this experiment, since the satellite is to be positioned at 35°E longitude, it definitely calls for a larger antenna to compensate for the increased distance between the satellite and the earth station. However, in the operational system since the satellite will be positioned at 79°E

longitude, the extra gain provided for in the experiment may compensate for the noise around the earth stations. However, in order to be sure that one is well within the safe margin of operation, it may be desirable to conduct noise surveys of all the locations at Delhi, Srinagar, Bombay and Ahmedabad.

20. The development work on TV receivers, electronic front-ends and antenna has also to be undertaken. Studies [2] have shown that the best way of covering the villages (non-electrified) is by providing a subsidiary line if the villages are within two miles of radius of the main power line. In this connection, it was also thought that if a cheap transformer could be developed which could be used to tap energy directly from the very high voltage lines, for driving the transistorized TV receivers and providing some light for the community centre would be a worthwhile proposition. So development work on this should also be undertaken.

21. In addition to the development problems that have been mentioned above, there are quite a few research problems which are to be tackled well before the start of the experiment and this may have a very great impact on the development of the total system.

Problems so far visualized for this purpose are as follows :

- optimum choice of modulation index;
- optimum bandwidth for TV transmission;
- total bandwidth requirements taking into account one video and along with number of audio channels. Also bandwidth requirements for the provision of multiple video channels with their associated audio channels;
- the interaction of the modulation index and optimum bandwidth on the above problem;
- modifications required in the direct receiver;
- modifications required in the antenna for this very wide band reception;
- studies on various approaches for a receiver for direct reception have revealed that an integrated TV set only for direct reception from the satellite could provide a very economical solution and this in turn has been confirmed by an independent study [3]. So, it appears worthwhile to start development work on producing a solid state receiver integrating the front-end converter in such a way that it will be useful for direct reception from the satellite only.

22. Also quite a few problems which have a bearing on frequency are to be undertaken. These problems include the studies of FM transmission, interference on FM systems (main lobe and side lobes), FM transmission interference on AM systems. This study should be aimed at bringing out clear definitions and specifications for signal strength levels, etc.

23. A definition of the areas to be covered and the facilities in each area are given below :

1. Ahmedabad-Anand

a) Earth station (ESCES) - with augmentation

b) Low power VHF transmitter

c) Microwave connection from Ahmedabad earth station

d) Programming facility

e) Conventional sets - 400

2. Delhi

a) Earth station - 98 foot parabolic antenna

b) VHF transmitter

c) Programming centre

d) Conventional TV receivers - 400

3. Bombay

a) Earth station with approx. 30 foot parabolic antenna

b) VHF transmitter

c) Programming centre

d) Conventional sets - 400

4. Srinagar

a) Receive-only station with a 30 foot (approx.) parabolic antenna

b) VHF transmitter

c) Programming centre

d) Conventional receivers - 1000

5. Poona

a) VHF transmitter

b) Link to Bombay earth station through microwave link

c) Programming centre

d) Conventional receivers - 400

The following areas will have clusters of 400 direct reception augmented TV sets (the augmentation will consist of a 7 to 10 foot parabolic antenna and an FM to AM converter) and suitable programme originating facilities.

1. Orissa and Madhya Pradesh area

a) Direct reception receivers - 400

b) Programme originating facility

2. Bihar

a) Direct reception receivers - 400

b) Programme originating facility

3. Uttar Pradesh

a) Direct reception receivers - 400

b) Programme originating facility

4. Rajasthan

a) Direct reception receivers - 400

b) Programme originating facility

5. Madras area

a) Direct reception receivers - 400

b) Programme originating facility

6. <u>Calcutta area</u>

a) Direct reception receivers - 400

b) Programme originating facility

7. <u>Kanpur area</u>

a) Direct reception receivers - 400

b) Programme originating facility

In addition, 200 augmented-conventional types of TV receivers may be placed at various locations for technical experiments and evaluation.

In summary there will be :

1. Two earth stations : Ahmedabad (ESCES augmented) and Bombay.
   One earth station : Delhi - 98 foot antenna.

2. One receive-only station (Srinagar).

3. Four conventional VHF transmitters : Delhi, Bombay, Srinagar, Poona.

4. One low power VHF transmitter : Ahmedabad-Anand.

5. Number of conventional community TV sets around VHF transmitters - 2600.

6. Number of augmented direct reception community TV sets - 2800.

These numbers may, however, be revised depending upon the cost and other considerations.

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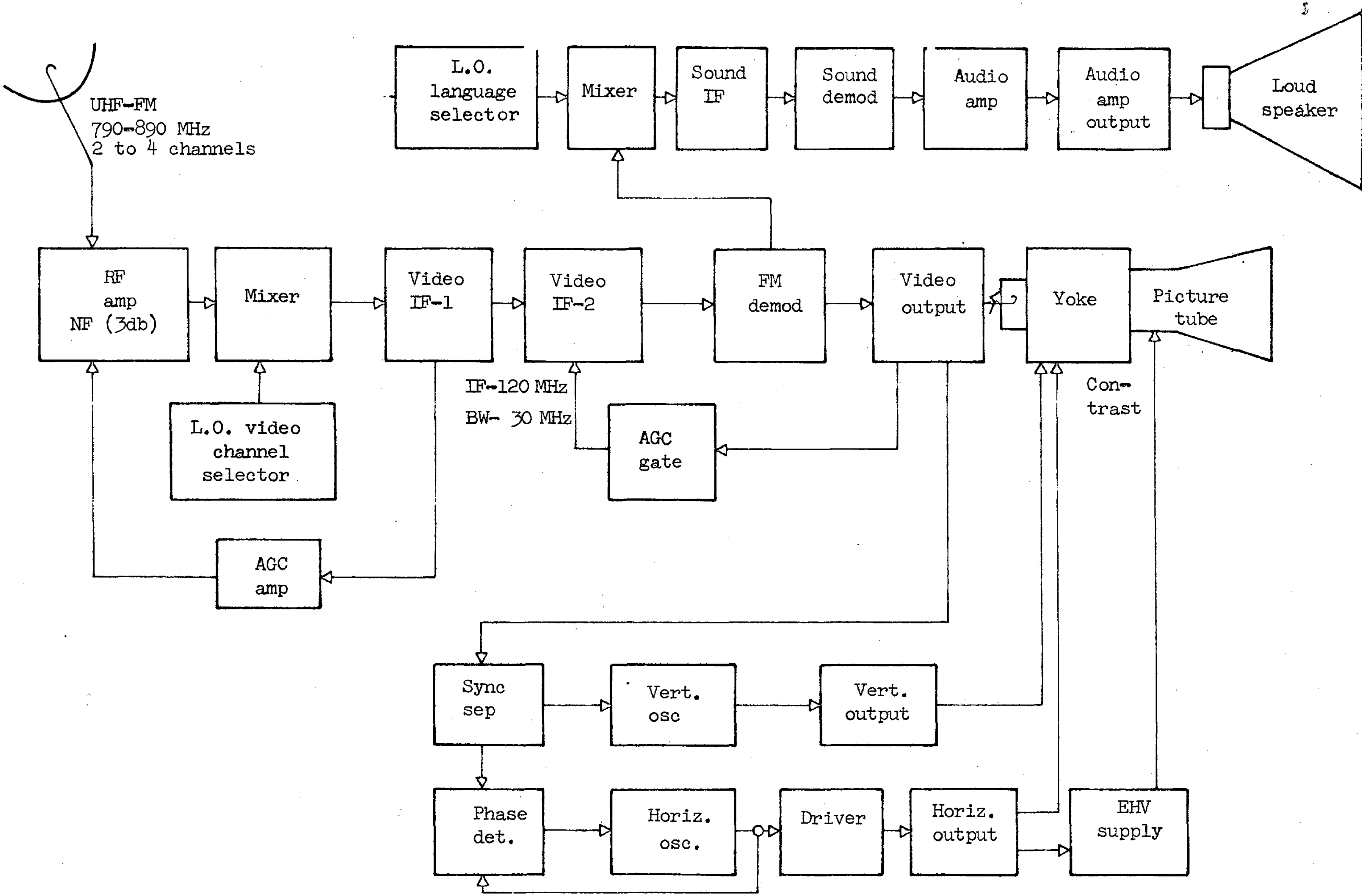

Figure 1 - Block-schematic of TV set capable of receiving satellite TV broadcast only

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2. Study of Community Broadcast Satellite Systems for India - report of the joint study carried out by the Indian National Committee for Space Research and the General Electric Co. (USA), June 1969.

3. Television Broadcast Satellite Study - by J. Jansen, P.L. Jordan, et al. TRW Systems Group Contract NAS 3-9707 dated October 24, 1969.

SPACE CONFERENCE

Document No. 124-E
10 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

MARCONI INTERNATIONAL MARINE CO. LTD.

PRELIMINARY COMMENTS ON THE PROPOSALS FOR THE MARITIME MOBILE SERVICE

1. General comment

Although a number of Administrations have made proposals for the provision of an allocation of frequencies for the maritime mobile service, it appears that many of these earlier proposals were drafted before the conclusions of the recent Special Joint Meeting of the C.C.I.R. were fully appreciated. In particular the superior technical and economic advantages, for the mobile services, of using frequencies within the bands 350 - 600 MHz do not appear to have been fully recognized until the report of the S.J.M. became available. By that time many Administrations had submitted, or were in the process of submitting, their proposals.

It is sincerely to be hoped however that the solid basis of technical information now available in the S.J.M. report will enable all administrations who have an interest in the future efficiency of the maritime mobile service to reach satisfactory agreement on the provision of adequate frequency space within the frequency bands 350 - 600 MHz, so that not merely very large ships but also international going ships of all sizes will be able to share the benefits of an efficient and economically viable communication service.

2. Maritime requirements

2.1 Despite the release of extra radiotelephone channels made available by the use of SSB equipment, it is evident from the radio traffic statistics and forecasts made by a number of major maritime administrations that the demands for long-range communication channels are increasing by over 20% per annum. This rapid expansion of long-distance radio traffic is likely to lead to saturation of the existing HF facilities before the end of the decade. Unless drastic action is taken to provide new facilities it seems inevitable that the delays in clearing a message, at present five to six hours on average, will steadily become worse.

2.2 The cost of such delays must already be enormous. If we consider the special problems of the container ships, bulk carriers, and tankers the financial repercussions of say a six hour delay will be evident. These repercussions extend throughout the shore terminals as well as the ships.

2.3 Due to the increasing economic value of good communications, it will become imperative for ship owners and managers to be able to make immediate contact with their ships at any time of the day or night, even at times when their radio/electronic officers may be off watch or engaged in other electronic duties. This capability may become possible by the further development of telex services to ships, but due to the vagaries of the present HF communication system such a service will be technically complicated and relatively costly. It could however become relatively simple if reliable satellite links become available.

2.4 From the above considerations it seems to be essential that we plan for the introduction of an adequate and economically viable satellite service for the use of merchant ships.

3. There is now clear evidence in the report of the S.J.M. of the C.C.I.R. that it would be advantageous for a maritime service if it could use frequencies within the bands 350 - 600 MHz. It is equally clear that the use of much higher frequencies, say around 1 600 MHz, would involve much more costly equipment and/or severe restrictions on the capacity of the service.

A brief examination of some of the factors and quantities involved will make this statement clearer.

3.1 On the basis of the conclusions of the special joint meeting of the C.C.I.R., the total requirement appears to be approximately 200-voice channels. Of these, approximately 90 channels may be required in the Atlantic sector.

3.2 With present satellite transponder techniques it seems unrealistic to expect more than 1 kW DC power from the satellite. If this is shared between 90 channels, planned on the basis of a 1 600 MHz system, the ship antenna will require a gain of 24 db measured at the centre of the beam;*) this implies a beamwidth of 10.5° which will necessitate the use of a sophisticated stabilizer system whose cost and complexity may debar all but the largest ships from attempting to use the service.

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*) These calculations are based on a high-quality voice communications system suitable for connection to the public network.

It is evident therefore that if the satellite service is restricted to frequencies of the order of 1 600 MHz or above, many thousands of smaller ships may be precluded from the system due to their increased dynamic motion and the more complex antenna necessary.

3.3 If, however, we plan the service within the 400 - 600 MHz band the antenna gain or power required is some 10 db less. Thus a full capacity (90 channel) system could be obtained from a satellite DC power of 1 kW*) by using a ship antenna of 14.0 db gain*). This gives a beamwidth of 33° which by itself is good enough to allow stabilization to be dispensed with on large ships and which only requires a relatively simple form of anti-roll correction on smaller vessels. Simple equipment of this type need not cost much more than half that of a 1.6 GHz ship installation. The ready availability of such equipment would permit ships of all sizes to make use of a viable satellite service.

4. From the above examples it is evident that the benefits to be obtained from a service within the 350 - 600 MHz band will be very substantial. Conversely it indicates that, without such an allocation of frequencies, the prospects of applying a modern communication service to all high-seas ships will be very remote.

5. It is now clear beyond all doubt that the frequencies within the range 350 - 600 MHz are the most suitable in every way, technically and economically for a satellite service to ships. It is hoped that this and successive I.T.U. conferences will regulate the use of these frequencies so that the vital long-range maritime services derive some benefit and are given exclusive access to an adequate amount of bandwidth.

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*) These calculations are based on a high-quality voice communications system suitable for connection to the public network.

SPACE CONFERENCE

1971

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 125-E
8 June 1971
Original : English

COMMITTEE 5

GREECE

PROPOSALS FOR AMENDMENT OF ARTICLE 5
OF THE RADIO REGULATIONS

Ref.

Part A. Allocations below 40 Gc/s

The proposed amendments are deemed necessary by the Greek Administration. They are based on the progress made and the experience gained since the Extraordinary Administrative Radio Conference of 1963 and the requirements of the several radio services to fulfil their needs in the current decade.

kc/s

	Region 1	Region 2	Region 3
GRC/125/1	2 498-2 502 STANDARD FREQUENCY 203 ~~204~~	2 495-2 505 STANDARD FREQUENCY 203 ~~204~~	

Ref.

GRC/125/2 SUP 204

Note : The suppression also applies to the other standard frequency guard-bands at 5 Mc/s, 10 Mc/s, 15 Mc/s, 20 Mc/s and 25 Mc/s.

Reason : Protection of radio astronomy in these bands is practically not possible.

kc/s

	Region 1	Region 2	Region 3
GRC/125/3	7 000-7 100		
		AMATEUR	
		211A	

GRC/125/4 ADD 211A

Space technique may be used in the amateur radio service in all frequency bands exclusively allocated to this service on a world-wide basis. However this use does not comprise the geostationary orbits and shall stop in case a harmful interference is provoked by it to other services.

Note : No. 211A also applies to the frequency bands 14 000-14 250 kc/s, 21 000-21 450 kc/s, 28 000-29 700 kc/s and 144-146 Mc/s.

Reason : To afford amateurs a greater possibility of a reasonable use of space techniques more than that which is foreseen by footnote 284A.

Ref.

kc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/5	21 850-21 870 ~~AERONAUTICAL FIXED~~ ~~AERONAUTICAL MOBILE (R)~~ ADD RADIO ASTRONOMY		
	21 870-22 000 (NOC)		

Reason : The band 21 850-22 000 kc/s is sparsely occupied by the aeronautical fixed and mobile (R) services. Consequently, it is deemed that 20 kc/s, out of 150 kc/s, can be allocated to the radio astronomy service, to compensate for the suppression of the footnote No. 204. (see proposal No. 2).

kc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/6	25 600-25 850 BROADCASTING		
	25 850-26 100 ~~BROADCASTING~~ ADD BROADCASTING-SATELLITE		

Reason : To afford the possibility for the operation of sound broadcasting emissions through satellites.

Ref.

Mc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/7	37.75-38.25 FIXED 228 229 231 MOBILE ~~Radio-astronomy~~ 233 234A		

GRC/125/8 ADD 234A In assigning frequencies to fixed and mobile services administrations shall have in mind the needs of radio astronomy in this band and take every possible measure for its protection.

Reason : To afford protection to radio astronomy which can not be secured by the existing secondary basis.

Mc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/9	117.975-132 AERONAUTICAL MOBILE (R) 273 273A		
	132-136 AERONAUTICAL MOBILE (R) 273A ~~274~~ 275	132-136 FIXED MOBILE 273A 276 277 278 279	

Ref.

GRC/125/10 MOD 273A

In the bands 117.975-132 Mc/s and in the band 132-136 Mc/s where the aeronautical mobile (R) service is authorized, the use and development, for this service, of systems using space communication techniques may be authorized but limited ~~initially to satellite relay stations of the aeronautical mobile (R) service~~ in those bands to bilateral links of the aeronautical mobile (R) service between aircraft stations and space stations. Such use and development shall be subject to coordination between administrations concerned and those having services operating in accordance with the Table which may be affected.

Reason: To better protect these bands which are essential for the aeronautical mobile (R) service.

Mc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/11	1 535-1 540 ~~SPACE (Telemetering)~~ ADD MARITIME MOBILE ~~350A~~ ~~351~~ 352 352C 352E		

Mc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/12	1 540-1 550 ~~AERONAUTICAL RADIONAVIGATION~~ ADD MARITIME MOBILE ~~351~~ 352 ~~352A~~ ~~352B~~ 352D 352E		

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Page 6

Ref.

Mc/s

GRC/125/12 (cont.)

Region 1	Region 2	Region 3
1 550-1 552.5	~~AERONAUTICAL RADIONAVIGATION~~ ADD AERONAUTICAL MOBILE (R) ADD MARITIME MOBILE ~~351~~ 352 ~~352A~~ ~~352B~~ 352D 352F	
1 552.5-1 567.5	~~AERONAUTICAL RADIONAVIGATION~~ ADD AERONAUTICAL MOBILE (R) ~~351~~ 352 ~~352A~~ ~~352B~~ 352D 352G	
1 567.5-1 627.5	AERONAUTICAL RADIONAVIGATION 351 352 352A 352B 352D	
1 627.5-1 642.5	~~AERONAUTICAL RADIONAVIGATION~~ ADD AERONAUTICAL MOBILE (R) ~~351~~ 352 ~~352A~~ ~~352B~~ 352D 352H	
1 642.5-1 645	~~AERONAUTICAL RADIONAVIGATION~~ ADD AERONAUTICAL MOBILE (R) ADD MARITIME MOBILE ~~351~~ 352 ~~352A~~ ~~352B~~ 352D 352F	
1 645-1 660	~~AERONAUTICAL RADIONAVIGATION~~ ADD MARITIME MOBILE ~~351~~ 352 ~~352A~~ ~~352B~~ 352D 352I	

Ref.

GRC/125/13 MOD 350A	Space stations employing frequencies in the band 1 525-~~1 540~~ 1 535 Mc/s for telemetering purposes may also transmit tracking signals in the band.
GRC/125/14 SUP 351	
GRC/125/15 MOD 352A	The bands ~~1 540-1 660~~ 1 567.5-1 627.5 Mc/s, 4 200-4 400 Mc/s, 5 000-5 250 Mc/s and 15.4-15.7 Gc/s are reserved ..., etc.
GRC/125/16 MOD 352B	The bands ~~1 540-1 660~~ 1 567.5-1 627.5 Mc/s, 5 000-5 250 Mc/s and 15.4-15.7 Gc/s are also allocated ..., etc.
GRC/125/17 ADD 352E	The use of this band is limited to transmission from satellite-borne stations to stations in the maritime mobile service for communication and/or radiodetermination purposes.
GRC/125/18 ADD 352F	The use of this band is reserved on a world-wide basis for the use and development of aeronautical and maritime common systems. Space techniques may also be used for these common systems.
GRC/125/19 ADD 352G	The use of this band is limited to transmissions from satellite-borne stations to stations in the aeronautical mobile (R) service for communication and/or radiodetermination purposes. Transmissions from terrestrial aeronautical stations directly to aircraft stations in the aeronautical mobile (R) service are also permitted.

Ref.

GRC/125/20 ADD 352H The use of this band is limited to transmissions from stations in the aeronautical mobile (R) service to satellite-borne stations for communication and/or radiodetermination purposes. Transmissions from aircraft stations in the aeronautical mobile (R) service directly to terrestrial aeronautical stations are also permitted.

GRC/125/21 ADD 352I The use of this band is limited to transmissions from stations in the maritime mobile service to satellite-borne stations for communication and/or radiodetermination purposes.

Reason (Proposals Ref. Nos. 12-21) :

a) To afford the possibility to the aeronautical mobile (R) and to the maritime mobile services to develop and operate systems employing space techniques for their communication, radiodetermination and their common requirements.

b) To distribute the bands between the two services in a way permitting the development of either separate and/ or joint systems by using space techniques.

c) To afford the necessary bandwidth to each service so that the foreseen number of channels (approximately 300) can be accommodated, in order to avoid congestions and handicaps similar to those coming up from the present appendices 15 and 25 of the Radio Regulations, for both services the aeronautical mobile (R) and the maritime mobile.

Ref.

Gc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/22	10.7-11.45	FIXED MOBILE	
	11.45-11.7	FIXED MOBILE ADD COMMUNICATION-SATELLITE (Space to earth)	

Gc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/23	11.7-11.95	ADD COMMUNICATION-SATELLITE (Space to earth) ~~BROADCASTING~~ ~~FIXED~~ ~~MOBILE~~ ADD Fixed ADD Mobile	
	11.95-12.75	BROADCASTING ADD BROADCASTING-SATELLITE ~~FIXED~~ ~~MOBILE~~ ADD **Fixed** ADD Mobile	

Ref.

Gc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/23 (cont.)	12.75-13.25 FIXED MOBILE ADD COMMUNICATION-SATELLITE (Earth to space)		

Reason : To satisfy the needs of the fixed, mobile, communication-satellite and broadcasting services in a reasonable way.

Ref.

Part B. Allocations above 40 Gc/s

In the opinion of the Greek Administration

a) Except radio astronomy (RA) which has specific frequency demands for its observations, no other service seems to have such kind of demands above 40 Gc/s. The other services require merely enough spectrum for their future needs, when their respective bands (exclusive or shared) below 40 Gc/s will be fully used.

Consequently, except radio astronomy which has to obtain very specific allocations in the spectrum above 40 Gc/s (as pointed out in the C.C.I.R. S.J.M. 1971 Report), all other services can be served in their space technique requirements, if they obtain the allocations they need, somehow in the low attenuation bands.

b) From the known data, the low and high attenuation bands between 40 and 300 Gc/s for space to earth (down direction) and earth to space (up direction) emissions are the following (approximate limits).

Transmissions between space to earth or earth to space	
Low attenuation bands	High attenuation bands
A - 40-52 Gc/s B - 72-105 Gc/s C - 130-170 Gc/s D - 190-270 Gc/s	a - 52-72 Gc/s b - 105-130 Gc/s c - 170-190 Gc/s d - 270-300 Gc/s

Ref.

c) From the above, it is concluded that, in allocating bands to several services, those served through transmissions from space to earth or from earth to space have to obtain frequencies from the low attenuation bands (A, B, C and D) and those which have to be protected from such emissions have to obtain frequencies from the high attenuation bands (a, b, c and d).

d) Furthermore the services belonging in the first category (of low attenuation) such as radio astronomy, satellite communications, etc. have to have allocations according to the complexity of the equipments they use and the protection these equipments need in order to function well. Consequently, for low power emissions (e.g. radio astronomy) or emissions received by simple and cheap means (e.g. in maritime mobile service), the frequency allocations have to be in the regions of the lowest possible attenuation, that is in the middle of the above-mentioned bands (A, B, C and D).

e) With this in mind, the following additions are proposed for Article 5, for frequencies above 40 Gc/s to provide bands for the future requirements of the several services.

Ref.

Gc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/24	40-43 COMMUNICATION-SATELLITE (Provisionally earth to satellite) 392A		
	43-48 AERONAUTICAL MOBILE AERONAUTICAL RADIONAVIGATION MARITIME MOBILE MARITIME RADIONAVIGATION A		
	48-51 COMMUNICATION-SATELLITE (Provisionally satellite to earth) 374A		
	51-52 EARTH SCIENCE SATELLITE		

A The bands 43-48 Gc/s, 95-101 Gc/s, 145-153 Gc/s, 190-200 Gc/s and 250-265 Gc/s are also allocated for the used and development of systems using space techniques for communication and radionavigation purposes in the aeronautical and maritime services. Future radio conferences may allocate these bands also to the corresponding terrestrial systems.

Ref.

Gc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/25	52-54 SPACE RESEARCH (Passive only) B		
	54-58 SPACE (Space to space) C		
	58-59 SPACE RESEARCH (Passive only) B		
	59-64 SPACE (Space to space) C		

B All transmissions in this band are prohibited. Only use of passive sensors from other radio services is also authorized.

C Future radio conferences may allocate this band also to fixed and mobile services.

Ref.

Gc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/25 (cont.)	64-65 SPACE RESEARCH (Passive only) B		
	65-66 EARTH SCIENCE SATELLITE		

Gc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/26	84-86 BROADCASTING-SATELLITE		
	86-92 RADIO ASTRONOMY SPACE RESEARCH (Passive only) B		
	92-95 COMMUNICATION-SATELLITE (Provisionally earth to satellite) 392A		

B All transmissions in this band are prohibited. Only use of passive sensors from other radio services is also authorized.

Ref.

Gc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/26 (cont.)	95-101 AERONAUTICAL MOBILE AERONAUTICAL RADIONAVIGATION MARITIME MOBILE MARITIME RADIONAVIGATION A		
	101-102 SPACE RESEARCH (Passive only) B		
	102-105 COMMUNICATION-SATELLITE (Provisionally satellite to earth) 374A		

A The bands 43-48 Gc/s, 95-101 Gc/s, 145-153 Gc/s, 190-200 Gc/s and 250-265 Gc/s are also allocated for the use and development of systems using space techniques for communication and radionavigation purposes in the aeronautical and maritime services. Future radio conferences may allocate these bands also to the corresponding terrestrial systems.

B All transmissions in this band are prohibited. Only use of passive sensors from other radio services is also authorized.

Ref.

Gc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/26 (cont.)	105-130 SPACE (Space to space) C		

Gc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/27	130-140 RADIO ASTRONOMY SPACE RESEARCH (Passive only) B		
	140-145 COMMUNICATION-SATELLITE (Provisionally earth to satellite) 392A		

B All transmissions in this band are prohibited. Only use of passive sensors from other radio services is also authorized.

C Future radio conferences may allocate this band also to fixed and mobile services.

Ref.

Gc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/27 (cont.)	145-153 AERONAUTICAL MOBILE AERONAUTICAL RADIONAVIGATION MARITIME MOBILE MARITIME RADIONAVIGATION A		
	153-158 COMMUNICATION-SATELLITE (Provisionally satellite to earth) 374A		

Gc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/28	170-182 SPACE (Space to space) C		

A The bands 43-48 Gc/s, 95-101 Gc/s, 145-153 Gc/s, 190-200 Gc/s and 250-265 Gc/s are also allocated for the use and development of systems using space techniques for communication and radionavigation purposes in the aeronautical and maritime services. Future radio conferences may allocate these bands also to the corresponding terrestrial systems.

C Future radio conferences may allocate this band also to fixed and mobile services.

Ref.

Gc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/28 (cont.)	182-185 SPACE RESEARCH (Passive only) B		
	185-190 SPACE (Space to space) C		

Gc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/29	190-200 AERONAUTICAL MOBILE AERONAUTICAL RADIONAVIGATION MARITIME MOBILE MARITIME RADIONAVIGATION A		

A The bands 43-48 Gc/s, 95-101 Gc/s, 145-153 Gc/s, 190-200 Gc/s and 250-265 Gc/s are also allocated for the use and development of systems using space techniques for communication and radionavigation purposes in the aeronautical and maritime services. Future radio conferences may allocate these bands also to the corresponding terrestrial systems.

B All transmissions in this band are prohibited. Only use of passive sensors from other radio services is also authorized.

C Future radio conferences may allocate this band also to fixed and mobile services.

Ref.

Gc/s

Ref.	Region 1	Region 2	Region 3
GRC/125/29 (cont.)	230-240 RADIO ASTRONOMY SPACE RESEARCH (Passive only) B		
	250-265 AERONAUTICAL MOBILE AERONAUTICAL RADIONAVIGATION MARITIME MOBILE MARITIME RADIONAVIGATION A		

A The bands 43-48 Gc/s, 95-101 Gc/s, 145-153 Gc/s, 190-200 Gc/s and 250-265 Gc/s are also allocated for the use and development of systems using space techniques for communication and radionavigation purposes in the aeronautical and maritime services. Future radio conferences may allocate these bands also to the corresponding terrestrial systems.

B All transmissions in this band are prohibited. Only use of passive sensors from other radio services is also authorized.

1971

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 126-E
1 July 1971
Original : English

COMMITTEE 5

NOTE BY THE CHAIRMAN

The annexed extract from I.F.R.B. Seminar Document No. II.4, September 1970, may be found helpful in dealing with categories of services and allocations and with foot-notes to the Table of Frequency Allocations.

H.A. KIEFFER
Chairman
Committee 5

Annex : 1

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A N N E X

CATEGORIES OF SERVICES AND ALLOCATIONS

(extracted from I.F.R.B. Seminar Document No. II.4,
September, 1970)

3.2 On page 35 of the Radio Regulations, 1968 Edition, beginning with No. 137, the subject of "primary" services, "permitted" services and "secondary" services, is dealt with. Those who did not take part in the work of either the Geneva Radio Conference in 1959 or the Space Conference in 1963 may have some difficulty in readily understanding Nos. 138 and 139, since these paragraphs result from a rather ruthless concentration into a few words of a lengthy report prepared at the Geneva Radio Conference in 1959 (Conference Document No. 242(Rev.) with Add. 1, 2 and 3).

3.3 First consider Nos. 137, 138 and 139 of the Radio Regulations (pages 35 and 36 of the Radio Regulations, 1968 Edition). In this connection it is recalled that in using the Table of Frequency Allocations, a thorough understanding of the meaning of the names given to services is essential and that the type of service is determined by the method of sending the information and not the kind of information which is sent. Take as an example, the stations on the ground and in the aircraft used for ground-to-air and air-to-ground communications; these are in the Aeronautical Mobile Service (designated in the Master Register by the symbols "FA" for the land station and "MA" for the station aboard the aircraft); however, stations on the ground transmitting information from one point to another concerning the movement of aircraft, for example, from Geneva airport to London airport, are in the Aeronautical Fixed Service (designated by the symbol "AX"). By definition (RR 24) this service is a Fixed Service, meaning a service of radiocommunication between specified fixed points, and therefore the frequency bands to be used by this latter service are those allocated in the Table to the Fixed Service and not those allocated to the Aeronautical Mobile Service although the communication may concern the movement of aircraft.

Therefore, to determine which band should be used for a given service, frequently it is necessary first to go back to the terms and definitions appearing in Article 1 to be sure which service is involved.

3.4 Having established this fundamental point, consideration may then be given to No. 137 of the Radio Regulations on page 35; here are defined the three categories of services and allocations, namely, "primary" services, "permitted" services and "secondary" services. Where, in the Table, a band is allocated to more than one service, either on a world-wide or on a regional basis, such services are listed in the following manner :

- "primary" service, the names of which are printed in small capitals;
- "permitted" service, the names of which are printed in "grotesque light" and
- "secondary" service, the names of which are printed in "italics".

Where the allocation of a particular band is to more than one "primary" service, these are listed in the alphabetical order of the names of these services in the French language; this order implies no difference of status between the said services.

3.5 In No. 138 of the Radio Regulations, it is stated that "permitted" and "primary" services have equal rights, except that, in the preparation of frequency plans the "primary" service, as compared with the "permitted" service shall have prior choice of frequencies. Notice here that the emphasis is on the difference of status at the planning stage. It follows that once the assignments are agreed between countries and recorded, without qualification or restriction, in the Master Register under Article 9 of the Radio Regulations, they have equal status. In any case of harmful interference which might arise, the criterion of the dates of recording under Article 9 would be applied in negotiations between administrations as to which of the stations should give way, in quite the same manner as in the case involving stations of two primary services.

3.6 With respect to "secondary" services, No. 139 on page 36 spells out the prescriptions which should be considered closely. They are :

RR139 Stations of a secondary service

a) shall not cause harmful interference to stations of primary or permitted services to which frequencies are already assigned or to which frequencies may be assigned at a later date;

b) cannot claim protection from harmful interference from stations of a primary or permitted service to which frequencies are already assigned or may be assigned at a later date;

c) can claim protection, however, from harmful interference from stations of the same or other secondary service(s) to which frequencies may be assigned at a later date.

From a study of these texts one sees that there are two aspects involved - that of causing harmful interference, and that of claiming protection from harmful interference. In short, stations of a secondary service have little or no rights at all, in this regard, except from stations of the same or other secondary service(s) in the future. Therefore, Administrations should recognize the serious risks involved in assigning frequencies to stations in bands which are allocated in the Table of Frequency Allocations to the service concerned on a secondary basis.

3.7 In dealing earlier with the structure of the Table, mention was made of allocations appearing in foot-notes to the Table concerning areas smaller than an I.T.U. Region. In the Radio Regulations these categories of allocations are foreseen in Nos. 142 to 149 on pages 37 and 38 of the Radio Regulations, 1968 Edition. Generally speaking, these fall into two categories, namely "additional services" and "alternative allocations" and appear in foot-notes to the Table. The key to the standard language used widely in the foot-notes concerned is the difference expressed by the term "also allocated" as distinct from "allocated".

The term "also allocated" means that the competent Conference decided that, in the countries enumerated in the foot-note, the band is allocated to the service(s) mentioned in addition to the service(s) appearing in the Table on a world-wide basis or for the I.T.U. Region concerned (RR142). The term "allocated" means that in the said countries the band is allocated to the service(s) mentioned in place of the service(s) appearing in the Table on a world-wide basis or for the I.T.U. Region concerned.

3.8 It is perhaps worthwhile mentioning at this juncture that at the Geneva Radio Conference, 1959, a great deal of time and effort was spent in reviewing the existing foot-notes containing allocations and in elaborating standard language for use in the revised regulations. Several alternatives had to be taken into account : for example, whether the allocation was in addition or in place of that appearing in the Table; whether the service(s) had primary, permitted or secondary status; whether the allocation had any other restrictive clause, and so on.

3.9 The Conference decided on the following basic standard text to cover all straightforward cases of alternative allocations :

> "In (country-name(s)), the band (from frequency to frequency) is allocated to the (name of service(s)) service" (e.g. RR244, RR245 on page 69).

and of additional services :

> "In (country-name(s)), the band (from frequency to frequency) is also allocated to the (name of service(s)) service" (e.g. RR247 on page 69).

It follows that when the allocation appearing in a foot-note is not restricted by the insertion of a reference to it being on a "permitted" or a "secondary" basis, the allocation has equal status, in the country or area specified, as the primary service(s) appearing in the Table on a world-wide basis or for the rest of the I.T.U. Region concerned.

To obtain an allocation in a foot-note different from that of the allocation appearing in the framed part of the Table for either an additional service(s) or an alternative allocation(s), each country must obtain the agreement of the competent World Administrative Conference. This is necessary because for an allocation to a primary service in a foot-note to the Table to be of any value internationally all other countries, whose services may affect or be affected by a station operating in accordance with the said foot-note, must undertake to respect the allocation in the same manner as a primary allocation appearing in the Table. In this relationship, the basic principle contained in RR117 (page 30) applies; namely, the equality of right to operate. In practice this means that the stations of each service of the same category in one Region or sub-Region (or country specified in a foot-note) must operate so as not to cause harmful interference to services in the other Region or sub-Region (or country specified in a foot-note).

3.10 Two minor points with respect to foot-notes generally :

a) where country names are mentioned, these have essentially a geographical significance and are arranged in the alphabetical order according to the names in French, and

h) particular care should be exercised when considering a foot-note to the Table which is not formulated in the language specifically prescribed in No. 145 of the Radio Regulations for an alternative allocation or in No. 142 for an additional allocation because, in certain cases, the Conference which adopted the text was making a distinction between the sense of the foot-note and an allocation under the terms of either No. 142 or No. 145.

e.g.

244 In Malaya, New Zealand and Singapore, the band 50-51 Mc/s is allocated to the Fixed, Mobile and Broadcasting Services.

245 In India, Indonesia, Iran and Pakistan, the band 50-54 Mc/s is allocated to the Fixed and Mobile Services.

247 In New Zealand, the band 51-53 Mc/s is also allocated to the Fixed and Mobile Services; the band 53-54 Mc/s is allocated to the Fixed and Mobile Services.

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CONFERENCE

1971

Document No. 127-E
10 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 4

SUMMARY RECORD

OF THE

FIRST MEETING OF COMMITTEE 4

Tuesday, 8 June 1971, at 1540 hrs.

Chairman : Mr. E. SANDBACH (Australia)

Subjects discussed	Document No.
1. Terms of reference	65
2. Organization of the work of the Committee and Constitution of Working Groups	
3. List of the provisions of the Radio Regulations and documents to be considered	
4. Designation of Chairmen of the Working Groups	
5. Drafting Group	

1. Terms of reference (Document No. 65)

The terms of reference for Committee 4, as given in Document No. 65 were noted.

2. Organization of the work of the Committee and constitution of Working Groups (C4-1 Annex 2)*)

The Delegate of India suggested adding "and relevant definitions from Document No. 64" under the references for Working Group 4A.

The Delegates of the United Kingdom and the United States of America thought that that was inappropriate in the paragraph on Working Group structure and unnecessary since it was understood that all relevant factors would be taken into account.

The structure of Working Groups suggested in paragraph 1 of Annex 2 was approved.

Terms of reference

The representative of the I.F.R.B. pointed out that some of the proposals listed in Annex 1 of C4-1 would be deleted following the decisions taken that morning in Plenary meeting and the words "as amended" should therefore be added.

The Director of the C.C.I.R. pointed out that the C.C.I.R. Special Joint Meeting had examined a number of items which did not appear to be covered by the various Working Groups.

The Delegates of Belgium and India felt that the report of that meeting (Document No. 64) should be mentioned and its definitions considered along with country proposals.

The Delegates of the United Kingdom and Canada thought that the terms of reference of Working Groups 4B and 4D covered adequately the points mentioned and that ad hoc arrangements could be made by Working Group Chairmen.

*) Amended and replaced by Document No. 118.

The Chairman said that Document No. 64 would be added to the list of documents for consideration with an indication that it would be studied by all the Working Groups and that a further document would be issued attributing particular Chapters to individual Working Groups. In reply to a point raised by the Delegate of Chile, he said that Working Group Chairmen should see that there was consistency of presentation, with ultimate uniformity being ensured by the Editorial Committee.

The representative of the I.F.R.B. assured the Delegate of India that there was no provision which prevented new definitions which were proposed during the course of the meetings from being taken into account.

The Delegate of the United States of America suggested rewording the terms of reference for Working Group 4A as follows : "Consideration of proposals concerning definitions ..."

The terms of reference of Working Group 4A, with that amendment, were adopted.

The terms of reference of Working Groups 4B and 4C, as given in Annex 2, were adopted.

At the suggestion of the Delegate of the United Kingdom, it was agreed to take the title given in the Working Group structure proposal as the terms of reference of Working Group 4D, to allow the Group maximum scope.

The terms of reference of Working Group 4E would be decided later.

3. List of the provisions of the Radio Regulations and documents to be considered (C4-1 Annex 1)*)

List of provisions

At the suggestion of the Delegate of the United States of America, it was agreed to mention that primary consideration of Appendices 1, 1A and ADD 1B was being given by Committee 6.

*) Amended and replaced by Document No. 118

List of documents

In reply to the Delegate of New Zealand, the Representative of the I.F.R.B. explained that documents not assigned to specific Working Groups contained general comments - often concerning questions of principle - for discussion in full Committee; he took the opportunity of expressing the hope that Working Groups would not duplicate Committee discussions by going deeply into matters of substance.

The Chairman in concluding the discussion on the item, in which several delegations participated, said that the list in Annex 1 would be brought up to date to include proposals subsequent to Document No. 99 and to take account of the decisions taken in Plenary meeting regarding the distribution of proposals among Committees. The revised version would also include the agreed reference to Document No. 64 and to a subsidiary document which would show the distribution of chapters to Working Groups. He requested delegations who noticed errors or omissions or wished to make changes to indicate them to the Secretariat of Committee 4 within twenty-four hours.

4. Designation of Chairmen of the Working Groups

Chairmen of the Working Groups were designated as follows :

Working Group 4A	Mr. M.P. Thué	(France);
Working Group 4B	Mr. G.C. Brooks	(Canada);
Working Group 4C	Mr. M.A. del Moral	(Argentina)
Working Group 4D	Mr. K.S. Jowett	(United Kingdom)

It was decided to leave designation of a Chairman for Working Group 4E until the following meeting of Committee 4 as the exact terms of reference of the Group would depend on Committee 6.

5. Drafting Group

The Chairman proposed the formation of a small Drafting Group of three persons, one for each working language of the Conference, to coordinate the drafting of the output of Committee 4. The Delegations of France, the United States of America and Spain agreed to propose representatives, the names to be submitted at a later meeting.

The representative of the I.F.R.B. said that a technical secretary would assist each of the Working Groups :

Working Group 4A	Mr. V. Quintas
Working Group 4B	Mr. M. Sant
Working Group 4C	Mr. L. Sonnesson
Working Group 4D	Mr. I. Dolezel

The technical secretary for Working Group 4E would be designated later.

The meeting rose at 1700 hours.

The Secretary
I. DOLEZEL

The Chairman
E. SANDBACH

SPACE
CONFERENCE

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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 2

SUMMARY RECORD

OF THE

FIRST MEETING OF COMMITTEE 2

(CREDENTIALS)

Thursday, 10 June 1971, at 0930 hrs

Chairman : Mr. C.J. MARTÍNEZ (Venezuela)

Subjects discussed :

1. Terms of reference

2. Organization of the Committee's work

1. Terms of reference

The Chairman read out the provisions of Chapter 5 of the General Regulations governing the deposit and verification of credentials, which constituted the mandate of the Credentials Committee of administrative conferences.

Those terms of reference were adopted.

2. Organization of the Committee's work

The Chairman noted that 53 delegations had so far deposited their credentials and he hoped that all delegations would be duly accredited before the signature of the Final Acts.

He proposed that a Working Group be set up to examine credentials as they were presented to the Secretariat.

It was agreed that the Group would consist of one member from each of the five regions.

On the proposal of the delegate of Argentina, the delegation of the United States of America agreed to represent America (Mr. G.L. Huffcutt).

On the proposal of the delegate of France, the delegation of Spain agreed to represent Western Europe and the Mediterranean Basin (name to be communicated).

On the proposal of the delegate of Australia, the delegation of Japan agreed to represent Asia and Oceania (Mr. Y. Okawa).

On the proposal of the delegate of Roumania, the U.S.S.R. delegation agreed to represent Eastern Europe (Mr. E. Motine).

On the proposal of the Vice-Chairman (Mr. N.P. Kamga, Federal Republic of Cameroon), the delegation of the Democratic Republic of the Congo agreed to represent Africa (name to be communicated).

The Chairman said that the meetings of both Working Group and Committee 2 itself would be so arranged as not to interfere with the work of other Working Groups and Committees.

It was announced that the second meeting of Committee 2 would be held on Thursday 17 June at 1500 hours and it was decided that the Working Group would hold its first meeting on Tuesday 15 June at 0930 hours.

The meeting rose at 1015 hours.

Secretary : Chairman :

W.W. SCOTT C.J. MARTÍNEZ

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CONFERENCE

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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS — GENEVA — 1971

PLENARY MEETING

MINUTES
OF THE
FIRST PLENARY MEETING

Monday, 7 June 1971, at 1600 hrs

Chairman : Mr. Gunnar PEDERSEN (Denmark)

Subjects discussed	Document No.
1. Election of the Chairman of the Conference	-
2. Tribute to the memory of the late Mr. Gross and Mr. Vieira	-
3. Election of the Vice-Chairmen	-
4. Convening of the Conference	91
5. Committee structure and organization of the work of the Conference	65, 107
6. Election of Chairmen and Vice-Chairmen of Committees	-
7. Constitution of the Conference Secretariat	-
8. Invitations to the Conference	92
9. Situation of certain countries with respect to the Convention	94
10. Date by which the Credentials Committee must reach its conclusions	-
11. Admission of International Organizations	93
12. Working hours of the Conference	-
13. Statement by the delegate of India	-

The Secretary-General said that, at their morning meeting, the Heads of Delegations had recognized Mr. Gunnar Pedersen as the doyen of the Conference and that, under the Convention, it was for him to open the meeting.

1. Election of the Chairman of the Conference

Mr. Gunnar Pedersen (Denmark) asked that the results of the deliberations of the Heads of Delegations concerning item 1 of the Agenda should be made known to the Conference.

Mr. Basu (India) announced that all the delegations represented at the Conference considered that Mr. Gunnar Pedersen should be asked to undertake the duties of Chairman of the Conference.

(Applause)

Mr. Gunnar Pedersen (Denmark) was thus unanimously elected Chairman of the World Administrative Radio Conference for Space Telecommunications.

Mr. Basu (India) congratulated the Chairman and said that all the participants in the Conference knew him well and were glad that he was undertaking the guidance of work which was fundamentally important for telecommunications throughout the world. Mr. Pedersen had successfully carried out similar duties over the past 25 years. He had taken part in the deliberations of the first Administrative Radio Conference in Atlantic City in 1947 and had presided over the first Space Conference in 1963. On behalf of all the delegations, he thanked Mr. Pedersen for agreeing once again to undertake such a heavy and complex task.

The Chairman made the statement appearing in Annex 1.

2. Tribute to the memory of the late Mr. Gross and Mr. Vieira

The Chairman paid a tribute to two friends of the I.T.U. who had died recently, first, to Mr. Gerald C. Gross, a most dynamic person who had died in May and had been Secretary-General of the I.T.U. from 1959 to 1965, and secondly, to Mr. Vieira, former head of the delegation of Portugal to many I.T.U. conferences, who had for many years participated actively in various study group meetings.

The Conference observed a minute's silence in memory of the deceased.

3. Election of the Vice-Chairmen

Mr. Basu (India) proposed that the Conference should follow the same procedure as in 1963 and should appoint Mr. Badalov, Deputy Minister of the U.S.S.R. and Mr. Tyson, Ambassador of the United States, as Vice-Chairmen. After referring to the high qualities of those two delegates and their important contributions to the I.T.U., he pointed out that the countries which they represented led the world not only in space telecommunications, but also in space exploration.

Mr. Badalov and Mr. Tyson were elected Vice-Chairmen of the Conference by acclamation.

4. Convening of the Conference (Document No. 91)

The Secretary-General introduced the document, explaining that the coordinated frequency planning for radiocommunication satellites referred to in the second paragraph on page 6 had not been included in the terms of reference proposed for the Committees in Document No. 65, because it had been thought that the Conference should discuss it first and should then decide how the Plenary meeting wished to deal with the question.

The Conference took note of Document No. 91.

5. Committee structure and organization of the work of the Conference (Documents Nos. 65 and 107).

The Conference took note of Document No. 65.

Since Document No. 107, replacing Document No. DT/3, had been distributed in French and English only, it was decided, at the proposal of Mr. Ferrand-Capella (Uruguay), to defer its consideration until the Spanish version was circulated.

6. Election of Chairmen and Vice-Chairmen of Committees

The Chairman pointed out that, according to the usual practice, the Chairman and Vice-Chairmen of the Conference were responsible for the work of Committee 1. He read out the proposals of the Heads of Delegations concerning the chairmanship of the other committees :

Committee 2 - Credentials	-	Chairman : Republic of Venezuela Vice-Chairman : Federal Republic of Cameroon
Committee 3 - Budget Control	-	Chairman : Socialist Republic of Roumania Vice-Chairman : Kingdom of Saudi Arabia
Committee 4 - Technical	-	Chairman : Commonwealth of Australia Vice-Chairman : Mexico
Committee 5 - Allocation	-	Chairman : Swiss Confederation Vice-Chairman : Czechoslovak Socialist Republic
Committee 6 - Regulations	-	Chairman : Republic of Liberia Vice-Chairman : Republic of India
Committee 7 - Editorial	-	Chairman : France, assisted by the United Kingdom of Great Britain and Northern Ireland and Spain

The delegations of the aforesaid countries should appoint the members who would perform those duties and should give their names to the Conference Secretariat as soon as possible.

The proposals of the heads of delegations were approved.

Mr. Fernand-Laurent (France) congratulated the Chairman and Vice-Chairmen of the Conference and the Chairmen and Vice-Chairmen who had just been elected. He wished to take that opportunity of drawing attention to an outstanding event of which he had just been informed, namely, that at 0845 hours that morning the "Salyut" space station had been joined by a team of cosmonauts. That exploit was a credit to the scientific accuracy, technical skill and human resources involved in the space undertakings of the Soviet Union. He thought that he would not only be expressing the feelings of the French delegation in conveying the most heartfelt congratulations to the Soviet delegation through the Chairman of the Conference. (Applause)

The Chairman said it was an excellent omen that such a gratifying event should take place on the very day of the opening of the Conference.

In connection with the distribution of the chairmanship of the committees, Mr. Basu (India) expressed regret that no provision had been made for making use of the services, counsel and contributions of Japan.

The Chairman said that that could be done in the course of the Conference. Everybody would certainly be very glad if the Conference could benefit by Japan's wide experience.

7. Constitution of the Conference Secretariat

The Secretary-General informed the Conference of suggestions concerning the people who might perform the duties of secretaries of the Conference and the seven committees.

Secretary of the Conference : Mr. Stead, Assistant : Mr. Winter

Technical secretary : Mr. Ćomić

Committee secretaries :

Committee 1	:	Mr. Stead
Committee 2	:	Mr. Scott
Committee 3	:	Mr. Prélaz
Committee 4	:	Mr. Dolezel
Committee 5	:	Mr. Matthey
Committee 6	:	Mr. Garcia
Committee 7	:	Mr. Macheret

It was decided that the above-mentioned officials should carry out the secretarial work of the Conference and committees.

8. Invitations to the Conference (Document No. 92)

The Secretary-General introduced the document and said that, since its publication, Bielorussia, Jordan, Liechtenstein, Nicaragua and Vietnam had accepted invitations to the Conference.

The Conference took note of Document No. 92 and of the list of countries which had accepted invitations to the World Administrative Radio Conference for Space Telecommunications.

9. Situation of certain countries with respect to the Convention (Document No. 94)

The Secretary-General said that the Republic of Cyprus had announced that its instrument of ratification of the Montreux Convention would shortly reach the I.T.U. through the proper channels. That country would thus have the right to vote as soon as the Secretariat received the document in question. The delegates of Chile and Uruguay had stated their countries would soon be in the same situation, as the necessary instruments of ratification would shortly be received by the Conference.

In reply to a question by Mr. Yusuf (Uganda) concerning the nomination of the delegate of Liberia as Chairman of Committee 6 when that country had not yet ratified the Montreux Convention and consequently had no right to vote, the Secretary-General said that delegates of countries which had not ratified the Convention were entitled to take part in all the deliberations of the Conference and to make proposals, but did not have the right to vote. That was the only restriction provided for in the Convention.

The Conference took note of Document No. 94.

10. Date by which the Credentials Committee must reach its conclusions

It was decided to give the Credentials Committee three weeks in which to submit its conclusions.

11. Admission of international organizations (Document No. 95)

It was decided to accept the requests for admission to the Conference submitted by the organizations listed in the Annex to the Document.

12. Working hours of the Conference

The Secretary-General proposed the following working hours : two meetings a day from Monday to Friday, the first in the morning from 0930 to 1230 hours with an interval of a quarter of an hour from 1100 hours and the second in the afternoon, from 1500 to 1800 hours with an interval of a quarter of an hour from 1630 hours.

It was so decided.

13. Statement by the delegate of India

(See text in Annex 2)

The meeting rose at 1720 hours.

The Secretary of the Conference :
Clifford STEAD

The Chairman :
Gunnar PEDERSEN

Annexes : 2

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ANNEX 1

STATEMENT BY MR. GUNNAR PEDERSEN, CHAIRMAN OF THE CONFERENCE

I thank all delegates here present for the great honour paid to my country, Denmark, and to myself.

I am deeply impressed by your confidence in me and I shall certainly do my best to bring the conference to a successful conclusion.

I know that we are going to have serious difficulties. But I know from past experience that it normally is somewhat easier to get international agreement in connection with the use of radio frequencies in space than at the surface of our old earth where the existing investments and old traditions make it difficult to obtain agreement on the optimum solutions. And it must be our goal to find the right solutions as the results of our conference could then be of great importance to all nations. If we are successful we will have cleared the road for the continued progress in the field of space activities falling within the I.T.U. responsibility.

We may then see how radio astronomy and space exploration will increase our knowledge of the world in which we are living.

The application of space technology for predicting the weather and for investigating the natural resources at the surface of the earth may then help to create possibility for a better and a safer life for the coming generations.

And the application of space broadcasting and space telecommunication in general may then greatly facilitate and intensify the exchange of information within the countries and between nations. We have good reasons to expect that this could create a sound background for a better understanding among the nations.

I believe that most of the delegates taking part in the 1963 space conference had actually expected that the results of that conference would cover the time period up to 1975 or perhaps 1980. But the space activities since 1963 have been even more successful than expected at that time. A substantial part of all intercontinental telecommunications are now carried by satellites and meteorological satellites have become operational. Experiments in several other fields have been carried out successfully. New provisions but also new and broader radio frequency bands are now needed. The 1963 space conference considered that the allocation of radio frequency bands to space broadcasting was premature. Considering the great technical progress since then it is quite evident that we must find a solution to this problem now. We have furthermore been invited specially by the United Nations Resolution of 16 December 1970 to consider the appropriate I.T.U. provisions under which satellite broadcasting services may be established.

We must now take into account the fact that communication satellites not only are used for intercontinental services but also for regional and domestic use. The allocation of bands must facilitate the use of earth stations near the big cities. The circuit capacity of the satellites must be increased to take care of the explosion of data to be transmitted between centres of great business activity. The density and speed of transport in the air and on the sea has created new problems and may well find their best solution by means of space technique.

It is my firm conviction that we have a good chance of reaching satisfactory results at this conference. The valuable results of the C.C.I.R. meeting in New Delhi last year and the joint group meeting in Geneva early this year will provide a fine starting point for our work. The I.T.U. has for more than 100 years been the effective instrument for coordinating telecommunication activities among nations. The importance has increased steadily and the I.T.U. is now a specialized agency of the United Nations on all telecommunication matters.

The nature of the problems has changed but space telecommunication is merely another form of telecommunication as covered by I.T.U. We must however realize that as the human activity penetrates deeper into space the need for a close cooperation among the nations increases more and more simply for solid technical reasons.

In the Telecommunication Convention and the Radio Regulations we have in the past worked out elaborate rules and regulations all serving to improve the telecommunication services. I believe that we cannot find any other field of human activity where such a detailed set of rules have so largely been respected by all nations.

It is my hope that we now shall be able to adopt new regulations in such a way that the good I.T.U. traditions of the past will be continued in space for the next 10 years or more.

Personally I am looking forward to working with old friends from previous conferences, but also to be working with new members of the I.T.U. We shall need the good cooperation of all in order to solve the many problems on our agenda within the time given to the conference. I shall need your assistance and your good advice, and may I add that I shall always be available to discuss personally with you when you so wish.

We have been given a heavy responsibility and only if we all cooperate we shall succeed - and thus make a constructive contribution which may deserve a few new lines in the history of mankind.

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ANNEX 2

STATEMENT BY THE INDIAN DELEGATE

Mr. Chairman,

The World Administrative Radio Conference on Space Telecommunications, which is meeting today in Geneva, promises to be an epoch-making event in the history of telecommunications and particularly in the progress of space telecommunications. Kindly allow me to express some of the thoughts and expectations from this Conference. We all hope that the decisions of this Conference will facilitate a rapid expansion in the orderly growth of space telecommunications for which the foundation has been laid during the last 14 years or so, commencing from the launching of the first sputnik by the U.S.S.R.

While commercial satellite communication systems are now functioning successfully, a need is being felt for opening suitable bands where the permissible flux-density from the communication satellites should be of a much higher order, thereby reducing the cost of the earth stations which may communicate through these high-powered satellites. This system of space communication would prove useful to many countries for domestic or regional needs, where one has to cover large sparsely populated areas which would otherwise require a much heavier investment to interconnect them to the national and international circuits through terrestrial systems. Many countries like India would be very much interested in this form of technology in space communication systems. I am sure this Conference would endeavour to provide suitable spectrum space for such requirements. The "rationale" of such a need has been clearly established by the C.C.I.R. S.J.M.

The technique of radio astronomy is now developing at a very fast rate. It has opened many new avenues of research which are expected to add substantially to the total knowledge of the heavenly bodies far beyond the reach of the optical telescope. In many countries, including my country, very high-power radio telescopes are functioning and collecting useful data. I am sure the distinguished delegates in this Conference would strive to provide as much protection as possible to the needs of the radio astronomy service and space research, keeping in view its importance to man's knowledge of the universe.

Mr. Chairman, some of the problems that will be dealt with in this Conference are of special significance to new and developing countries. These countries are keenly interested in making use of space radio technology in all its aspects for meeting their developmental needs. This new technology will make it possible to cover the whole population in these countries with communication and broadcasting facilities in a very short time and offers an attractive solution. One of the problems involved in this regard is the allocation of suitable bands for satellite broadcasting. It has been brought out in the work of the International Working Party/ PLEN./2 of the C.C.I.R., that the utilization of bands around 12 GHz would involve an economic penalty to the new and developing countries. This arises firstly because of the likely heavy attenuation the signals from satellites may suffer due to heavy rains in the tropical and sub-tropical regions, where most of the new and developing countries are situated. Secondly, the electronic circuitry required to enable a conventional television set receive transmissions at 12 GHz from the FM television satellites, would cost much higher than that for 800 and 2 500 MHz bands. No doubt the countries where these bands are already in use for terrestrial radio services, may have to generously make some adjustments in this regard. We are earnestly looking forward that this Conference would, with the cooperation and assistance from all the delegates present here, evolve suitable allocations and realistic regulations to meet these requirements, especially of new and developing countries.

Mr. Chairman, we have assembled here today with great expectations. Your Chairmanship inspires us. The ever-increasing rate of scientific achievements during the period over the last century has been possible by the nations' ever closer working together across national and man-made frontiers. This has altered the texture of our life so very deeply, intimately and permanently. We are sure that the outcome of this Conference will offer ways and means for the quick realization of the dreams of humanity in the field of telecommunication.

Thank you, Mr. Chairman.

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SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 5

MALAYSIA

1. Replace last sentence of paragraph 1 by :

"In contrast, the observations in paragraph 3.4.3.3.2.1 on page 39 of the Special Joint Meeting Report of the C.C.I.R., Geneva, February-March 1971, discourages sharing of the UHF band in the vicinity of 800 MHz between trans-horizon and broadcasting-satellite services."

2. In the last sentence of paragraph 2, replace "of the upper UHF band" by "at about 800 MHz".

3. In paragraph 3, replace "upper UHF band" by "frequency bands from 610 MHz to 960 MHz".

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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 130-E
11 June 1971
Original : English

COMMITTEE 5

MALAYSIA

GENERAL COMMENT CONCERNING PROPOSALS

ARTICLE 5 OF THE RADIO REGULATIONS, BROADCASTING-SATELLITE SERVICE

The Malaysian Delegation refers to the Technical Report on the satellite broadcasting system in the upper UHF band by the Indian Space Research Organization and also to the Document No. 111 of the Republic of India. The Government of Malaysia have only but admiration for the bold experiment in direct broadcasting by satellite that the Republic of India intends to conduct with the aid of NASA of the U.S.A. It is indeed commendable that India, with problems of immense magnitude, should embark on this pioneering project. This, we sincerely hope, will be very successful and bring literacy and education to the masses. India has proposed the frequency of 850 Mc/s in the upper UHF band for this project. Malaysia in Region 3 has in operation a troposcatter multichannel link, spanning the China Sea, between East and West Malaysia in the region of 850 Mc/s. Other trans-horizon systems in the upper UHF band are being planned within Malaysia and between Malaysia and her neighbouring countries. The troposcatter system in operation in Malaysia has perhaps one of the longest hops for a trans-horizon system, i.e., about 750 km. It is a vital and reliable means of communication within our country. The deliberations in the Technical Report and the Document by the Indian Space Research Organization and the Republic of India respectively, suggest that adequate protection can be ensured. In contrast, the observations in paragraph 3.4.3.3.21 on page 39 of the Special Joint Meeting Report of the C.C.I.R., Geneva, February-March 1971, discourages frequency sharing of the upper UHF band between trans-horizon and broadcasting-satellite services.

At first consideration, it is likely that the antenna of the troposcatter terminal in East Malaysia and probably those of a few trans-horizon systems planned by Malaysia are pointing towards the geostationary orbit of the proposed Indian satellite. In the area in Region 3 where the East-West Malaysia link is in operation there are periods where the median level of signal received of this link is close to threshold level. The mechanics of the troposcatter transmission is even today not properly understood. Further, the Special Joint Meeting report has not considered the required power flux-density limits in the case of sharing of the upper UHF band between the satellite broadcasting and trans-horizon services.

Considering all these factors, the Government of Malaysia is of the opinion that the use of satellite broadcasting systems in the upper UHF band in Region 3 should be avoided.

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COMMITTEE 4

JAPAN

ALLOWABLE POWER FLUX-DENSITY PRODUCED AT THE SURFACE ON THE EARTH BY A SATELLITE IF RADIO-RELAY SYSTEMS WERE TO SHARE THE FREQUENCY WITH SPACE SERVICES IN THE BAND 2.3-3 GHz

1. Introduction

This document is in response to the request set forth in Annex 2-4 to the S.J.M. Report.

Allowable power flux-density in the band 2.3-3 GHz was derived by comparing two frequencies, 2.5 GHz and 4 GHz which are the representative of 2.3-3 GHz and 3-8 GHz respectively. (Concerning the 3-8 GHz, the values of power flux-density were agreed at the S.J.M.)

The result of calculation shows that it is necessary to limit the power flux-density 2 db low in the band 2.3-3 GHz as compared with 3-8 GHz.

The radiation diagram of radio-relay antenna used in this document is one which is proposed in the S.J.M. Report.

2. Models assumed in calculation

The method of calculating an aggregate interference noise into a 2,500 km long radio-relay system is similar to the one used in Document M/39 submitted to the S.J.M. from Japan, the title of which is "Maximum power flux-density at the surface of the earth from communication-satellite in the band 1-10 GHz".

The models assumed in calculation are as follows :

(1) Parameters of geostationary satellites

Geostationary satellites, producing the maximum power flux-density at the surface of the earth allowed for are placed along the orbit with 6° spacing.

(2) Atmospheric attenuation

The attenuation in the earth to space link at the elevation angle of 0° is 3.8 db at 4 GHz and 3.2 db at 2.5 GHz (see C.C.I.R. Report 234-2).

This means that the 2.5 GHz radio-relay systems are more sensitive to interference than 4 GHz radio-relay systems. But no account was taken of the atmospheric attenuation in the calculation of interference.

(3) Parameters of radio-relay systems

Hop distance was assumed to be 60 km at 2.5 GHz in order to take advantage of better propagation condition at lower frequencies.

Other parameters concerning 2.5 GHz and 4 GHz were derived from the same models. (The justification for adopting these models at 2.5 GHz is given in (4).)

	2.5 GHz	4 GHz
Hop distance (km)	60	50
Antenna effective area (m^2)	7.5	7.5
Antenna gain (db)	38	42
Feeder attenuation	3 db	3 db
Polarization discrimination (db)	none	none
Receiver system noise temperature (°K)	750	750
Baseband thermal noise per hop under free space (pWp)	25	25
Restriction of antenna direction	none	none

(4) Radiation diagram of radio-relay antenna

Average sidelobe gain was assumed to be given by

$\Phi_o \leq \Phi \leq 40°$	$35 - 25 \log_{10} \Phi$	(db)
$40 < \Phi \leq 180$	-5	(db)

Where $\Phi_o = 0.76°$ for 2.5 GHz and $\Phi_o = 0.52°$ for 4 GHz.

The radiation diagram for angles less than 40° is based on the assumption that ($38 - 25 \log_{10}\Phi$), which is shown in § 8.1.1 of the S.J.M. Report, represents the peak-envelope of sidelobe, and that the difference between the peak value and the average value is 3 db.

(5) Locations and antenna directions of radio-relay stations

As the interference noise depends on the latitudes of a radio-relay route, three values of latitudes of 0° (low latitude), 40° (medium latitude) and 60° (high latitude) were considered. It was further assumed that all radio-relay stations are located at the same latitude and that the azimuth (the azimuth towards the south is zero for the northern hemisphere), of each antenna is uniformly distributed over Azo + 15° ~ Azo − 45° (where Azo is the azimuth of the geostationary satellite orbit at elevation angle of zero) and the elevation is distributed over −3° ~ +3° with a triangular distribution curve.

(6) Power flux-density curve

The curve adopted in the calculation of interference is the one which was established by the S.J.M. for the band 3-8 GHz and is given by

-152	$\mathrm{dbW/m^2/4\ kHz}$	$0° \leq \Theta \leq 5°$
$-152 + \frac{\Theta - 5}{2}$	$\mathrm{dbW/m^2/4\ kHz}$	$5° \leq \Theta \leq 25°$
-142	$\mathrm{dbW/m^2/4\ kHz}$	$25° \leq \Theta \leq 90°$

3. Results of calculation and discussions

(1) An aggregate interference noise over a 2,500 km long radio-relay system depends on antenna directions as well as on the latitude of the route and, therefore, is a statistical value. Accordingly, results of calculation carried out for the models above mentioned give the statistical distribution of an aggregate interference noise.

The results are shown in Table 1.

It is unavoidable that the interference noise of 1,000 pWp of the C.C.I.R. Recommendation 357-1 would be exceeded in some unfavourable routes. In this document, just the same as in Document No. M/39, it was assumed to be reasonable that the 20% value be chosen as the reference on which the p.f.d. limit should be derived.

(2) The 20% value of an aggregate interference noise at 4 GHz lies in the range of -57.1 to -57.4 dbmOp, all of which exceed -60 dbmOp (1,000 pWp). This shows that the probability of interference noise to exceed 1,000 pWp is very great for the models shown in § 2.

But there are several factors which were not considered in calculations, as explained in detail in § 2.4.2 and Annex 2-4 of the S.J.M. Report. Some of them are optimistic and others, pessimistic. Therefore, it was assumed that, on balance, the interference noise at 4 GHz is 1,000 pWp and only the difference of an aggregate interference noise between at 2.5 GHz and at 4 GHz is paid attention to.

These differences, as shown in Table 1, lie in the range of 1.7 to 2.1 db, the interference noise at 2.5 GHz being greater than at 4 GHz. This result was derived after a rather complicated computer simulation and, therefore, it is difficult to identify the contribution of each factor. However, the following factors may be pointed out.

(a) The level of interference noise caused by an in-beam entry is independent of frequency.

But the wider width of antenna beam at 2.5 GHz increases the probability of an in-beam interference entry.

(b) The level of an interference noise caused by off-beam entries at 2.5 GHz is greater by about 4 db than at 4 GHz.

(c) The longer hop distance at 2.5 GHz contributes to the decrease of interference noise.

However, this factor is more than cancelled by the factors (a) and (b).

(3) In conclusion, the power flux-density at 2.5 GHz must be lower 2 db than at 4 GHz in order that the 2.5 GHz system may be given the same degree of protection as the 4 GHz system.

4. Justification of the system to be protected

The 2.3-2.7 GHz band is currently allocated to fixed and mobile services, and due to good propagation characteristics, it is widely used for medium channel capacity radio-relay systems. The model shown in § 2 makes it possible to carry 960 telephone channels with the C.C.I.R. noise performance by means of transmitters with about 800 mW output power.

The transmitter power should be kept to the minimum, because the increase of the output power makes power consumption at a repeater station larger and brings about lower reliability of equipment.

Furthermore, it is generally difficult for radio-relay antenna of this type of the system to avoid exposures from the geostationary satellite orbit.

It is, therefore, reasonable to protect the model assumed in calculation of this document. Further comments may be necessary on C.C.I.R. Recommendation 283-2 in which the radio channel arrangement is given for systems in the band 2 500-2 700 MHz with a capacity of 300 channels. Judging from the present technology, however, this recommendation seems to be rather old and, therefore, it seems reasonable to increase the channel capacity to at least 960 channels.

In fact, the 960 channel system is standard in this frequency band in Japan and a proposal for the amendment of Recommendation 283-2 will be submitted to the next interim meeting of the C.C.I.R. Study Group 9.

It should be noted that C.C.I.R. Recommendation 382-2 provides for the radio channel arrangement for a system with a capacity of 1,800 channels at 2 GHz band, and, hence, large capacity transmission at 2 GHz is a proven technique.

5. Conclusion

It is necessary that, if space services share the frequency in the range of 2.3 to 3 GHz with line of sight radio-relay system, the maximum power flux-density of a satellite at the surface of the earth should be as follows.

-154	$\mathrm{dbW/m^2/4\ kHz}$	$(0° \leq \theta \leq 5°)$
$-154 + \frac{\theta - 5}{2}$	$\mathrm{dbW/m^2/4\ kHz}$	$(5° \leq \theta \leq 25°)$
-144	$\mathrm{dbW/m^2/4\ kHz}$	$(25° \leq \theta \leq 90°)$

Where θ is an angle of arrival above the horizontal.

TABLE 1

Aggregate interference noise (dbmOp)
in 2.500 km long radio-relay route

	Percentage	Latitude (degrees)		
		0°	40°	60°
Noise (dbmOp) at 2.5 GHz	50%	-57.1	-56.9	-56.8
	20%	-55.4	-55.3	-55.2
	10%	-54.7	-54.5	-54.4
	5%	-53.4	-53.9	-53.8
	1%	-52.9	-52.9	-52.8
Noise (dbmOp) at 4 GHz	50%	-60.1	-60.1	-60.0
	20%	-57.1	-57.4	-57.2
	10%	-56.2	-56.5	-56.4
	5%	-55.3	-55.9	-55.5
	1%	-54.1	-54.5	-54.3
Difference between 2.5 GHz and 4 GHz (db)	20%	1.7	2.1	2.0

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PLENARY MEETING

JAPAN

INFORMATION DOCUMENT RELATING TO ALLOCATION OF FREQUENCIES ABOVE 40 Gc/s

It is difficult to foresee the future requirements in the frequency band above 40 Gc/s in concrete form, and the technical data, which justify the forecast of this usage in a materialized way, are scanty at the present stage. However, with a view to making good use of these new frequency bands, it is very important to expedite the development of this new portion of the spectrum for practical utilization, fixing a target of research and development thereof.

1. Basic way of thinking

It is hardly possible to come to any definite conclusion on the aptitudes of the utilization classified by service. However, the characteristics of frequency in propagation loss caused by atomospheric absorption, are obvious. Therefore, it is a basic problem how to use properly the territory of "window" where absorption coefficient is lower and the territory where absorption coefficient is higher, depending upon their specific characteristics, (on the basis of C.C.I.R. Report 223-2, New Delhi).

It is noted that the important spectra in the field of radio astronomy and space research are included in the frequency band above 40 Gc/s. Therefore, with respect to the protection of the aforesaid spectra, we must say that they are very worthy of attention. Moreover, regarding these frequency bands, further technical development for future utilization is foreseen in the terrestrial service in these bands. Accordingly, it is considered necessary to pay full consideration to the utilization of this terrestrial service too. In view of the foregoing, the allocation table has been prepared with due consideration to the following matters based on the above-mentioned way of thinking.

2. Key points considered at the time of preparing the allocation table

(1) It is conjectured that the territory of "window" will be below 50 Gc/s, 70-110 Gc/s, 135-160 Gc/s and around 220-285 Gc/s. These portions are appropriate for communication service between earth and space, and would be very important frequency bands, affording a great capacity of communication service, broadcasting-satellite service which assumes the form of renovation, aeronautical and maritime mobile services which utilize space techniques, earth science satellite, space research service and radio astronomy service.

(2) The frequency bands in the vicinity of 60 Gc/s, 120 Gc/s and 180 Gc/s do not seem appropriate for the communication between space and earth because the atmospheric attenuation is very high.

However, these bands would become important for space-to-space communications and short-haul terrestrial communications.

It should also be noted that these frequency bands could be available for the communication between aircraft at high altitude.

(3) Astronomical observations on the earth's surface are possible through the radio window of 70 to 110 Gc/s. Of interest are the observations of the spectrum lines of Formaldehyde in the vicinity of 73 Gc/s and Hydrogen cyanide in the vicinity of 88 Gc/s.

The 71 to 73 Gc/s band is of particular importance from technical and physical viewpoints.

(4) With respect to the use of the frequency band above 40 Gc/s, it is worthy of attention, from the economic point of view, that the unit of frequency bandwidth should be wide enough to accommodate a large capacity of communications.

It should also be noted that a high resolution radar is now under development in order to meet the increasing requirement for radiodetermination.

SPACE
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UNITED KINGDOM

Page 3, paragraph 9, 8th line : replace "250 Mc/s" by "250 kc/s".

Page 3, paragraph 10, 2nd line : replace "for" by "from".

Page 3, paragraph 10, 6th line : replace "Channel 37" by "Channel 39".

SPACE CONFERENCE

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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

UNITED KINGDOM

PROPOSALS FOR FREQUENCY ALLOCATIONS TO THE MARITIME MOBILE SERVICE USING SPACE COMMUNICATION TECHNIQUES AT FREQUENCIES OF THE ORDER OF 450-600 Mc/s

1. The S.J.M. Report (4.4.1.1) states that from an economic and technological point of view of a frequency band at about 400 Mc/s was the most suitable for maritime satellite communications since it would permit the engineering of relatively low-powered and economical equipment as well as simple antenna designs for a satellite system. Some administrations considered that the use of higher frequencies might postpone or prevent small ships from using satellite techniques; others considered that it might prevent the early introduction of a satellite system for the maritime mobile service. The S.J.M. concluded that the WARC-ST should be invited to examine the possibility of providing exclusive channels for the maritime mobile service at about 400 Mc/s.

2. The S.J.M. (4.2.1.1) concluded that a bandwidth equivalent to approximately 200 voice channels should be provided for the maritime satellite service. This figure excluded channels required for distress, safety, search and rescue and radiodetermination.

On the assumption that each channel would require a bandwidth of 25 kc/s there would be a total bandwidth requirement of 5 Mc/s for the space-to-earth transmissions and 5 Mc/s for the earth-to-space transmissions. It is assumed that the communication-satellite bands would be used for the link between the satellite and the earth station on land.

3. The U.K. has reconsidered the proposals in Conference Document No. 54 in the light of the S.J.M. conclusions and is of the opinion that a viable maritime satellite system which caters inter alia for the requirements of smaller ships could best be met by allocation of frequencies in the 400-600 Mc/s region.

4. The U.K. has considered the possibility of finding two exclusive allocations of the order of 2 Mc/s wide in a frequency range of the order of 400-600 Mc/s but has come to the conclusion that this is not possible. It has therefore examined the possibility of finding two bands at this order of frequency which the maritime mobile satellite service could share with existing terrestrial land-based services providing the operation of the maritime service in these was restricted to the "high seas" e.g. some 200 km or more from coastlines and two smaller bands each some 250 kc/s wide which could be used by ships in coastal waters or in port.

5. The U.K. proposals are for two 2 Mc/s wide shared bands, one, 468-470 Mc/s, for the space-to-earth directions (DOWN) and the other 611-613 Mc/s, for the earth-to-space direction (UP), for "high seas" operation and two 250 kc/s exclusive bands, one, 464-464.25 Mc/s, space-to-earth (DOWN) and the other 607-607.25 Mc/s, earth-to-space (UP), for "coastal" operation.

6. In selecting the band 468-470 Mc/s for the (DOWN) band the U.K. has borne in mind that this band is allocated to the fixed and mobile services, and that it would be necessary to limit the power flux-density from the satellite to a level that would not cause unacceptable interference to these services but would still be adequate for a maritime satellite service.

7. To enable smaller ships to operate satisfactorily with a reasonably simple antenna (i.e. one without a complex stabilizing system) a beamwidth of some 50° (i.e. $\pm$ 25°) would be desirable. Such an antenna would have a beam-edge gain approaching 8 db and would require a power flux-density of - 140 dbW/m^2 for a satisfactory service (S.J.M. Annex 4.4, page 143).

8. A power flux-density of this order would not result in very significant interference to land mobile services except at the extreme edge of the service range when this is limited by receiver noise. Most land mobile services are however not limited by receiver noise but by co-channel and adjacent channel interference and do not operate to the limit of the service range determined by receiver noise. It is therefore concluded that a power flux-density of - 140 dbW/m^2 would not cause unacceptable interference with terrestrial services using the frequency band 468-470 Mc/s.

9. The band 464-464.25 Mc/s has been selected as the space-to-earth (DOWN) band for use in coastal waters and its use for a maritime mobile service would limit the use of the band by terrestrial services within interference range, i.e. within some 100-150 km of coastal areas or parts in which ships might operate. In more inland areas however the band could be freely used by fixed and land mobile services using radiated powers up to the order of 100 watts e.i.r.p. The clearance of a small band of 250 Mc/s wide by, say 1975, would not present a difficult problem in view of the fairly wide bandwidth available to fixed and mobile services at this order of frequency.

10. The earth-to-space (UP) band proposed for "high seas" operation, 611-613 Mc/s, has been chosen for a band which is nominally allocated to broadcasting but which is generally used for radio astronomy. However, the radio astronomy use is generally confined to a 2 Mc/s band, 608-610 Mc/s, a situation which has come about because of interference from high power television transmitters operating above 614 Mc/s. (In Europe, Channel 37, 614-622 Mc/s) and from high-power radar below 606 Mc/s. However, a maritime mobile satellite service could operate satisfactorily in the band 611-613 Mc/s without causing interference to radio astronomy and would not suffer interference from services in the bands adjacent to the band 606-614 Mc/s. It would not however be desirable for high-power broadcasting stations to operate in this part of the band because of potential serious interference to the maritime satellite service. For this reason it is proposed that the allocation to broadcasting should be secondary from 1975.

11. The earth-to-space (UP) band proposed for use in coastal waters is 607-607.25 Mc/s and has been chosen to give reasonable separation from radio astronomy operating in the band 608-610 Mc/s and from radar operating below 606 Mc/s. It is considered that these frequency spacings and the geographical separations that will exist in practice will be adequate to avoid mutual interference.

12. While the allocations proposed are the most suitable as far as the U.K. is concerned there is some flexibility in the choice of frequencies. For example, the 250 kc/s "coastal" DOWN band could be located elsewhere in the 450-470 Mc/s band, e.g. within the band 454-455.3 Mc/s or the band 458.5-459.5 Mc/s and an allocation of 250 kc/s in either band could be accepted. Equally some small adjustment of the "coastal" UP band could be accepted.

U.K. Proposals based upon these considerations are given in Document No. 108.

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

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PLENARY MEETING

INTERNATIONAL AIR TRANSPORT ASSOCIATION

I.A.T.A. VIEWS ON ARTICLE 5 OF THE RADIO REGULATIONS

Introduction

1. As a major component of the civil aviation world-wide industry, I.A.T.A., representing 108 member airlines providing international scheduled operations, makes use of many facilities and services employing radio technology as governed by the I.T.U. Radio Regulations.

2. I.A.T.A. recognizes a need for improvements in long-range aeronautical mobile communications quality and reliability to provide direct voice communications between the pilot, air traffic control and airline company control and to provide, in the future, automatic air/ground/air data transmission capability. I.A.T.A. is also of the opinion that use of space telecommunication techniques offers the best prospects for achieving the desired improvements. The achievement of improved facilities for long-range communications will lead to increased safety, expedition and efficiency of civil air transport operations.

3. The objective of this paper is to draw attention of the W.A.R.C. to the views of I.A.T.A. in relation to those parts of Article 5 of the Radio Regulations that affect the aeronautical mobile services.

4. The I.A.T.A. views relate to the following frequency bands :

(a) Band 117.975-132 MHz

(b) Band 132-136 MHz

(c) Band 1 537.5-1 657.5 MHz

(d) Band 5 000-5 250 MHz

(e) Band 10 000-10 500 MHz

(f) Band 40-260 GHz.

5. The growth of civil air transport operations and the extension of radiotelecommunication technique usage leads I.A.T.A. to believe, in the interests of safety of life, that allocation of radio frequency spectrum exclusively to the aeronautical services is essential.

6. Band 117.5-132 MHz

6.1 Although no specifications for an aeronautical space telecommunications/radionavigation/radiolocation system have yet been established the present wording of Footnote 273A appears unduly restrictive. It is considered that the wording of Footnote 273A could be made more flexible without losing any protection of "conventional" terrestrial services which is the subject of the last sentence of the existing Footnote 273A.

6.2 Further, with the advance of electronic and radio technology it is becoming economically possible to provide operational flexibility for the application of space communication techniques to offer both radiocommunication and radiodetermination facilities and to permit such systems to interface with the existing aeronautical infrastructure.

7. Band 132-136 MHz

7.1 In Region 2, the 132-136 MHz band is extensively used to meet the requirements for air traffic control channels. This was already recognized in the existing Radio Regulation 276 stating that in the band 132-136 MHz the aeronautical mobile (R) service shall operate on a primary basis subject to coordination between administrations concerned and those having services in accordance with the Table, which may be affected. To some extent, there appears to be an inconsistency between the Radio Regulation 276 and the primary service allocations in the existing Table. Furthermore, there is a requirement for a world-wide uniformity in the allocation of the band 132-136 MHz particularly in the light of the provision of Radio Regulation 273A.

7.2 In Region 3, requirements for air traffic control channels in the 132-136 MHz band are rapidly increasing and difficulties are being experienced in making such channels available. The I.C.A.O. MID/SEA RAN Meeting (1968) reviewed this matter, noting that, in some countries in Region 3, frequencies in the band 132-136 MHz had been assigned in accordance with the primary allocations in the existing Table. The existing provisions of 277 state that, in Region 3, the band 132-136 MHz will eventually become exclusively allocated to the aeronautical mobile (R) service. However, the I.C.A.O. MID/SEA RAN Meeting considered that if this were left to the ordinary processes of evolution it might take a long time before the band would indeed become exclusively available for the aeronautical services. Accordingly, the Meeting established a recommendation (17/4) to the effect that civil aviation authorities of the states concerned in Region 3, urge their radio frequency licencing authorities to take urgent action for the release of the frequencies in the band 132-136 MHz for the aeronautical mobile (R) service.

7.3 In view of the above I.A.T.A. considers that for reasons of consistency and for the possible future application of space techniques, the allocation for the band 132-136 MHz in Regions 2 and 3 could be changed to provide unique allocation on a world-wide basis to the aeronautical mobile services.

7.4 If this principle is accepted, consequent changes to Footnotes 276 and 277 would be necessitated. (Further, Footnote 279 would no longer be necessary.)

8. Band 1 540-1 660 MHz

8.1 There is a requirement, based on forecast air traffic expansion, to provide additional spectrum and allotment flexibility to the aeronautical mobile (R) and radionavigation services.

8.2 I.A.T.A. is of the opinion the existing spectrum width of 120 MHz is adequate for aeronautical mobile services. However, it is at present exclusively allocated on the basis of aeronautical radionavigation. In order to provide flexibility in application to meet growing needs for aeronautical mobile (R) service, the allocation to services should be amended to allocate part of the band (40 MHz in total) to aeronautical mobile (R) use. Such an allocation should be exclusive to the aeronautical services world-wide.

8.3 If accepted, there would be consequential changes in Footnotes 350A, 352A and 352B.

9. Bands 5 000-5 250 MHz and 10 000-10 500 MHz

9.1 It is suggested that, in order to provide for expanding requirements of the aeronautical mobile (R) service both the above bands could be allocated uniquely to aeronautical mobile (R) and aeronautical radionavigation on an equal basis.

9.2 Each of the bands is respectively a sub-harmonic or a harmonic of the other to offer potential for radionavigation system application.

9.3 If acceptable, both bands could be subject to modified footnotes.

10. Allocations above 40 GHz

(a) The highest frequency band allocated exclusively to aeronautical radionavigation in the existing Allocation Table appears at 15.4-15.7 GHz. It is expected that there will be expanded communication and navigation requirements for conventional aeronautical and/or advanced spacecraft transports, which can be accommodated in the frequency spectrum above 40 GHz. With respect to such new allocations, it is considered that the needs of the aeronautical service could best be met by exclusive allocations to both the aeronautical mobile (R) service and the aeronautical radionavigation service having equal status.

(b) It should be realized that precise requirements for spectrum space above 40 GHz for aeronautical purposes are difficult to ascertain at the present time. However, from the information available, it is considered that the allocations such as those proposed by New Zealand in NZL/62/51-58 are adequate in terms of bandwidth. Further, the exact location in the spectrum of the allocations may be subject to adjustment in the light of further developments. While, therefore, the actual position of the bands and their widths may be subject to adjustment, it is considered that certain principles should be adhered to. The most important principle is that the allocations are on an exclusive basis to the aeronautical services. Further, it appears desirable that a harmonic relationship be included in any adjustments that may become necessary. It should be mentioned at this point that harmonically related bands are particularly useful in this part of the spectrum where, except for the absorption lines, the propagation characteristics are similar over several octaves.

SPACE
CONFERENCE

Document No. 135-E
14 June 1971
Original : French

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

WORKING GROUP 5D

RECOMMENDATIONS BY I.M.C.O. CONCERNING MARITIME REQUIREMENTS FOR THE USE OF SPACE TECHNIQUES

At the first meeting of Working Group 5D, the representative of the Inter-Governmental Maritime Consultative Organization (I.M.C.O.) expressed the desire that Circular-letters Nos. 192 and 222 from the Secretary-General of the I.T.U., dated 5 November 1970 and 25 February 1971 respectively, should be reproduced. These texts are annexed hereto, for information purposes.

Annexes : 2

INTERNATIONAL TELECOMMUNICATION UNION

UNIÓN INTERNACIONAL DE TELECOMUNICACIONES

SECRÉTARIAT GÉNÉRAL

UNION INTERNATIONALE DES TÉLÉCOMMUNICATIONS

ADRESSE TÉLÉGRAPHIQUE : BURINTERNA GENÈVE
TÉLÉPHONE 34 70 00 — 34 80 00
TÉLEX 23000

GENÈVE, 5 November 1970
PLACE DES NATIONS

Référence à rappeler dans la réponse :
When replying, please quote :
Indíquese en la respuesta esta referencia :
Nº Circular-letter No. 192

Subject : Distribution of an I.M.C.O. Recommendation

To the Director-General

Dear Sir,

Following a request received from the Secretary-General of the Inter-Governmental Maritime Consultative Organization, I have pleasure in sending you one copy in English of a Recommendation adopted by the Maritime Safety Committee of I.M.C.O.

Yours faithfully,

For the Secretary-General

R.E. BUTLER
Deputy Secretary-General

Annex : 1

Prière d'adresser toute correspondance officielle à
Please address all official correspondence to
Toda correspondencia oficial debe dirigirse a

Monsieur le Secrétaire général
Union internationale des télécommunications
1211 GENÈVE 20
Suisse - Switzerland - Suiza

ANNEX XI

RECOMMENDATION

MARITIME REQUIREMENTS FOR THE USE
OF SPACE TECHNIQUES

THE MARITIME SAFETY COMMITTEE,

NOTING that the International Telecommunication Union will convene in June 1971 a World Administrative Radio Conference for Space Telecommunications, hereafter referred to as the Space Conference,

NOTING FURTHER that at present no provision is made for the use of space techniques for the maritime mobile service,

RECOGNIZING that the use of space techniques could significantly improve the safety and navigation of ships and other units operating at sea, as well as the efficiency and economy of shipping, which carries 80 per cent of the world trade,

APPROVES the attached consolidated paper prepared by the Sub-Committee on Radiocommunications in cooperation with the Sub-Committee on Safety of Navigation, in order to assist Member Governments in their preparations for the Space Conference,

RECOMMENDS that administrations :

a) approach their national telecommunication authorities with a view to incorporating the maritime requirements, which appear in the Appendix to this Recommendation, in their national proposals for the Space Conference;

b) in view of the importance of this Space Conference for the maritime mobile service, make provision for the inclusion of an appropriate number of maritime telecommunication experts in their national delegations,

REQUESTS the Secretary-General :

a) to bring the Recommendation to the attention of I.M.C.O. Member Governments, Parties to the 1960 Safety Convention and Governments who participated in the 1960 Safety Conference, for action as mentioned in the previous paragraph;

b) to submit the Recommendation to the International Telecommunication Union for distribution to its Members;

c) to convey the Recommendation to Executive Heads of the United Nations, the International Civil Aviation Organization and the World Meteorological Organization for their consideration;

d) to submit the Recommendation and any other relating materials to the International Radio Consultative Committee for consideration at its Special Joint Study Group meeting in February - March 1971.

APPENDIX

PART I

STATEMENT OF MARITIME REQUIREMENTS
FOR THE USE OF SPACE TECHNIQUES

1. Introduction

a) At its twenty-fourth session in May 1969 the Administrative Council of the International Telecommunication Union (I.T.U.) decided that a World Administrative Radio Conference for Space Telecommunications will be held at Geneva in June 1971. The Conference, among other things, will consider and revise, as necessary, the Radio Regulations including the existing Table of Frequency Allocations to provide for the use of space radio techniques by the Aeronautical Mobile and Maritime Mobile Services.

b) The purpose of this document is to outline present and future maritime operational requirements for the use of space techniques and the consequential frequency allocations necessary to satisfy these requirements.

2. International cooperation

a) I.M.C.O. is closely cooperating with the United Nations Committee on the Peaceful Uses of Outer Space and with other Specialized Agencies, in particular the International Telecommunication Union (I.T.U.) and the International Civil Aviation Organization (I.C.A.O.).

b) Since the problems of I.C.A.O. and I.M.C.O. are to a certain extent similar, every effort is being made by I.M.C.O. to identify common or closely related requirements of the Aeronautical and Maritime Mobile Services which could be satisfied by the application of common techniques on the most economical basis.

3. World Administrative Radio Conference, Geneva, 1967

The World Administrative Radio Conference, Geneva, 1967, adopted Recommendation No. MAR.3, in which it invites :

a) Administrations to determine the foreseeable operational requirements of the Maritime Mobile Service that can be accommodated by means of space communication techniques;

b) I.M.C.O. to continue to study requirements and other considerations where benefit may accrue to the safety and navigation of ships at sea through application of space communication techniques;

c) C.C.I.R. to study the technical aspects of systems which offer the potential of fulfilling these maritime requirements and to recommend a practical system with particular attention to the environment in which ships operate.

4. Operational requirements

a) The Maritime Safety Committee, in determining maritime operational requirements for the use of space techniques, took into consideration :

i) Recommendation No. MAR.3 of the World Administrative Radio Conference, Geneva, 1967;

ii) the need to improve the existing Maritime Distress System, search and rescue and safety communications;

iii) the opportunity to meet certain operational requirements of the Maritime Mobile Service which cannot be met by the existing resources and methods;

iv) the desirability of improving the present navigation and ship location systems;

v) the present heavy congestion in frequency bands available to the Maritime Mobile Service;

vi) the continuous rate of growth of maritime mobile communications and of the number of ships which will make the present allocated frequency bands inadequate within the foreseeable future.

b) The system should in principle be able to operate reliably 24 hours a day, not being limited by weather conditions and its performance should not be impaired by propagation circumstances.

It should have sufficient capacity to cover all vessels which desire to use it.

The shipborne equipment should operate in conditions of rolling and pitching normally experienced by ships.

c) Based on the considerations mentioned above, the following is a list of the main maritime operational requirements for a system using space techniques. It is considered that the requirements will increase as users experience the advantages of a reliable world-wide satellite system.

Furthermore the provision of a wide area coverage, high quality, rapid access communication system would enable several of the important operational requirements to be satisfied by such a system.

1. Handling of distress cases including distress alerting and search and rescue control communications, also position determination by the land-based station of the unit in distress and of SAR units involved. In special cases communication between search and rescue centres.

2. Distribution of urgency and safety messages including medical assistance.

3. Interrogation of the land-based station by mobile craft station for obtaining position information possibly followed by environmental meteorological and oceanographic information, or regular interrogation of the mobile craft station in appropriate time intervals by the land-based station and transmission of position information etc. to the mobile craft.

4. Initial position determination providing accuracies of the order of 1 - 2 nautical miles. As technology develops, and considering cost effectiveness, the accuracy may be improved to be suitable for navigation near coasts, in narrow passages and fairways.

5. Transmission of highly accurate standard frequencies and time signals.

6. Selective calling and multiple access technique to facilitate communications.

7. Selective calling of ships by coast stations for establishing public correspondence through terrestrial communications.

8. Public correspondence including ship's and company operational business carried out by telegraphy and telephony.

9. Data transmission; including facsimile, teleprinter and wideband systems.

10. Automatic warning of ships which are continuously tracked by the system, in cases of approaching shallow waters, underwater obstructions, drilling and production platforms, etc.

11. Advising ships which are continuously tracked by the system on anti-collision actions and on avoidance of continuously tracked navigational hazards, e.g. icebergs.

12. Automation of the position-reporting system based on a position information as mentioned in 3. Thus the present repeated individual reporting actions on mobile craft could be abolished.

13. Traffic control including collision warning especially in converging areas subject to the radiodetermination system providing sufficient relative accuracy (see 4).

14. Distribution to mobile craft of meteorological, hydrographic and oceanographic information including its transmission by facsimile (reports, forecasts and warnings).

15. Individual meteorological and oceanographic advice to mobile craft by land-based stations (e.g. weather routing, navigation through ice, etc.).

16. Collection from mobile craft of meteorological hydrographic and oceanographic observations.

d) There is a secondary requirement for transmission of programmes to ships at sea for news and morale purposes.

5. <u>Sharing possibilities between aeronautical and maritime services</u>

a) Consideration has been given to the feasibility for stations of the aeronautical and maritime services to share the same frequency bands and/or the same system when using space communication techniques.

The following three sharing possibilities were considered by the C.C.I.R. (Report 511, New Delhi, 1970) :

i) sharing the same system utilizing the same frequency band and common channels;

ii) sharing the same system utilizing the same frequency bands and common channels for common needs (distress, search and rescue, radiodetermination and public correspondence) and exclusive channels for unique needs (air traffic control, notice to mariners and notice to airmen);

iii) sharing the same system utilizing the same or different frequency bands but each service having exclusive channels.

b) From the standpoint of optimum frequency spectrum conservation and economy for users the most effective system appears to be one which utilizes a common satellite, common frequency bands and common channels for common needs and which provides for exclusive channels for individual needs.

c) The use of common frequencies for a future joint aeronautical-maritime distress system and position determination system, if either can be achieved, is endorsed. This takes account of the C.C.I.R. studies cited above relating to the feasibility and desirability of various frequency sharing arrangements when using space techniques.

A joint distress system could utilize space techniques by performing the following functions :

i) alerting for announcing a distress incident with necessary particulars (manually and/or automatically actuated);

ii) advising particulars of distress, e.g. location, identification and type of incident;

iii) contacting and informing suitable aircraft and/or ships of a distress incident and coordinating rescue operations.

d) Even where the operation of aircraft and ships is different, there are advantages in both services using contiguous frequency bands together with a common band possibly between them. This will allow the use of common channels for common needs and exclusive channels for unique requirements. Common functions may include : distress alerting, search and rescue, meteorological services, radiodetermination, transmission of time signals and public correspondence, if practicable.

6. Frequency requirements

General considerations

The Maritime Safety Committee in determining the frequency allocations necessary to be considered to satisfy the maritime operational requirements for a system using space techniques, took into account the following considerations :

i) initially the system should cover those routes and areas most frequented by ships; ultimately a world-wide coverage is desirable;

ii) to satisfy the maritime operational requirements the system should be capable of being used by all ships, regardless of size;

iii) consequently shipborne equipment should be kept as simple and as inexpensive as possible;

iv) at present no frequencies are allocated to the Maritime Mobile Service for the use of space techniques;

v) experiments have shown that maritime satellite communication and radiodetermination in the VHF bands are feasible and economical;

vi) in Recommendation No. MAR.3 of the World Administrative Radio Conference, Geneva, 1967, administrations and the C.C.I.R. are invited to consider in their studies a technically suitable frequency band higher in the spectrum than band 8 (30 - 300 MHz) and of sufficient bandwidth to accommodate the overall needs of the Maritime Mobile Service;

vii) frequencies in the 300 - 800 MHz portion of the spectrum are also technically suitable for satellite service to ships at sea;

viii) very little experience is available on the use of the frequency bands 1535 - 1660 MHz which would be more expensive than use of VHF bands, in particular if costly stabilized platforms and steerable antennae are needed.

PART II

PROPOSED AMENDMENTS TO THE INTERNATIONAL TELECOMMUNICATION UNION FREQUENCY ALLOCATION TABLE

(ARTICLE 5 OF THE RADIO REGULATIONS)

The following summary of the proposals so far considered reflects only the maritime point of view and is intended to assist Member Governments in developing their national positions for the Space Conference also taking into account other national requirements. From these or other proposals, sufficient provision for the maritime use of space techniques is essential to meet its operational requirements.

1. Method of presentation

a) Underlining indicates new proposed text.

b) Dashes through the text (e.g. ~~FIXED~~) indicate existing text which is proposed for deletion.

c) NOC indicates no change to existing provisions.

d) MOD indicates a proposed modification of the existing provisions.

e) ADD indicates an addition to the existing provisions.

2. The proposals are numbered for ease of reference. The reasons for the proposals are given after each proposed amendment.

Proposal No. 1

NOC 273

MOD 273 A In the band 117.975 - 132 MHz and in the band 132 - 136 MHz where the Aeronautical Mobile (R) Service is authorized the use and development for this service and the Maritime Mobile Service and the Radiodetermination Service of systems using space communication techniques may be authorized ~~but limited initially to satellite relay stations of the aeronautical mobile (R) service~~. Such use and development shall be subject to coordination between administrations concerned and those having services operating in accordance with the Table, which may be affected. The use of space communication techniques by the maritime mobile service and the radiodetermination service will be subject to the necessary agreements between the aeronautical and maritime mobile services.

Reason

It is considered that the wording of No. 273A should be made more flexible without losing any protection of terrestrial services which is the subject of the last sentence of existing No. 273A. A limited shared use with the Maritime Mobile Service offers economic advantages to both the aviation and maritime communities and will provide for a common radiodetermination service and for satellite communications between aircraft and ships for search and rescue coordination purposes and for maritime safety purposes. The provisions in the two last sentences of No. MOD 273A preclude possible interference with aeronautical services.

Proposal No. 2

1. It is proposed that a frequency spectrum of the order of 1 MHz within the band 156.025 - 162.025 MHz and of the order of 1 MHz outside and adjacent to this band respectively, be allocated for transmissions of ship stations and directly related coast stations to satellite-borne stations and satellite-borne stations to ship stations and directly related coast stations, for purposes of communications and/or radiodetermination. Such use shall be subject to coordination among administrations concerned and those having services operating in accordance with the Table, which may be affected.

2. It is further proposed that administrations coordinate the clearing by 1 January 1976 on a world-wide basis of at least two adjacent channels of 25 kHz each in both bands for exclusive space use for maritime communications, with emphasis on safety.

Reason

a) To provide for the use of space techniques by the Maritime Mobile Service;

b) the clearing on a world-wide basis of two 25 kHz channels of conventional terrestrial services is considered advisable to preclude any space/terrestrial/space system interference to channels used for communications relating to Safety of Life at Sea (SOLAS).

Proposal No. 3

<table>
<tr><th colspan="3">216 - 399.9 MHz</th></tr>
<tr><th colspan="3">Allocation to Services</th></tr>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td rowspan="2">216-223

AERONAUTICAL
RADIONAVIGATION
BROADCASTING

297 298 299 300 301</td><td>216-220

FIXED
MOBILE
RADIOLOCATION</td><td rowspan="3">216-225

AERONAUTICAL
RADIONAVIGATION
Radiolocation

306 307 308</td></tr>
<tr><td rowspan="2">220-225

AMATEUR
RADIOLOCATION</td></tr>
<tr><td rowspan="2">223-235

AERONAUTICAL
RADIONAVIGATION
Fixed
Mobile
299 300 301 302 303
304 305

308A</td></tr>
<tr><td>225-235
FIXED
MOBILE

308A</td><td>225-235
FIXED
MOBILE
AERONAUTICAL
RADIONAVIGATION

308A</td></tr>
</table>

216 - 399.9 MHz		
Allocation to services		
Region 1	Region 2	Region 3
235-267	FIXED MOBILE 305 308A 309	
267-272	FIXED MOBILE Space (Telemetering) 308A	309A 309B
272-273	FIXED MOBILE SPACE (Telemetering) 308A	309A
273-328.6	FIXED MOBILE 308A 310	
335.4-399.9	FIXED MOBILE 308A	

ADD 308A In the bands 225-328.6 and 335.4-399.9 MHz, the use of space techniques by the aeronautical and maritime mobile services is authorized. Such use shall be subject to agreement among administrations concerned, and those having services operating in accordance with the Table, which may be affected.

Reason :

To make provision for the use of space techniques in the Aeronautical and Maritime Mobile Services in the bands 225-328.6 MHz and 335.4-399.9 MHz.

Proposal No. 4

The use by the Maritime Mobile Service of space techniques in the bands 405 - 890 MHz should also be considered by the Space Conference. A Note similar to Note ADD 308 A should be inserted as appropriate in the parts of the Table relating to the bands concerned.

Reason

The importance of the use of space techniques for meeting the maritime operational requirements suggests also considering this portion of the frequency spectrum particularly as it appears to be technically and economically very suitable for this purpose.

Proposal No. 5

1535 - 1660 MHz

It is proposed to reallocate the band 1535-1660 MHz as follows :

1. Delete the allocation of the band 1535-1540 MHz to SPACE (Telemetering).

2. Allocate two frequency bands of the order of 10 MHz each to the Maritime Mobile Service on an exclusive or a primary basis.

3. Allocate one frequency band of the order of 2 MHz to the Maritime Mobile and Aeronautical Mobile Services with equal status.

4. Reduce the allocation to AERONAUTICAL RADIONAVIGATION in the band concerned, as appropriate.

Reason :

a) To provide for the use of systems using space techniques by the Maritime Mobile Service. Provision for the use of frequencies in the band 1535-1660 MHz is essential to accommodate future operational and channel requirements.

b) To provide a small frequency band for joint aeronautical and maritime use, such as an aeronautical-maritime distress system and a position determination system.

Proposal No. 6

It is proposed to use the bands 43-48 GHz, 66-71 GHz, 95-101 GHz, 138-146 GHz, 190-200 GHz and 250-265 GHz for the use of systems using space techniques for communication and radiodetermination in the Aeronautical Mobile and Maritime Mobile Services.

Reason

To make provision for the use of space techniques for the Maritime Mobile Service in these bands.

INTERNATIONAL TELECOMMUNICATION UNION

UNIÓN INTERNACIONAL DE TELECOMUNICACIONES

UNION INTERNATIONALE DES TÉLÉCOMMUNICATIONS

SECRÉTARIAT GÉNÉRAL

ADRESSE TÉLÉGRAPHIQUE : BURINTERNA GENÈVE
TÉLÉPHONE 34 70 00 — 34 80 00
TÉLEX 23000

GENÈVE, PLACE DES NATIONS 25 February 1971

Référence à rappeler dans la réponse :
When replying, please quote :
Indíquese en la respuesta esta referencia : Circular-letter No. 222

Subject : Distribution of an I.M.C.O. Recommendation

Ref. : Our Circular-letter No. 192 (5 November 1970)

To the Director-General

Dear Sir,

Further to Circular-letter No. 192 of 5 November 1970, I have pleasure in annexing hereto a copy of a letter dated 21 January 1971 which I have received from the Secretary-General of the Intergovernmental Maritime Consultative Organization (I.M.C.O.).

"An additional I.M.C.O. statement on maritime requirements for the use of space techniques" is annexed to this letter and is a supplement to the Recommendation annexed to the above-mentioned Circular-letter No. 192.

Yours faithfully,

Mohamed MILI
Secretary-General

Annex : 1

INTER-GOVERNMENTAL MARITIME
CONSULTATIVE ORGANIZATION

London, 21 January 1971

I.M.C.O.

Ref. : T2/6.05
WdG/glh

The Secretary-General
International Telecommunication Union
Palais des Nations
GENEVA
Switzerland

Sir,

At its twenty-second session (5 - 9 October 1970) the Maritime Safety Committee of I.M.C.O. adopted a Recommendation concerning maritime requirements for the use of space techniques (Annex XI to Document MSC XXII/22). The Recommendation was intended for communication to Member Governments to assist them in their preparations and in developing their national positions for the World Administrative Radio Conference for Space Telecommunications. That Recommendation was submitted to your Organization as an attachment to my letter of 12 October 1970.

The Sub-committee on Radiocommunications at its eighth session (11 - 15 January 1971) considered new material concerning this subject, including results of most recent studies and experiments. It prepared a document intended to supplement, amplify and up-date the I.M.C.O. Recommendation referred to above. In discharging its task the Sub-committee had the benefit of the valuable assistance of the I.T.U. representative, for which appreciation is expressed.

On instructions by the Maritime Safety Committee, I have pleasure in submitting four copies (English and French versions) of this document, which should be regarded as an addition to the previous I.M.C.O. Recommendation, on the understanding that it has not yet been considered by the Committee. I would be grateful if you could communicate the Recommendation to I.T.U. Members for action as appropriate.

Please accept, Sir, the assurance of my highest consideration.

(signed) Z.N. SDOUGOS
Head, Marine Safety Division

ANNEX

An additional IMCO Statement
on Maritime Requirements for the Use
of Space Techniques

I. Introduction

1. The Maritime Safety Committee at its twenty-second session (5-9 October 1970) gave its approval to an IMCO Recommendation on Maritime Requirements for the Use of Space Techniques (Annex XI to document MSC XXII/22), hereafter referred to as "the IMCO Recommendation" and, in view of the timing of the CCIR meeting in February 1971 and the ITU Space Conference, has authorized its Sub-Committee on Radiocommunications to communicate to all concerned relevant materials on the subject, on the understanding that its Report had not been considered by the Committee, if as a result of fresh developments the Sub-Committee found it necessary to amplify its views on maritime satellites.

2. The Sub-Committee has received and considered new materials concerning the subject, including results of most recent studies and experiments. In the light of this information its previous views and conclusions have been reviewed and, as a result, certain recommendations have been expanded or made more precise and some additional new recommendations have been drafted to cover points omitted in the past.

3. The material in the following paragraphs is intended to complement, amplify and up-date the IMCO Recommendation.

II. Additional Recommendations

The aim of the System

4. The International Maritime Satellite System, hereafter referred to as "the System", should provide for transmission via satellites of telephone, telegraph and facsimile messages and

for radiodetermination and, in combination with existing navigational and communication services, improve such services in the following fields:

(a) safety of life and property at sea and efficiency of navigation;

(b) information and data exchange for efficient and economic operation of ships and other units operating in marine environments;

(c) other public correspondence including passenger and crew communication.

System Functions

5. To cover the above fields adequately the System should perform the functions as they are specified in part 4(c) of the IMCO Recommendation, due account being taken of the views expressed hereafter.

Joint use of satellite techniques by shipping and aviation

6. Consideration should be given to the possibility of designing a future satellite system which could provide for joint aeronautical-maritime use and operating basically in the same bands. Due regard will have to be given to the essential differences in requirements needed for both services as to the number and speed of served vehicles, frequency, priority and duration of communication periods as well as accuracy and time-intervals between position radio-determinations. IMCO recognizes a common need for distress, alerting, search and rescue and possibly radiodetermination which may use fully or partly common system and/or channels.

Areas to be covered

7. Initially the System should, as far as possible, cover all the sea areas between the latitudes of 70°N and 70°S on a 24-hour per day basis. The areas at the latitudes of 70° to 82°

should be served at least for 3-4 hours not less than once a day.

At a later stage the introduction of satellites to cover polar regions could be envisaged.

Categories of vessels likely to participate in the System

8. Although the number of vessels to be covered by the System is estimated* as 60,000 by 1980 and 100,000 by the year 2000 (gross tonnage of 100 and upwards), it is expected that initially at least vessels from the following groups will participate:

(a) vessels covered by the International Convention for the Safety of Life at Sea;

(b) fishing vessels, operating in distant waters, and

(c) scientific and industrial units operating in marine environments

It is expected that in the period 1980-2000 up to two-thirds of all existing ships will be at sea at any given time.

9. In connexion with the above a requirement in paragraph 4(b) of the IMCO Recommendation which states that the System "should have sufficient capacity to cover all vessels which desire to use it" is essential.

Priority in Services

10. Alerting and transmission of distress signals and messages as well as search and rescue communications should have immediate access to the System. Adequate priority should also be assigned to urgency and safety messages.

Some conditions of the System's operation

11. The System should provide considerably more rapid access and higher reliability than present maritime radio systems.

---

* The estimates are based on information which has been made available to the Organization by Administrations

12. The System should be capable of inter-connexion with the general telecommunication network.

13. Frequency provision for duplex operation should be made.

14. Both way selective calling and also identification are essential for the System.

15. Due to the large number of potential users and the need to achieve maximum possible uniformity, the shipborne equipment and antennae should be as inexpensive as possible.

16. Maintenance and operation of the shipborne equipment should be as simple as possible.

Proposed Amendments to the International Telecommunication Union Frequency Allocation Table

17. Further consideration has been given to the above in an attempt to amplify the views expressed in Part II of the Appendix to the IMCO Recommendation with the object of retaining maximum possible flexibility in allocation of frequency bands and consequently development of the System.

18. In the light of new material received and concrete proposals intended for the ITU Space Conference and taking account of estimates of the numbers of potential marine users of the System (see paragraph 8 above), the following conclusions have been reached:

400 MHz Band

19. It is now well recognized that frequencies of the order of 400 MHz are optimum for the development of the System. It is concluded that the utilization of this band has the advantage of minimum system cost, (low shipborne transmitter power, simple shipborne antennae etc.) compared with any other frequency band.

20. Minimum user cost is of particular importance due to the very large number of ships which will ultimately participate in the system. Unless frequencies of this order are made available, small vessels may never be able to take part in a satellite system due to higher cost.

21. Development of the System in the next decade calls for the allocation of at least 2MHz in each direction. To meet immediate need for experimental and pre-operational systems at least 250 kHz in each direction is required, as soon as possible.

VHF Band

22. Recent tests have again confirmed the feasibility of using frequencies in this band. Provision for maritime satellites in this band should not therefore be excluded.

23. Interference problems between space and terrestrial services would necessitate the exclusive allocation of frequencies in this band for the System.

1535-1660 MHz Band

24. Developments in the use of space techniques for maritime purposes necessitate the allocation of sufficient spectrum space (of the order of 10 MHz for each of the up and down links) in this band.

25. It appears that this band is also suitable for the development of a future joint maritime-aeronautical system, particularly for alerting, distress and search and rescue purposes.

SPACE
CONFERENCE

1971

Document No. 136-E
14 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

NORWAY

SUPPLEMENTARY INFORMATION TO DOCUMENT No. 8 ON SPECTRUM/CHANNEL REQUIREMENTS FOR THE INTERNATIONAL MARITIME COMMUNICATIONS SATELLITE SYSTEM

Statistical information on the distribution of Norwegian merchant ships and the maritime mobile telecommunication traffic, including forecasts up to the year 1985, was presented at the Special Joint Meeting (S.J.M.) of the C.C.I.R. in Document M/240. Our study estimates that at least 32 voice equivalent channels will be needed for telecommunication traffic to Norwegian ships via an Atlantic satellite in 1985.

Other contributions to the S.J.M. which in general confirm these traffic forecasts, are summarized in Annex 4-2 of the S.J.M. report (see attachment).

Considerations of the factors listed in the S.J.M. report, para. 4.2.11 and the justifications contained in Annex 4.2 led to the conclusion by C.C.I.R. that a bandwidth equivalent to approximately 200 voice channels should be provided for the maritime mobile service by satellites. This figure excludes the channels required for distress, safety, search and rescue and radiodetermination.

The Norwegian Telecommunications Administration is of the opinion that many of the problems encountered in the present radio service for distress, safety, search and rescue can be satisfactorily solved by one reliable, world-wide satellite system with sufficient capacity for these services as well as for public correspondence to and from ships. In total this also seems to be the most economic solution for the users and the telecommunication entities. In order also to make the development of ship and land-based equipment attractive to industry, sufficient spectrum space must be made available by this World Administrative Conference to take care of the 1985-1990 requirements.

The Norwegian Administration also believes that a majority of nations operating merchant and/or fishing fleets desire to establish their own low cost coast stations in the satellite system. In such a system coast stations should have the possibility to use equivalent types of equipment, in the same bands as the ship stations.

The Norwegian proposal contained in Document No. 8 sets aside 2 x 7 MHz (1 535-1 542 MHz and 1 637.5-1 644.5 MHz) for the maritime mobile service on an exclusive basis. With a frequency-saving modulation method this proposal, in our view, represents a very realistic judgement of the absolute minimum requirements for the 10-15 years to come.

An exclusive allocation seems absolutely necessary to achieve an economic viable satellite system and acceptable costs for the ship-borne equipment.

Rather limited experiment and studies within different nations performed prior to this conference have led to divergent views concerning the cost aspect and the suitability of the different parts of the UHF band for a satellite system, in particular with regard to small vessels.

As long as the questions concerning the technological factors and the transmission parameters have not been definitely established, the Norwegian Administration in principle supports proposals for additional frequency allocations in the lower part of the UHF band.

Annex : 1

A N N E X

Annex 4-2

(Annex relating to § 4.2.1.1)

Justification for channels required for the maritime services other than distress, safety, S.A.R. and radiodetermination

The Norwegian Administration submitted information (M/240), particularly with respect to the Atlantic Ocean areas, which indicates their needs for marine radiotelephony in the periods 1975, 1980 and 1985. Their study estimated a total requirement of 158,000 telephone calls, 170,000 telegraph messages, 132,000 telex messages and additional 25,000 data messages per year served by an Atlantic satellite in 1985.

In total, this corresponds to 80 calls of 5 minutes per hour (6.7 Erlang) or 16 voice equivalent channels. In these calculations no account has been taken of peak traffic periods of the day or seasonal variations. If additional channel capacity can be made available to accommodate these peak traffic periods, at least 32 voice equivalent channels will be needed.

The preceding material takes into account the 1985 requirements of Norwegian vessels only and it is estimated that world shipping requirements will be of the order of ten times this figure, or 320 voice equivalent channels. I.T.U. maritime traffic statistics indicate that the factor of 10 is conservative.

The Norwegian study also showed that in 1985, they will have 569 ships in the area to be served by an Atlantic satellite. During this same period of time, their study showed that there would be 1,600 Norwegian ships in other parts of the world. Since it has been estimated that the world total of ships at this time will be approximately 60,000, this indicates a ratio of Norwegian vessels to the world fleet of approximately 1 to 30, whereas the estimate of 320 voice equivalent channels was based on a ratio of 1 to 10. Hence, on this basis, the estimate of 320 channels could be raised to as high as 1,000 voice equivalent channels.

The Norwegian Administration presented the view that increasing rationalization requires more specialized crew members on board all ships. As part of the recruiting arrangements which aims at a higher living standard on board, it seemed likely that the crew members might be given telephone calls to their homes with cost reimbursed. If such a monthly call is granted this would imply a doubling of traffic from crew members.

Information contained in a separate study by the United States was said to confirm generally the Norwegian figures. In a 1980 forecast of vessels world-wide, the United States predicted slightly in excess of 29,000 vessels at sea at any one time. This would seem to indicate a need for about 150 voice equivalent channels at that time.

Documents M/223 (U.S.S.R.) and M/246 (I.M.C.O.) indicate that there will be approximately 100,000 vessels to be covered by the satellite system in the year 2000 (gross tonnage of 100 and upwards). Up to two-thirds of all existing ships will be at sea at any given time.

The French Administration has advised that up to 200 vessels can be accommodated by one satellite channel, based on each ship utilizing the channel for periods of 5 to 6 minutes per day. This also leads to a marine requirement of approximately 330 voice equivalent channels needed by the year 2000.

Document No. 137-E
14 June 1971
Original : English

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 5

NORWAY

MODIFICATION TO No. 322 OF
ARTICLE 5 TO THE RADIO REGULATIONS

Ref.

No. 322 in RR should be modified as follows :

NOR/137/19 MOD 322 In Norway, the ~~band 435-440 Mc/s~~ bands 430-432 MHz and 438-440 MHz ~~is~~ are also allocated to the fixed service.

Reason : The fixed service frequency assignments have been rearranged in a manner which permits the amateur service in Norway to use the frequency band 432-438 MHz. This band corresponds to the 3rd harmonic of the amateur band 144-146 MHz.

Document No. 138-E
15 June 1971
Original : Spanish

SPACE CONFERENCE

1971

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

MEXICO

DRAFT RESOLUTION No. G

PLANNING AND ADMINISTRATION OF THE RESOURCES OF THE GEOSTATIONARY SATELLITE ORBIT

The World Administrative Radio Conference for Space Telecommunications, Geneva, 1971

considering

a) that the use of space techniques is being actively introduced in most telecommunication services;

b) that the degree to which countries can resort to the use of space techniques involving geostationary satellites will depend on the capacity of the geostationary satellite orbit and of the frequency bands allocated to each service;

c) that the geostationary satellite orbit, like the frequency spectrum, constitutes a limited natural resource;

d) that the position of satellites in the geostationary satellite orbit is a parameter in the efficient use of radio frequencies;

bearing in mind :

Numbers 61, 167 and 190 of the International Telecommunication Convention (Montreux, 1965);

resolves

1. that the Administrative Council shall convene an Administrative Conference, at the appropriate time and with the appropriate agenda, to prepare a World Plan for the use of the geostationary satellite orbit, in conformity with the general principles enunciated in the Annex to this Resolution;

2. that the World Plan for use of the geostationary satellite orbit shall define, in particular, the criteria governing the longitudinal position of the satellites intended for the different services;

3. that the I.F.R.B. shall ensure the observance and coordination of the World Plan;

4. that, when the World Plan is implemented, there shall not be a proliferation of satellites which could result in premature saturation of the orbit or of the arcs of the orbit in great demand, and that new satellite projects shall be coordinated between the countries affected in the region;

5. that in the coordination referred to in paragraph 4 above, the I.F.R.B. shall participate in the consultative and administrative capacity conferred on it by this Conference;

invites the C.C.I.R.

to give preference in its study programmes for the establishment of the necessary technical standards relating to services using space techniques to those programmes referring to geostationary satellite orbits.

Annex : 1

ANNEX

to Resolution No. G

General principles on which the world-wide planning of the use of the geostationary satellite orbit for telecommunication service satellites should be based

1. Planning of the resources of the geostationary satellite orbit shall be based on consideration of the medium- and long-term requirements stated by countries, groups of countries and regions, the distribution in areas where the orbit is in great demand being made with due regard to the necessary technical principles and on a basis of absolute equity.

2. The relevant technical standards of the C.C.I.R. shall be taken into account in planning and provision made for such adjustments to the plans as may be rendered necessary by any changes that occur as a result of improvements in the C.C.I.R. technical standards.

SPACE CONFERENCE

1971

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 139-E
15 June 1971
Original : English

COMMITTEE 5

JAPAN

FREQUENCY SHARING BETWEEN COMMUNICATION-SATELLITE SYSTEMS AND RADIO-RELAY SYSTEMS AT FREQUENCIES ABOVE 15.4 GHz

1. Introduction

This document describes various factors justifying the Japanese proposal (see point 1.2 of page 2, Document No. 30) in which a proposal is made for the frequency sharing between communication-satellite systems and radio-relay systems at frequencies above 15.4 GHz.

The main points stressed are as follows :

a) The power flux-density (p.f.d.) in the range of 15.4-23 GHz agreed at the S.J.M. is sufficiently large and it is unlikely that any substantial limitations will be placed on the design of communication satellites.

b) As the coordination distance at above 15.4 GHz becomes short, the coordination between earth stations and radio-relay systems will be comparatively easy.

c) Frequencies slightly above 10 GHz have been already well developed for fixed services and the work to use higher frequencies is also proceeding. It is, therefore, necessary to secure ample frequency spectrum to be utilized for radio-relay systems in future.

2. Effects of p.f.d. limits on the design of communication-satellite systems

An investigation is carried out on what kinds of limitations will be placed on communication-satellite systems by the p.f.d. limits shown in § 2.4.2 of the S.J.M. Report for the frequency band in 15.4-23 GHz.

The p.f.d. limit in this frequency range is -105 dbW/m^2/MHz for $\theta > 25°$. This is equivalent to the satellite e.i.r.p. of 57 dbW/MHz. Since communication-satellite systems at these high frequencies will be generally used for wideband transmission, it seems reasonable to assume a bandwidth of 100 MHz. Thus, the e.i.r.p. of a geostationary communication satellite is 77 dbW. One possible combination of the output power and antenna gain to achieve this e.i.r.p. is 50 W and 60 db. These values far exceed the values technically feasible in future.

It seems that in general the arrival angle of the main-beam of an upper SHF communication satellite will be higher. If consideration will be given to a case of the arrival angle less than 5°, although it is not likely. In this case, the e.i.r.p. limit of a communication satellite is 10 db less than the one mentioned above and is 67 dbW. This value also seems to exceed the value technically feasible in future.

Next, consideration will be given to whether a p.f.d. in excess of the limit is necessary for design of communication-satellite systems. Typical system parameters of an earth station are assumed to be as follows.

Antenna effective area; 25 m^2 (diameter of about 8 m), receiving system noise temperature; 600°K. Then, the received power corresponding to a p.f.d. of -105 dbW/m^2/MHz is -91 dbW/MHz and thermal noise is -140 dbW/MHz. Therefore, the carrier-to-noise ratio is 49 db. If the threshold level is assumed to be 20 db, a drop-out margin of 29 db is available.

On the other hand, in case of the p.f.d. of -115 dbW/m^2/MHz corresponding to $\theta \leq 5°$, the drop-out margin is 19 db. Judging from § 2.4.4 Figure 2.4.2 of the S.J.M. Report, it is unnecessary to have a large drop-out margin provided the elevation angle is not too low. For example, the figure shows that an earth station with a drop-out margin of 20 db can operate at an elevation angle of 5° at about 20 GHz without diversity technique.

Furthermore, it is reasonable to assume that space diversity or frequency diversity will be adopted if the precipitation attenuation is great due to low elevation angle. (See § 2.4.2 of the S.J.M. Report.)

These considerations show that a p.f.d. in excess of the limit is not likely to be needed in future communication-satellite system design.

3. Coordination distance

Examples of coordination distance calculations according to the method agreed at the S.J.M., are shown in Annex 8-2E of the S.J.M. Report. Tables 1 and 2 of this document show examples of coordination distance calculations in the 4-6 GHz band and in the 20-30 GHz band. The examples of calculations in the 20-30 GHz bands are based on the models in Annex 8-2E of the S.J.M. Report with some modification and extension. (For the sake of simplicity, values are shown only for interference mode (a) which is most important.) These tables clearly indicate that the coordination distance in higher frequency bands becomes very short.

4. Demand for radio-relay systems operating at high frequencies

Necessity of using higher frequencies above about 12 GHz for radio-relay systems to meet the growing telecommunication traffic demand, is widely recognized, as described in § 2.5.1 of the S.J.M. Report. From a technical point of view, the use of higher frequencies up to 200 GHz is recognized as potentially feasible. However, it seems appropriate as a matter of course, that the use of frequencies should start from relatively low frequencies. According to the S.J.M. Report these radio-relay systems require a wide bandwidth. Technically a contiguous band of about 20% of the centre frequency is preferable.

As an example, the situation in Japan will be described. About 1,300 transmitters in the frequency bands above 10 GHz, are being operated for public telecommunication service as of March 1971. The number of transmitters becomes larger, if transmitters for other than public service are included. The highest operating frequency is about 15 GHz.

The number of transmitters operated has increased at a rate of about 20% per year since 5 years ago and is expected to increase at a rate of about 15 to 20% per year in future.

Therefore, in order to use higher frequencies, a new PCM radio-relay system using a bandwidth of 3.5 GHz in the range of 17.7 to 21.2 GHz is being developed. An experimental route involving a number of repeating stations in tandem is expected to be established shortly. Basic investigation for using high frequencies above 30 GHz for radio-relay system is also proceeding.

From the viewpoint that the frequency allocation should take into account the frequency requirements for future radio-relay systems as described above, it is considered that an exclusive frequency allocation for the communication-satellite service will be large hindrance to the advance of radio-relay systems.

5. Conclusion

Various factors affecting frequency sharing above 15.4 GHz between communication-satellite systems and radio-relay systems have been considered and it was made clear that sharing will not cause any substantial limitation in either system.

Moreover, a wide frequency spectrum should be available for future radio-relay systems. Therefore, although an exclusive allocation has some advantages, all relevant factors being considered, the allocation of exclusive bands above 15.4 GHz for the communication-satellite service is not advisable.

TABLE 1

Coordination distance in case of interference into terrestrial stations

f	(GHz)	25		6	
Pt	(dbW)	10		-	
B	(Hz)	10^6		4.10^3	
E	(°)	20	3	20	3
θ	(°)	0.5	0	0.5	0
Gt	(db)	0	20	-	
Pt + Gt	(dbW)	-		20	40
Pr	(dbW)	-114		-131	
S	(dbW)	164		176	
Po	(%)	0.003		0.005	
n		1		1	
P	(%)	0.003		0.005	
Lb(p)	(db)	174	194	196	216
F(p)	(db)	-5		-3	
20 long 10(f/4)	(db)	16		3.5	
Lo(0.01%)	(db)	161	183	196	216
Zone A Δ Lo	(db)	17	18	12	8
Δ L	(db)	9	0	6	0
Lc	(db)	152	183	190	216
d	(km)	120	210	290	520
Zone B Δ Lo	(db)	20	14.5	14	13
Δ L	(db)	9	0	5	0
Lc	(db)	152	183	191	216
d	(km)	120	230	450	1,200
Zone C Δ Lo	(db)	19	13	18	21
Δ L	(db)	7	0	7	0
Lc	(db)	154	183	189	216
d	(km)	140	280	860	> 2,000

TABLE 2

Coordination distance in case of interference into earth station

f	(GHz)	20		4	
Pt	(dbW)	-15		13	
E	(dbW)	35		55	
B	(Hz)	10^6		4.10^3	
Pr	(dbW)	-129		-145	
Po	(%)	0.003		0.01	
n		1		1	
ε	(°)	20	3	20	3
θ	(°)	0.5	0	0.5	0
Gr	(db)	0	20	0	20
Lb(p)	(db)	164	184	200	220
F(p)	(db)	-5		0	0
20 long $10(\frac{f}{4})$	(db)	14		0	0
Lo(0.01%)	(db)	155	175	200	220
Zone A Δ Lo	(db)	18	14	10	8
Δ L	(db)	9	0	5	0
Lc	(db)	146	175	195	220
d	(km)	110	190	320	560
Zone B Δ Lo	(db)	21	16.5	13.5	13
Δ L	(db)	10	0	6	0
Lc	(db)	145	175	194	220
d	(km)	100	210	520	> 1,000
Zone C Δ Lo	(db)	22	18.5	20	22
Δ L	(db)	8	0	8	0
Lc	(db)	147	175	192	220
d	(km)	120	280	1,000	$\geq$ 1,000

SPACE CONFERENCE

1971

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 140-E
15 June 1971
Original : English

COMMITTEE 5

JAPAN

PROJECT OF 20 GHz LARGE-CAPACITY DIGITAL RADIO-RELAY SYSTEM IN JAPAN

1. Introduction

Microwave radio-relay systems using frequencies 2, 4, 6, 11 and 15 GHz have been installed extensively for long and short distance telecommunications throughout Japan.

However, the total bandwidth of those microwave systems is not sufficient in order to meet the increasing demand for telephone channels as well as new wideband services such as video telephone and high-speed digital data transmission. This makes it necessary to develop new radio-relay systems using higher frequency bands.

In Japan, in order to cope with the future growing demand for public communication, an experimental large-capacity digital radio-relay system using frequencies about 20 GHz is scheduled to be established in 1972.

The plan of the experiment and the system realization is described in this document.

2. Features of the new radio-relay system

Considerations underlying the new radio-relay system are as follows:

(1) The number of repeaters is large, compared with that of conventional microwave systems, because the shorter repeater spacing is required to overcome the attenuation due to oxygen, water vapour, and rain absorption.

(2) Economic considerations lead to systems with as large capacity as possible.

(3) The digital phase modulation should be employed to control the accumulation of distortion produced by a large number of repeaters in tandem.

From these considerations, a large-capacity digital radio system operating at a bit rate of 400 Mb/s in the 20 GHz band has been designed.

3. General description of the experimental radio system

3.1 The large-capacity digital radio system forms a part of the experimental integrated communication network comprising a number of newly-emerging wideband transmission systems such as 60 MHz coaxial system, and high-speed digital cable system. This experimental network is being constructed in order to conduct various experiments for developing new techniques in video telephone, high-speed data transmission, electronic switching systems, new-type telephone sets and so on.

3.2 The experimental radio system forms 13 hop link connecting two laboratories 60 km distant from each other. The solid-state technology such as Gunn diodes and integrated circuits is employed in the repeater design aiming at higher reliability, miniaturization, and small power consumption. In addition, the repeater is designed to be mounted at the top of the pole together with antennae.

3.3 The main parameters of the system are as follows:

(1) Frequency: 17.7-21.2 GHz

Frequency arrangement: See Figure 1

Modulation: 4-level PSK
Differential coherent detection

Clock frequency: 200 MHz

Bit rate per carrier: 400 Mb/s (equivalent to 5760 PCM telephone channels)

Route capacity:	5760 x 10 telephone channels
Repeater spacing:	3-5 km
Transmit power:	200 mW
Antenna gain:	48 db

4. Plan of introducing the large-capacity digital radio system into practical use

Following the above-mentioned experiment, a plan is under way to place the 20 GHz large-capacity digital radio system into commercial operation in 1974.

In addition, radio networks operating frequencies below 15 GHz are approaching saturation at densely populated regions, and the increasing demand for new communications services requiring wider bandwidth will be forecast in those areas, as shown in Figure 2. Accordingly, this plan will be rapidly extended to routes connecting large cities in Japan, as shown in Figure 3.

Annexes : 3 drawings

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Fig. 1 Frequency arrangement

Fig. 1 Aménagement des fréquences

Fig. 1 Disposición de canales

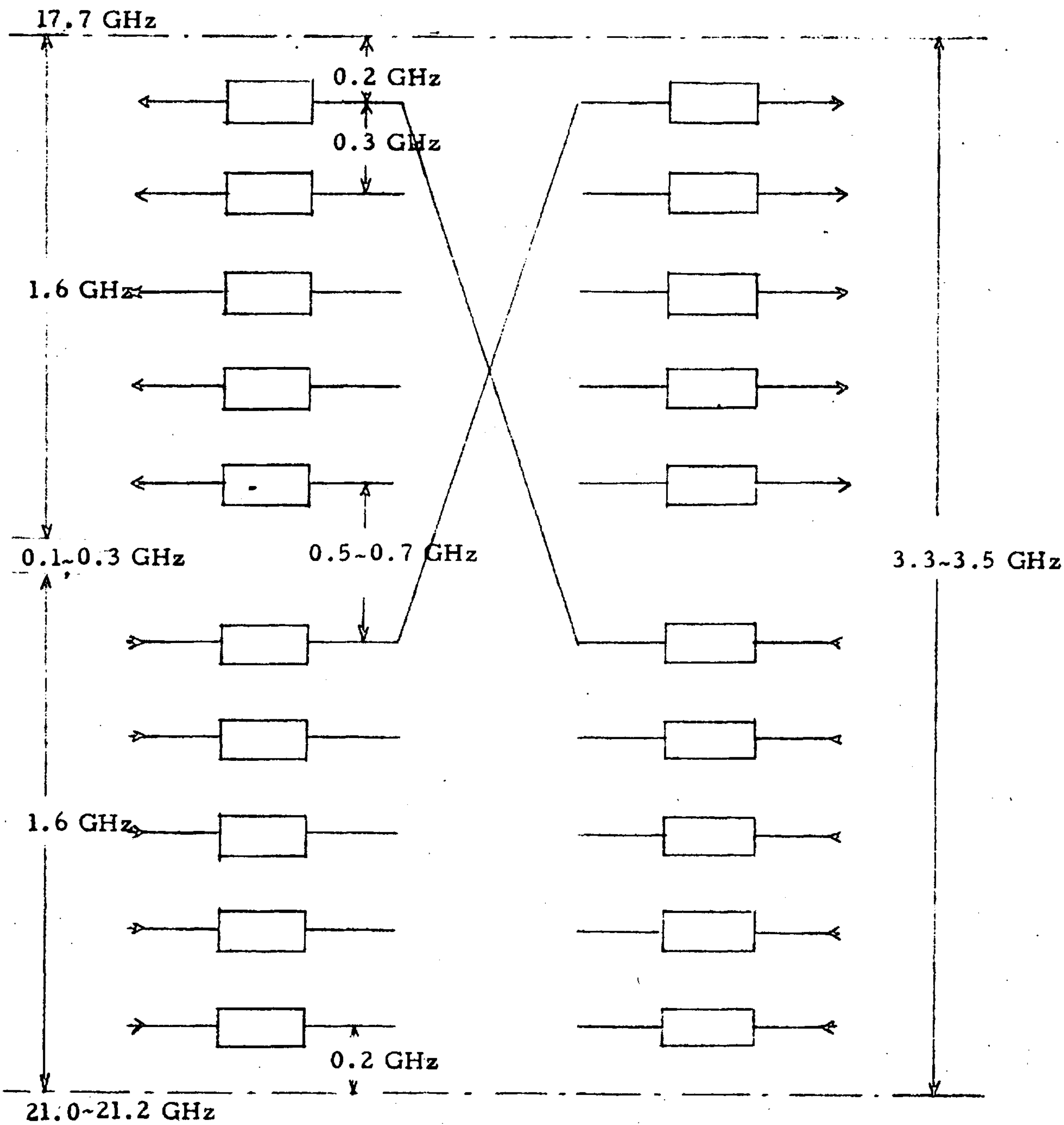

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Fig. 2 The route demand forecast curve for new services at the most densely populated regions

Fig. 2 Courbe de prévision des demandes de circuits pour les nouveaux services dans les régions les plus peuplées

Fig. 2 Curva de previsión de la demanda de arterias para nuevos servicios en las zonas más densamente pobladas

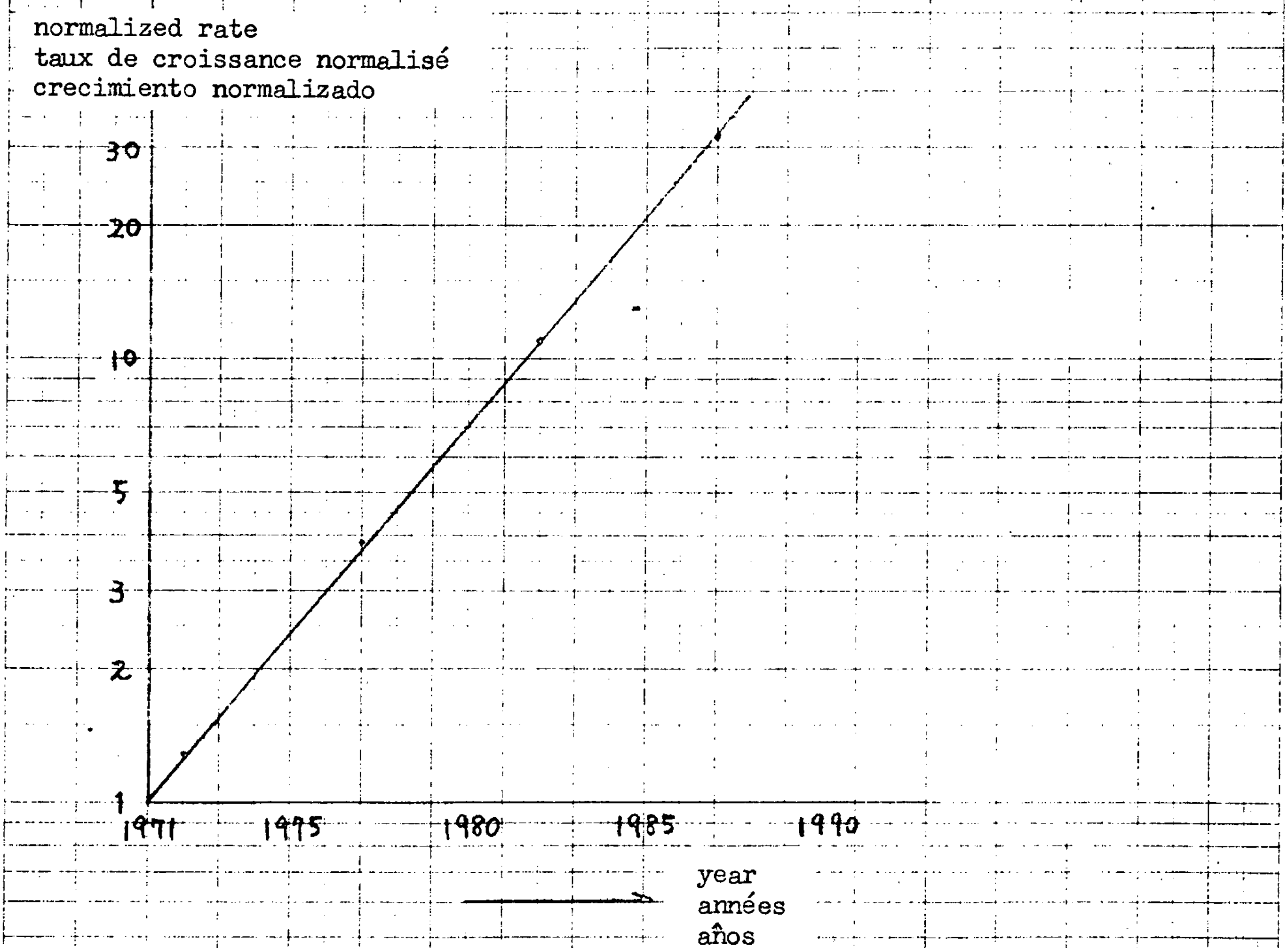

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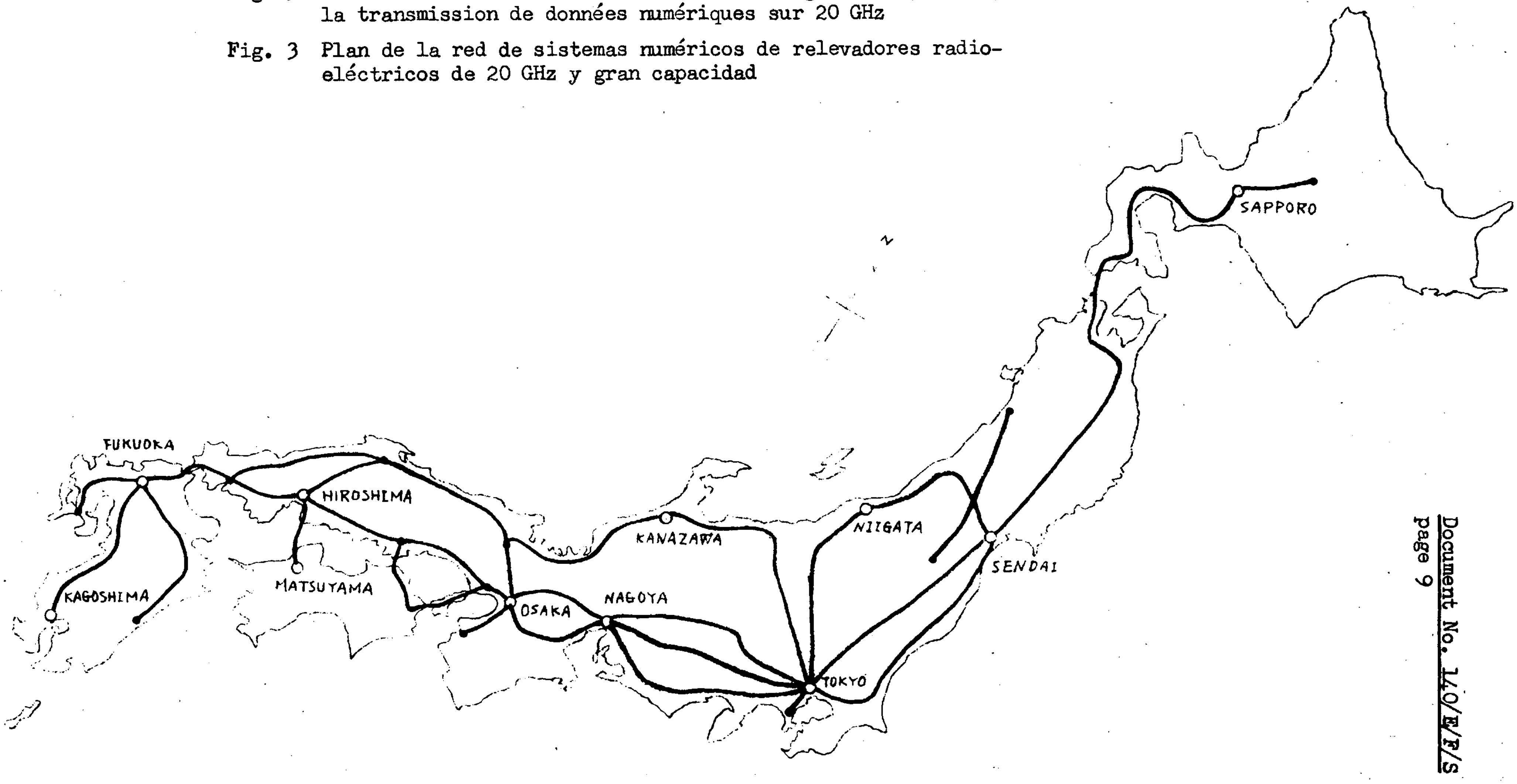
Fig. 3 20 GHz large-capacity digital radio-relay system network plan

Fig. 3 Plan du réseau de faisceaux hertziens de grande capacité pour la transmission de données numériques sur 20 GHz

Fig. 3 Plan de la red de sistemas numéricos de relevadores radioeléctricos de 20 GHz y gran capacidad



SPACE CONFERENCE

1971

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 141-E
15 June 1971
Original : English

PLENARY MEETING

JAPAN

~~DRAFT RESOLUTION H~~

relating to the experimental use of radio waves
by ionosphere research satellites

The World Administrative Radio Conference for Space Telecommunications, Geneva, 1971,

considering

a) that the research of the earth's ionospheres is very important for investigation of the relationship between the sun and the earth and also for effective use of radio-wave transmission via the ionospheres;

b) that successful researches have been made by the use of the satellites such as Alouette 1, 2, ISIS 1 and 2 in which top-side sounding equipment are installed;

c) that ionosphere research satellites similar to the above satellites will successively be used for further investigation into the ionospheres and the space above them;

d) that the top-side sounding equipment is mostly operated in frequency-sweeping pulse mode;

e) that these kinds of satellites are usually operated intermittently during a period of a fraction of each day according to the orbital condition;

f) that it is easy to identify the sounder's signals because the operation of the sounder can be accurately commanded at will by the earth station concerned;

resolves

that transmission of radio waves from ionospheric research satellites orbited above the ionospheres be authorized in the HF band if suitable means are available of controlling the operation of the satellite and preventing harmful interference to other services concerned.

SPACE
CONFERENCE

Addendum No. 1 to
Document No. 142-E
16 June 1971

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 6

The attached annex is to be added to Document No. 142.

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ANNEX

Draft structure of the Working Group of Committee 6

1. Working Group 6A

Terms of reference : Article 9 and Appendix 1 (Provisions related to the procedures to be followed in the frequency bands shared with equal rights between the space service and terrestrial services)

Document and proposal Nos.
CAN/16/125-130
USA/28/155-161, 347, 348
J/33/45-47
IND/39/29
G/56/165-173
B/74/131-132
IFRB/61/paras. 3.4, 3.6 and 3.8.

2. Working Group 6B

Terms of reference : Article 9A and Appendix 1A (Provisions related to the procedures to be followed in the frequency bands shared with equal rights between the space service and the terrestrial services.

Document and proposal nos.
CAN/17/135-137, 139-165
USA/28/176-Rev., 177-179, 181, 181-Rev., 182, 184, 187, 193-Rev., 193A, 194, 349, 195, 198-200, 202, 204-Rev., 205-213, 215, 217, 218, 221, 222, 224, 227, 231, 232, 235-239, 244-Rev., 246-251
J/33/48-50
IND/36/8
F/44/180, 181, 183, 184, 185, 185A, 186, 198, 199, 200-210
F/45/211-259
B/75/135-137, 139-145
G/80/217, 218-226
F/87/314, 315
G/95/279, 280, 282-286, 288-306, 311-314, 316
IFRB/61/paras. 3.4, 3.7, 3.9.

3. Working Group 6C

Terms of reference :	Article 9A and Resolution Spa 1 (consideration of provisions to be adopted with regard to the sharing of frequency bands between space systems)
Document and proposal Nos.	CAN/17/131-134, 138-140 CAN/20/168 ARG/26/57, 58 USA/28/162-171, 174-Rev., 174A, 175, 180, 182, 184, 252, 265 F/44/182, 187-197 F/46/260 B/75/133, 134, 138-140 G/95/274, 275, 277, 278, 281, 283-285, 319.

Note : The following proposals have not yet been allocated to the above three working groups. They may be considered in a fourth working group or in the main Committee 6 at a later stage.

Article 8 : J/32/44
B/73/130

Article 14 : CAN/18/166
ARG/24/53A, 54A
USA/28/245
B/76/146

Article 15 : CAN/19/167

SPACE CONFERENCE

Document No. 142-E
15 June 1971
Original : French

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 6

SUMMARY RECORD

OF THE

FIRST MEETING OF COMMITTEE 6

Wednesday, 9 June 1971, at 1600 hrs

Acting Chairman : Mr. M.K. BASU (India)

Subjects discussed	Document No.
1. Terms of reference	65
2. List of documents to be considered by the Committee	109 (rev.)
3. Organization of the work of the Committee and setting up of Working Groups	Annex
4. Election of Chairmen of the Working Groups	–
5. Participation in the Working Groups	–

1. Terms of reference (Document No. 65)

   Approved.

2. List of documents to be considered by the Committee (Document No. 109(rev.))

   Approved.

3. Organization of the work of the Committee and setting up of Working Groups (see Annex, which corresponds to the Annex to Document No. C6-1)

The Chairman announced that, in addition to the items listed in the Annex to Document No. C6-1, the Committee would also have to deal with certain definitions and miscellaneous questions (see Section III of Article 1 of the Radio Regulations).

The representative of the I.F.R.B. drew attention to an error on page 3 of the Spanish text of Document No. C6-1, where "F/44/132" should be replaced by "F/44/182".

The delegate of Canada said that his country had studied the question very carefully and had concluded that Articles 9 and 9A could not be examined separately and that the consideration of Resolution No. Spa 1 would also affect those two Articles. He therefore suggested that the Committee's work should be divided between the following two groups :

1. Working Group 6A, to study Articles 9 and 9A, Appendices 1 and 1A and Resolution No. Spa 1;

2. Working Group 6B, to study Articles 8, 14 and 15, definitions and miscellaneous questions.

The delegate of the U.S.S.R. suggested that the following three Working Groups could be set up :

1. a group to deal with the tasks assigned to Working Groups 6A and 6B referred to in the Annex to Document No. C6-1;

2. a second group to deal with the tasks assigned to Working Group 6C referred to in that Annex;

3. a third group to deal with Articles 8, 14 and 15, definitions and miscellaneous questions.

During the ensuing exchange of views, several speakers expressed the view that Articles 1 and 1A and Appendices 1 and 1A could not be separated from one another, and the Canadian proposal was supported by the delegates of New Zealand, Poland, the United States of America, the United Kingdom, Argentina, Nigeria, Cuba and India.

The delegate of the U.S.S.R. also agreed to support that proposal, which was thus approved.

The delegate of France pointed out that certain particularly important documents submitted by his country had been omitted from the Annex to Document No. C6-1, although they appeared in Document No. 109(rev.). He asked for an assurance that those texts would be considered by the appropriate Working Group of the Committee.

The representative of the I.F.R.B. replied that those documents had not been mentioned as the result of an error, but that they would be discussed, probably by Working Group 6A that had just been set up. Their final assignment would be decided upon by agreement with the Chairman.

4. Election of Chairmen of the Working Groups

The Chairman pointed out that Mr. Willems (Netherlands) had successfully conducted the deliberations of Working Group 6B at the 1963 Space Conference and suggested that he should preside over Working Group 6A.

The suggestion was approved unanimously, and Mr. Willems agreed to preside over the Working Group.

The Chairman's suggestion that Mr. Aritake (Japan) should preside over Working Group 6B was also approved unanimously.

The question of the establishment of a group to draft the Committee's conclusions gave rise to a discussion in which the delegates of the United Kingdom, Canada, New Zealand, Spain and Nigeria took part, and as a result of which it was decided that, in due time, experts from English, French and Spanish speaking countries who take part in the work of the Committee and the Working Groups will also draft the texts as adopted by the Working Groups and Committee 6.

5. Participation in the Working Groups

Since the extent of participation in each Working Group only had to be determined approximately for administrative purposes, the Chairman asked delegations to indicate by a show of hands their intention to take part in Working Groups 6A and 6B.

The results showed that a very large number of delegations wished to take part in Working Group 6A, whereas participation in Working Group 6B would be somewhat smaller.

The meeting rose at 1740 hrs.

The Secretary :	The Acting-Chairman :
W. GARCIA	M.K. BASÚ

SPACE
CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 143-E
15 June 1971
Original : English

COMMITTEE 4
COMMITTEE 5

REPUBLIC OF INDIA*)

TECHNO-ECONOMIC CONSIDERATIONS IN THE USE OF THE 12 GHz BAND FOR SATELLITE BROADCASTING IN THE TROPICAL COUNTRIES

1. C.C.I.R. Special Joint Meeting recommends, and various proposals submitted to W.A.R.C. by many countries seem to favour, the use of the 12 GHz band for satellite broadcasting. However, it is significant to note that most of these proposals have originated from developed countries. The S.J.M. has also noted that the examples of the satellite television broadcasting systems presented in the S.J.M. Document refer to sub-tropical and other countries and the case of tropical countries is not covered.

2. Any new satellite system that is proposed or planned has to establish its feasibility from both technological as well as economic considerations. The problems related to this exercise may be grouped as :

- technical problems related to space segment
- technical problems related to ground segment
- technical problems related to propagation of satellite signals, and
- economic considerations.

3. The different technical problems to be considered under the space segment include such considerations as station keeping, fuel requirements, weight of the spacecraft, coverage of the land area and the electronics. A comparison of the effect of these problems on the space segment at different frequency bands is presented in Table 1.

*) Other proposals are contained in Document Nos. 111 (+ Corr.) and 112.

4. The main problems of the ground segment are in the areas of receiving antenna diameters and their pointing, receiver noise factors and the RF hardware. The significance of these problems at different frequencies is included in Table 1.

5. The major propagation problems associated with the satellite broadcasting systems in the tropical zones are heavy attenuation of signals due to rain, cloud and precipitation attenuation. Taking India as a typical example of a tropical country, complete rain data has been collected for monsoon places of Chirapunji, Calcutta and Bombay. For these places, assuming a satellite located at 79°E longitude, total attenuation due to cloud, rain and precipitation has been computed employing standard techniques. The results of these computations are presented in Tables 2(i) through 2(v) and 3.

5.1 In evaluating the rain attenuation, the data required for rainfall rate has been collected for the monsoon months of June and July for the years 1949-1953 and the average rain rate data has been presented for four periods of a day

- Period 1	0600-0900 hrs
- Period 2	1000-1300 hrs
- Period 3	1400-1500 hrs
- Period 4	1600-2000 hrs

5.2 From the data presented it may be observed that a total attenuation of 9 db (including cloud attenuation) would occur to the satellite television signals at 12 GHz band and this may be as high as 15 db for places located in the eastern region of India.

6. The various technical parameters considered in Table 1 would add to the television satellite broadcasting system operating in the 12 GHz band. However, in a total system where a large number of ground-receiving sets would be involved, the incremental cost in this as a result of change of frequency would have a significant effect on the total cost of the system. To bring to focus this aspect, a cost comparison of the front-end converter required for the reception of satellite television signals at different frequencies is presented in Table 4.

6.1 Economic considerations play a very important role in deciding the deployment of a total system and this is all the more so for new and developing countries. The development of a 12 GHz system would add at every stage to the increase in cost of the total system and this fact may prove to be a deterring factor for these countries to consider such a system. Further, there is a requirement of sophisticated technology to be developed in these countries and this may, in some cases, be very difficult to realise in any meaningful time frame. Therefore, for new and developing countries, particularly from economic considerations, the use of this band for satellite broadcasting appears to be a remote possibility. Briefly one can state that the 12 GHz satellite system has the following difficult problems associated with it :

a) station keeping which would call for larger quantities of fuel;

b) higher pointing accuracies, and

c) decreased performance in transmitting antenna etc.

7. To cover a larger area at higher frequencies of operation, one would require a smaller antenna. This would determine the RF power requirements of the satellite and considering the very low efficiencies of the transmitters at these frequencies one would wonder whether it would be possible to realise a 12 GHz system for community reception. Therefore to cover large land areas particularly in the tropical areas the 12 GHz system does not appear to be feasible both from technical and economic considerations, at least for a few years to come. As such, if satellite broadcasting is to play any important role in these new and developing countries, where application of satellite television broadcasting for community viewing is urgent, the only possibility that is left is to consider allocation of frequencies in the upper UHF and the 2.5 GHz bands.

REFERENCES

1. "Study of Community Broadcast Satellite Systems for India", report prepared by a joint team from Indian National Committee for Space Research (INCOSPAR) and General Electric Company, June 30, 1969.

2. "Project SOCI", Technical Report No.11, prepared by Dr. M. Jamison and Dr. de Mendonca, Research, Development and Systems Institute, Sao Paulo, Brazil.

3. "Satellite Broadcasting" (Sound and Television), Chapter 3, S.J.M. Reports, Geneva, March 1971.

4. Document IWP PLEN/2/J-2, Oct. 1970. Subject - Question 5-IC/11, Study Programme 5-1 C/11.

5. "Atmospheric Noise of various Downlink Frequencies", INASCOM Study Report - 4, March 19, 1969.

6. "Rainfall attenuation as a function of frequency", Fig. 10-1-1, Report of the Special Joint Meeting, Geneva, 3 February-3 March 1971, Part II, Annexures.

7. "Atmospheric attenuation in satellite communications", Walter Holzer, Microwave Journal, P.199, March 1965.

8. "Intensity of rainfall at Bombay Airport" by A.K. Mukherjee and G. Krishnamurthy, Indian Journal of Meteorology and Geophysics, (Quarterly) April 1970.

9. "Television Broadcast Satellite Study" by J. Jansen, P.L. Jordan et al, TRW Systems Group, TRW No. 08848-6002 - RO - 000, October 24, 1969.

10. "Feasibility of satellite broadcasting systems in the 12 GHz band for tropical countries", B.S. Rao et al. Paper presented at the Space and Radio Communication Symposium, Paris, June 1971.

Annex : 4 Tables

ANNEX

TABLE 1

Comparative statement of different aspects of satellite broadcasting at various frequency bands

Sl. No.	Item	Particulars		
		800 MHz	2 500 MHz	12 000 MHz
1	North-south station-keeping for satellite	Not required if held within ± 2.5°	Required to be done for at least ± 1° for 10' apertures	Required very badly if one were to use apertures of 4' to 5' within ± .25°
2	East-west station-keeping for satellite	Required to keep satellite within view ± 1°	Required to keep satellite within view ± 1°	Required to be of the same accuracy as of north-south station keeping at ± .25°
3	Ground receiving system			
	Antenna diameter	Diameter restricted by practical low cost design	Diameter restricted by overall accuracy and pointing accuracy	Diameter severely restricted by satellite station-keeping and ground antenna pointing accuracy
	Receiver noise figure	4 db noise figure achieved at low cost	4 db noise figure may be achieved at relatively low cost. 6 to 7 db noise figure achieved at low cost	4 db to 5 db noise figure may pose problems due to high cost. 7 to 9 db noise figure may be practical at low cost

Sl. No.	Item	Particulars		
		800 MHz	2 500 MHz	12 000 MHz
	RF Hardware			
	Cables	Low cost cable can be used	Medium cost cable can be used	May need waveguides
	Feed	Low cost helical feed can be used	Low cost cavity horn feed can be used	Will need wave-guide to cable transition or an integrated feed/front-end combination
	Filters	Low cost materials can be used	Medium cost materials can be used	Waveguide filters or stripline filters must be used
	Local oscillator			May need two IF frequencies to take care of image rejection problems Order of magnitude better stability criteria will be required for local oscillators Crystals for separate audio carrier system
	Component production	May be possible in India in short time	In relatively short time the component fabrication can be started in India	The technology will be very new to Indian industry and will need longer time and higher cost to acquire

Sl. No.	Item	Particulars		
		800 MHz	2 500 MHz	12 000 MHz
	Propagation	Scintillations might pose problems due to proximity of geomagnetic equator	Scintillation effects may be small	Atmospheric attenuation due to rain and clouds may be very severe
	Spacecraft			
	Antenna	Deployable large antenna required	Single deployment small antenna can be used	Small antenna can be used with very high efficiency
	RF transmitter	High efficiency transmitters using solid-state devices can be used	Medium efficiency solid-state devices can be used. High efficiency tubes may require power conditioners or high voltage solar array systems	Transmitting devices available show low efficiency. The low efficiency can severely increase solar power requirement or reduce available channels per satellite

Note : 1. The east-west station-keeping is required to be carried out irrespective of frequency.
2. The north-south station-keeping requires very much for fuel.

TABLE 2 (i)

Attenuation of satellite signals at 12 GHz

Place : Cherrupunji
Location : 91.6°E, 25°N
Satellite location : 79°E longitude
Elevation : 58°
Range of signal through rain : 1.15 km

Month	Period	Average rain rate, mm/hr	Attenuation/km db	Total Attenuation db
June	I	155	>10	>10
	II	105	>10	>10
	III	51	4	4.6
	IV	69	6	6.9
July	I	167.7	>10	>10
	II	93	9	10.35
	III	40	3	3.45
	IV	108	>10	>10

TABLE 2 (ii)

Place : Bombay
Location : 72°E, 20°N
Satellite location : 79°E longitude
Elevation : 60°
Range of signal through rain : 1.15 km

Month	Period	Average rain rate, mm/hr	Attenuation/km db	Total Attenuation db
July	I	44.2	3.5	4.03
	II	34.5	2.5	2.88
	III	22.3	1.5	1.73
	IV	23.4	1.6	1.8
June	I	31.6	2.2	2.54
	II	19.0	1.3	1.5
	III	14.2	0.8	0.92
	IV	19.6	1.4	1.7

TABLE 2 (iii)

Place	: Calcutta
Location	: 88°E, 24°N
Satellite location	: 79°E longitude
Elevation	: 60°
Range of signal through rain	: 1.16 km

Month	Period	Average rain rate, mm/hr	Attenuation/km db	Total Attenuation db
June	I	3.0	0.12	0.138
	II	10	0.55	0.63
	III	21	1.3	1.5
	IV	13.5	0.8	0.92
July	I	12	0.7	0.805
	II	13.5	0.8	0.92
	III	28	2	2.3
	IV	7	0.34	0.39

TABLE 3 (i)

Summary

Month	Place	Attenuation in db Periods			
		I	II	III	IV
June	Bombay	4.0	2.88	1.73	1.8
	Calcutta	0.14	0.6	1.5	0.92
	Cherrupunji	>10	>10	4.6	6.9
July	Bombay	2.54	1.5	0.92	1.7
	Calcutta	0.81	0.92	2.3	0.39
	Cherrupunji	10	10.35	3.45	10

TABLE 3 (ii)

Analysis of climatological data for Bombay (Colaba)

Month	Monthly total rainfall (mm)	Number of rainy days	Heaviest fall per day (mm)	Amount of rainfall per rainy day (mm)
June	520.3	15.4	208.9	33.8
July	709.5	23.5	304.8	30.2
August	439.3	19.1	187.0	23.0
September	297.0	12.8	148.1	23.2

TABLE 3 (iii)

Frequency of showers of intensity of 50 mm/hr and more

	June	July	August	September	October
1963	2 (1)	3 (1)	6 (1)	2 (0)	1 (1)
1964	5 (0)	2 (1)	3 (0)	1 (1)	1 (1)
1965	10 (3)	15 (6)	6 (0)	3 (0)	-
1966	2 (0)	14 (5)	2 (0)	6 (0)	-
1967	11 (4)	5 (2)	1 (0)	-	-
Total	30 (8)	39 (15)	18 (1)	12 (1)	2 (2)

Figures in brackets indicate those lasting for 9 minutes or more.

TABLE 3 (iv)

Maximum duration (in minutes) of heavy rainfall intensity 50mm/hr and more

	June	July	August	September	October
1963	12	12	9	6	12
1964	3	12	3	9	9
1965	15	30	6	6	-
1966	3	54	6	6	-
1967	27	15	6	-	-

TABLE 3 (v)

Maximum intensity of shower (mm/hr)

	June	July	August	September	October
1963	52	68	80	68	63
1964	65	67	62	55	55
1965	91	115	87	57	-
1966	66	107	53	87	-
1967	110	132	54	30	-

TABLE 4

Front-end equipment cost for reception of TV signals direct from satellite at different frequency bands; estimated retail price vs system performance

Band	Electronics		Antenna		System noise temperature (deg K)	Retail price*) $
	Pre-amplifier	Noise figure (db)	Dia. (ft)	HPBW (deg)		
800	None	5.5	4 10	21 8.5	826 811	85 175
	Transistor	4.05	4 10	21 8.5	534 519	87 177
	Uncooled paramp	2.2	4 10	21 8.5	276 261	285 375
2 500	None	6.0	4 10	7.6 3.0	915 909	125 275
	Transistor or TDA	4.95	4 10	7.6 3.0	671 665	137 287
	Uncooled paramp	2.7	4 10	7.6 3.0	302 296	325 475
12 000	None	7.0	4 10	1.5 0.7	1 227 1 225	261 761
	TDA	5.2	4 10	1.5 0.7	717 715	311 811
	Uncooled paramp	3.3	4 10	1.5 0.7	382 380	461 961

*) Based on production quantities of 10^6. Prices do not include the regular TV set.

1971

SPACE CONFERENCE

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15 June 1971
Original : Spanish

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

CUBA

AMATEUR SERVICE

1. Introduction

The Special Joint Meeting of C.C.I.R. Study Groups recognized the possibility that if the amateur service was authorized by the WARC-ST to use space techniques, the risk of interference might be increased, and it added that, not only should the relevant provisions of the Radio Regulations be observed, but that the use of telecommand systems enabling satellite transmissions in the amateur service to be switched off or some or all of their technical parameters to be modified should be ensured.

It is reasonable to believe that, for technical and economic reasons, such space techniques will not be accessible to amateurs in developing countries.

2. Proposals

a) In order to maintain interest in the amateur service, while avoiding any form of privilege, exclusive bands should be maintained for the existing conventional service, via the ionosphere;

b) at the very least, the bands 7, 14, 21 and 28 Mc/s, allocated on a world or regional basis to the amateur service, should be exclusively reserved to the contentional service via the ionosphere, with no possibility of the use of space techniques in those bands;

c) the use of space techniques, alongside conventional techniques, might be authorized in some of the bands at present allocated to the amateur service between 30 Mc/s and 1 000 Mc/s, if the WARC-ST sees fit;

d) in bands in which the use of space techniques is authorized, the power of terrestrial transmitters and the power flux-density at the earth's surface should be limited;

e) in all cases, sharing criteria should be maintained in order to avoid possible interference in other countries or within the same country between the terrestrial and satellite amateur services, as is done in the case of other services.

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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 5

PROVISIONAL

SUMMARY RECORD

OF THE

FIRST MEETING OF COMMITTEE 5

(ALLOCATION)

Wednesday, 9 June 1971, at 0935 hrs

Chairman : Mr. H.A. KIEFFER (Switzerland)

Vice-Chairman : Mr. J. MARŠIČEK (Czechoslovakia)

Subjects discussed

1. Working methods

2. Constitution of Working Groups and designation of Chairmen

Introductory remarks

The Chairman welcomed delegates to the first meeting of Committee 5 and introduced the Vice-Chairman, Mr. J. Maršíček (Czechoslovakia). He was glad to be able to announce that the Committee would be assisted by Mr. A. Berrada, Chairman of the I.F.R.B., and by Mr. T. Nishizaki, Member, and that the Technical Secretariat would consist of Mr. A.A. Matthey, Mr. V. Quintas and Mr. J. Balfroid.

He drew attention to the terms of reference of Committee 5, which were set out as follows in Document No. 65 :

> "To consider, revise and supplement, as necessary, the existing Table of Frequency Allocations in the Radio Regulations for radiocommunication services, in so far as they may use space radio techniques, and the Radio Astronomy Service",

and also to the apportionment of proposals appearing in Document No. 109 (Rev.). Delegates would recall that the Plenary had added the service definitions contained in Sections II and IIA of Article 1 of the Radio Regulations to the terms of reference of Committee 5.

1. Working methods

The Chairman said that there seemed to be two methods of dealing with proposals to revise the Table of Frequency Allocations : one by dividing the spectrum by frequency bands and the other by arranging proposals by radio services or groups of radio services. After preliminary consultation with some delegations and with the I.F.R.B., he wished to suggest that the latter method, that is, by radio services, be adopted.

A prolonged discussion took place in which emphasis was placed on the problems of small delegations which, in the first instance, expressed preference for the approach by frequency bands, and on the problems of coordination between Working Groups. It was felt that, whichever method was adopted, those problems could not be entirely avoided. Stress was also laid on the experience of previous Conferences, on the inevitable sharing out of work among Working Groups and on the fact that the results achieved in the Working Groups would necessarily be presented by frequency bands. On balance, the Committee decided to divide the work by radio services, as the Chairman had suggested.

2. Constitution of Working Groups and designation of Chairmen

The Chairman suggested that the proposals concerning service definitions might be entrusted to an ad hoc Group, which would be requested to give urgent consideration to those proposals and to report back to Committee 5 as soon as possible.

It was so decided.

At the invitation of the Chairman, the Delegation of Italy agreed to provide a Chairman and proposed Mr. A Petti, who was duly appointed.

In the light of the discussion on working methods, the Chairman introduced the suggested Working Group structure which appeared in the annex to the agenda. After a short discussion, during which it was decided to assign telemetry, telecommand and tracking to the proposed Working Group 5B, the following Working Group structure was adopted and the Chairmen listed below were appointed :

Working Group		Chairman
5A	Communication-Satellite Service	Mr. L.C. BAHIANA (Brazil)
5B	Space Research Service, Radio Astronomy Service, telemetry, telecommand, tracking	Mr. B. DESTA (Ethiopia)
5C	Meteorological-Satellite Service, earth resources satellites (ERS), Standard Frequency and Time Signals, Amateur Service	Mr. K. OLMS (Federal Republic of Germany)
5D	Mobile Services and Radio-determination	Mr. M. CHEF (France)
5E	Broadcasting-Satellite Service	Mr. R. GALIĆ (Yugoslavia)

It was requested that every effort should be made to reduce simultaneous meetings of Working Groups to a minimum.

The meeting rose at 1315 hrs.

The Chairman :

H.A. KIEFFER

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SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 4

FIRST REPORT FROM WORKING GROUP 4A

REVISION OF ARTICLE 1, SECTION III

1. After consideration of the following proposals : CAN/13/22, USA/28/7, IND/38/24, F/40/31, G/53/22-25, B/70/30, MEX/77/38, CHN/82/38 and C.C.I.R. Recommendation 445, Working Group 4A proposes the following addition to Article 1, Section III :

" ADD 98A Equivalent isotropically radiated power

The product of the power of an emission as supplied to an antenna and the antenna gain in a given direction relative to an isotropic antenna. "

2. After consideration of proposal B/70/29, Working Group 4A proposes the following modification :

" MOD 93 Harmful interference

The effect of any emission, radiation or induction which endangers the functioning of a radio-navigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunication service operating in accordance with these Regulations. "

3. After consideration of proposals B/70/23-28 and section 1.2 from the Report of the S.J.M. (C.C.I.R.), Working Group 4A prepared a set of definitions concerning frequency bands, which is given in Annex 1 to this Document.

Some delegations expressed the thought that these definitions may not be necessary in the Radio Regulations, and that the working groups of Committee 4 and the other Committees should be consulted on their applicability.

In any way, the Group is of the opinion that these definitions be considered as a whole, and that they must be retained or rejected all together (except obviously numbers 85 and 89 of the R.R.).

Furthermore, Working Group 4A proposes to add a footnote relating to the title of Article 5, with the :

" See Resolution 6 "

4. After consideration of the other proposals relating to Article 1, Section III, Working Group 4A finds it necessary that other Working Groups of Committee 4 and the other Committees express their opinion on the opportunity to add in the Radio Regulations the definitions of the following terms :

Pre-assigned frequency	CHN/82/36
Demand assigned frequency	CHN/82/37
Figure of merit of a system	CHN/82/39
Noise temperature	CHN/82/40
Energy dispersal frequency	CHN/82/41

Annex : 1

ANNEX

Terms and definitions relating to frequency bands

ADD 88A Frequency band

A continuous part of the frequency spectrum limited by two defined frequencies.

ADD 88B Allocated frequency band

Frequency band which may be used by a given service.

ADD 88C Shared (allocated) (frequency) band

Frequency band allocated to different services in a particular area.

Note : The term "shared band" (or "band sharing") must not be used to designate the operation of sub-dividing a given allocated band.

ADD 88D Geographically*) allocated frequency band

Frequency band allocated to a given service in a particular geographical*) area and to other services in other geographical*) areas.

Note : The term "geographically shared band" must not be used.

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*) In space radiocommunication, the terms "geographical" or "geographically" may relate :

- either to a region of space
- or to an area of the earth's surface
- or to a unit constituted by a region of space and an area of the earth's surface.

MOD 89 Assigned frequency band

The frequency band which a station is authorized to use for a given emission. Its width ~~the-centre-of-which coincides-with-the-frequency-assigned-to-the-station-and the-width-of-which~~ equals the necessary bandwidth plus twice the absolute value of the frequency tolerance.

Note : In most services, the concept of "(radio frequency) channel" corresponds to that of "assigned frequency band".

NOC 85 Assigned frequency

The centre of the frequency band assigned to a station.

ADD 89A Shared assigned (frequency) band

An assigned frequency band, or radio frequency channel, used by several stations, either in the same service or in different services.

An assigned frequency band may be :

- geographically*) shared, the geographical position of the stations being taken into account;

- time-shared, if it can be used by different stations only in separate periods of time;

- partly shared, if it has a common position with one or more other assigned frequency bands.

ADD 89B Frequency allotment plan

Plan making possible the assignment of a same frequency to various stations in the same service, regardless of their position within given areas or countries.

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*) See 88D

SPACE
CONFERENCE

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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

Note by the Secretariat

The following communication has been received from Mr. Jaroslav MARŠÍČEK, Head of the Czechoslovak Delegation and Vice-Chairman of Committee 5 :

"I am compelled, for professional reasons, to leave Geneva for a short time.

I should be glad if, during my absence, Mr. Milan ZAHRADNÍČEK, Deputy Head of the Czechoslovak Delegation, could take over my duties as Vice-Chairman of Committee 5."

SPACE CONFERENCE

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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 5

REPUBLIC OF INDIA

PROPOSAL FOR AMENDMENT OF ARTICLE 5
OF THE RADIO REGULATIONS

Ref.

IND/148/35 SUP 199 Mar
and
199.1 Mar

Reason : In India, there is a need to use the band 1 800-2 000 kc/s for radionavigation also. There is no more any need to use this band for aeronautical mobile service. Deletion of footnotes 199 and 199.1 will reflect this position correctly and will be in common with other countries in Region 3.

Corrigendum No. 1 to
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SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

In paragraph 1, line 9, replace Lamu by Malindi.

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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 5

KENYA

TANZANIA

UGANDA

GENERAL OBSERVATIONS CONCERNING PROPOSALS - ARTICLE 5 OF THE RADIO REGULATIONS

The Delegations of Kenya, Tanzania and Urganda wish to clarify the position of their countries with regard to proposals concerning Article 5 of the Radio Regulations. Our countries, which together form the East African Community, have invested considerably in tropospheric scatter radiocommunication systems. At present, there are in service, three links utilizing the frequency band 790-960 MHz. Plans are also in hand to purchase equipment for an additional tropo link to be installed in Tanzania within the next two years or so. In addition, yet another tropo system is planned to link Kismayu in Somalia with Lamu on the Kenya coast in order to provide high quality and reliable inter-state communications between those two countries under the wider Pan African Telephone Network scheme sponsored by I.T.U.

Because of the terrain coupled with population distribution characteristics in East Africa, this form of communication is proving to be among the most suitable from an economic and technological point of view. In our experience, propagation in this frequency band has proved quite satisfactory and it is for this reason that our future planning aims at utilizing this frequency band and possibly up to 2 GHz band.

Attention is drawn to paragraph 3.4.3.3.2.1 of the C.C.I.R. S.J.M. Report which states among other things that tropospheric scatter systems which point towards the geostationary orbit are particularly vulnerable to interference from broadcasting satellites operating at frequencies in the vicinity of 800 MHz. Out of six transhorizon system antennae at present in service in East Africa, four point towards the geostationary orbit. It is also significant to note that the S.J.M. Report concludes in paragraph 8.4.5.6, page 121 that, in a significant number of practical situations it would be very difficult to ensure satisfactory operation in shared frequency bands of transhorizon systems with the various satellite systems.

For these reasons, while appreciating the desire of the Republic of India to solve its community development problems by the use of satellite broadcasting, the Delegations of Kenya, Tanzania and Uganda feel unable to support the Indian proposal as contained in Document No. 111-E or any other similar proposal aimed at utilizing this particular frequency band for satellite broadcasting. We believe that a separate frequency band should be allocated to the satellite broadcasting service in order to avoid harmful interference to existing services.

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 150-E
June 1971

LIST OF DOCUMENTS

No.	Origin	Title	Destination
1	S.G.	Agenda for the Conference	PL
2	S.G.	Prop., Symbols etc.	PL
3	Denmark	Prop., RR Art. 5	PL
4	F.R. of Germany	Prop., RR Art. 1	PL
5 + Corr.1, 2	F.R. of Germany	Prop., RR Art. 5	PL
6	S.G.	Opinion expressed by the Plan Committee for Europe and the Mediterranean Basin	PL
7 + Corr.	Sweden	Prop., RR Art. 5	PL
8	Norway	Prop., RR Art. 5	PL
9	Australia	Prop., RR Art. 1	PL
10 + Corr.1, 2	Australia	Prop., RR Art. 5	PL
11	Australia	Prop., RR Art. 7	PL
12(Rev.)	Canada	Proposals	PL
13(Rev.)	Canada	Prop., RR Art. 1	PL
14(Rev.) + Corr.	Canada	Prop., RR Art. 5	PL
15(Rev.)+Add	Canada	Prop., RR Art. 7	PL
16(Rev.)	Canada	Prop., RR Art. 9	PL
17(Rev.)	Canada	Prop., RR Art. 9A	PL
18(Rev.)	Canada	Prop., RR Art. 14	PL
19(Rev.)	Canada	Prop., RR Art. 15	PL
20(Rev.)	Canada	Prop., RR New App. 1B	PL
21	Argentina	Prop., RR Art. 1	PL
22 + Corr.	Argentina	Prop., RR Art. 5	PL
23	Argentina	Prop., RR Art. 7	PL
24 + Corr.	Argentina	Prop., RR Art. 14	PL

No.	Origin	Title	Destination
25 + Corr.	Argentina	Prop., RR Art. 41	PL
26	Argentina	Prop., RR Res. Spa. 1	PL
27	Argentina	Prop., RR Rec. 16	PL
28 + Corr. 1,2	U.S.A.	Proposals	PL
Corr.1 to Corr.1 to 28	U.S.A.	Revised curves for the determination of coordination distance in shared frequency bands between 1 and 40 GHz	PL
29	Japan	Prop., RR Art. 1	PL
30 + Corr. 1,2	Japan	Prop., RR Art. 5	PL
31 + Corr.	Japan	Prop., RR Art. 7	PL
32	Japan	Prop., RR Art. 8	PL
33	Japan	Prop., RR Arts. 9 & 9A	PL
34	Japan	Prop., RR Rec. Spa. 7	PL
35 + Corr.1, 2	India	Prop., RR Art. 5	PL
36	India	Prop., RR Art. 9A	PL
37	India	Prop., Frequency sharing	PL
38	India	Prop., RR Art. 1	PL
39 + Corr.	India	Prop., RR Art. 5	PL
40	France	Prop., RR Art. 1	PL
41	France	Prop., RR Art. 5	PL
42	France	Prop., RR Art. 6	PL
43 + Corr.	France	Prop., RR Art. 7	PL
44	France	Prop., RR Art. 9A	PL
45	France	Prop., RR App. 1A	PL
46 + Corr.	France	Prop., RR App. 1B	PL
47	France	Draft Recommendation	PL
48	France	Draft Recommendation	PL
49	Netherlands	Prop., RR Art. 5	PL
50	S.G.	List of documents	–

No.	Origin	Title	Destination
51	United Kingdom	Explanatory memorandum covering the Frequency, administrative and technical aspects of the U.K. Proposals for the World Administrative Radio Conference for Space Telecommunications	PL
52	United Kingdom	Control of interference between geo-stationary satellite systems and non-synchronous inclined-orbit satellite systems using the same frequencies in the communication-satellite bands	PL
53	United Kingdom	Prop., RR Art. 1	PL
54	United Kingdom	Prop., RR Art. 5	PL
55	United Kingdom	Prop., RR Art. 7	PL
56	United Kingdom	Prop., RR Arts. 9 & 9A	PL
57	United Kingdom	Draft Resolution C	PL
58	S.G.	International cooperation in the peaceful uses of outer space	PL
59	U.S.S.R.	Prop., RR Art. 5	PL
60	Australia	Prop., RR Art. 5	PL
61 + Corr.	S.G.	Report of the I.F.R.B.	PL
62	New Zealand	Prop., RR Art. 5	PL
63	Sweden	Prop., RR Art. 5	PL
64	S.G.	Special Joint Meeting of C.C.I.R. Study Groups	PL
65	S.G.	Suggestions for the organization of the work of the Conference	PL
66	New Zealand	Additional Prop., RR Art. 5	PL
67	Australia	Prop., RR Art. 1	PL
68	Sweden	Additional Prop., RR Art. 5	PL

No.	Origin	Title	Destination
69	Brazil	Prop., RR Arts. 1, 5, 7, 8, 9, 9A & 14	PL
70	Brazil	Prop., RR Art. 1	PL
71 + Corr.	Brazil	Prop., RR Art. 5	PL
72 + Corr. 1,2	Brazil	Prop., RR Art. 7	PL
73	Brazil	Prop., RR Art. 8	PL
74	Brazil	Prop., RR Art. 9	PL
75	Brazil	Prop., RR Art. 9A	PL
76	Brazil	Prop., RR Art. 14	PL
77	Mexico	Proposals	PL
78	Mexico	Prop., RR Art. 2	PL
79	United Kingdom	Coordination between geostationary communication satellite system sharing the same frequency bands	PL
80	United Kingdom	Prop., RR App. 1A	PL
81	United Kingdom	Rev. Prop., RR Art. 7	PL
82	China	Prop., RR Art. 1	PL
83	France	Add. Prop., RR Art. 1	PL
84	France	Rev. Prop., RR Art. 5	PL
85	France	Add. Prop., RR Art. 6	PL
86	France	Rev. Prop., RR Art. 7	PL
87	France	Add. Prop., RR Art. 9A	PL
88	France	Proposals concerning the determination of the coordination area for earth stations	PL
89	France	Draft Recommendation	PL
90	France	Proposals on the establishment of plans for satellite broadcasting	PL
91	S.G.	Convening of the Conference	PL

No.	Origin	Title	Destination
92	S.G.	Invitations to the World Administrative Radio Conference for Space Telecommunications	PL
93 + Corr.	S.G.	Notification to international organizations	PL
94+Add.1,2	S.G.	Situation of certain countries with respect to the International Telecommunication Convention, Montreux (Montreux, 1965)	PL
95	United Kingdom	Rev. Prop., Art. 9A	PL
96	United Kingdom	Draft Recommendation	PL
97	Japan	Prop., Art. 1	PL
98 + Corr.	Japan	Prop., Art. 5	PL
99	Japan	Prop., Art. 7	PL
100	Secretariat	List of documents	PL
101	U.S.A.	A study of international aeronautical communications/navigation satellite system-channel/spectrum requirements (1 535-1 660 MHz)	PL
102	U.S.A.	Artificial site shielding	PL
103	U.S.A.	Signal levels in the rear section of an operational earth station antenna	PL
104	Mexico	Amateur service	PL
105	Mexico	Survey of earth resources	
106	Mexico	Satellite broadcasting	PL
107(Rev.)	Secretariat	Programme of work for the Conference as recommended by the meeting of Heads of delegations	PL
108	United Kingdom	Proposals for frequency allocations to the maritime mobile service using space communication techniques at frequencies of the order of 450-600 MHz.	PL

No.	Origin	Title	Destination
109(Rev.)	Secretariat	Assignment of proposals	PL
110	Chile	Proposed amendment concerning the aeronautical mobile service	PL
111 + Corr.	India	Likelihood of interference to the receivers of tropospheric scatter links operating over the frequency band 845-935 MHz in Regions 1 and 3 from the emissions of an Indian broadcasting satellite proposed to be located at longitude 79 degrees East in the geostationary orbit	PL
112	India	Prop., RR Art. 5 and 7	PL
113	UNESCO	Frequency allocations for space communications	PL
114	Mexico	Proposed amendments to Chapter II (frequencies).	PL
115	I.P.T.C.	The transmission of news by satellite	PL
116	Secretariat	Committee structure	PL
117 (Rev.)	U.S.S.R.	Draft Resolution No. Spa. F	PL
118	Secretariat	Structure of the Working Groups of Com. 4	Com. 4
119	Argentina	Prop., RR Art. 5	PL
120	Com. 5	Structure of the Working Groups of Com. 5	Com. 5
121	Brazil	Draft Recommendation H	PL
122(Rev.)	Com. 6	Structure of the Working Groups of Com. 6	Com. 6
123	Rep. of India	Satellite instructional television experiment (site)	PL

No.	Origin	Title	Destination
124	Marconi International Marine Co.Ltd.	Preliminary comments on the proposals for the maritime mobile service	PL
125	Greece	Prop., RR Art. 5	Com. 5
126	Com. 5	Note by the Chairman - Categories of services and allocations	Com. 5
127	Com. 4	Summary Record of the first meeting of Com. 4	Com. 4
128	Com. 2	Summary Record of the first meeting of Com. 2	Com. 2
129	PL	Minutes of the first Plenary Meeting	PL
130	Malaysia	General comments concerning RR Art. 5 - broadcasting satellite service	Com. 5
131	Japan	Allowable power flux-density produced at the surface of the Earth by a satellite if radio-relay systems were to share the frequency with space services in the band 2.3-3 GHz	Com. 4
132	Japan	Information document relating to allocation of frequencies above 40 Gc/s	PL
133	United Kingdom	Proposals for frequency allocations to the maritime mobile service using space communication techniques at frequencies of the order of 450-600 Mc/s	PL
134	I.A.T.A.	I.A.T.A. views on Article 5 of the RR	PL
135	I.M.C.O.	Recommendations concerning maritime requirements for the use of space techniques	WG 5D

No.	Origin	Title	Destination
136	Norway	Supplementary information to Document No.8 on spectrum/channel requirements for the international maritime communications satellite system	PL
137	Norway	Modification to No. 322 of Article 5 to the RR	Com. 5
138	Mexico	Draft Resolution No. G	PL
139	Japan	Frequency sharing between communication-satellite systems and radio-relay systems at frequencies above 15.4 GHz	Com. 5
140	Japan	Project of 20 GHz large-capacity digital radio-relay system in Japan	Com. 5
141	Japan	Draft Resolution H	PL
142 + Add.	Com. 6	Summary Record of the first meeting of Com. 6	Com. 6
143	India	Techno-economic considerations in the use of the 12 GHz band for satellite broadcasting in the tropical countries	Com. 4 & 5
144	Cuba	Amateur service	PL
145	Com. 5	Provisional Summary Record of the first meeting of Com. 5	Com. 5
146	WG 4A	First report from WG 4A, revision of Article 1, Section III	Com. 4
147	Secretariat	Note by the Secretariat - Communication from the Czechoslovak Delegation	PL
148	Rep. of India	Prop., RR Art. 5	Com. 5
149	Kenya Tanzania Uganda	General observations concerning proposals - Article 5 of the RR	Com. 5
150	Secretariat	List of documents	PL

SPACE CONFERENCE

Document No. 151-E
16 June 1971
Original : French

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

WORKING GROUP 5B
WORKING GROUP 5C

Note from Working Group 5D
to Working Groups 5B and 5C

After considering, on 15 June 1971, the U.S.S.R. proposals Nos. 59/6, 59/7 and 59/13 concerning the choice of frequencies 10 003 kHz, 14 993 kHz and 19 993 kHz for purposes of the search for, and rescue of, manned space vehicles, Working Group 5D reached the conclusion that the proposals could be accepted.

Working Group 5D, for its part, has adopted the principle of adding Note 201A (Proposal USSR/59/2) with reference to the other frequencies affecting the maritime mobile service (2 182 kHz, 8 364 kHz and 156.80 MHz) and the aeronautical mobile service (2 182 kHz, 3 023.5 kHz, 5 680 kHz-121.5 MHz and 243 MHz).

On the other hand, with a view to avoiding congestion in the band 19 990-20 010 kHz, the Working Group envisages deleting Note 221A (search and rescue frequency 20 007 kHz).

M. CHEF
Chairman

SPACE
CONFERENCE

Document No. 152-E
16 June 1971
Original : French

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

WORKING GROUP 5B

Note from Working Group 5D to
Working Group 5B

After considering on 15 June 1971, the group of proposals relating to the band 21 850-22 000 kc/s, Working Group 5D concluded that the aeronautical mobile (R) service and the aeronautical fixed service might agree to relinquish this 20 kc/s band and to adopt the 21 870-22 000 kc/s band for their services.

This decision, moreover, is the subject of I.C.A.O. Proposal No. 1 which points out that the radio astronomy studies may prove to be of advantage to international aviation.

M. CHEF
Chairman

SPACE
CONFERENCE

Document No. 153-E
16 June 1971
Original : French

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

WORKING GROUP 5E

Note from Working Group 5D
to Working Group 5E

After considering, on 15 June 1971, proposal NZL/62/7 concerning bands 80-87 MHz, 87-100 MHz and 100-108 MHz in Region 3, Working Group 5D is agreed, so far as it is concerned, on adopting the revised text of No. 267, thereby removing the radionavigation service in New Zealand from band 83-88 MHz.

The new text would accordingly read as follows :

"MOD 267 - In New Zealand, bands 87-88 Mc/s and 94-108 Mc/s are allocated to the fixed and mobile services."

M. CHEF
Chairman

Document No. 154-E
16 June 1971
Original : English

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 2

FIRST REPORT BY

THE WORKING PARTY OF COMMITTEE 2

(CREDENTIALS)

1. The Working Party of Committee 2 (Credentials) met on 15 June 1971, at 0930 hrs with Mr. C.J. Martinez, (Venezuela), Chairman of Committee 2 in the chair.

2. In accordance with the Montreux Convention (1965) the Working Party decided to accept credentials signed by competent authorities in the following form :

- Credentials conferring full powers;
- Credentials giving the delegations the right to sign the Final Acts;
- Credentials indicating that delegations are authorized to represent their Governments, so long as such credentials contain no restriction whatever on the powers of the delegations;
- Credentials indicating the membership of the delegations, provided that they contain no restriction whatever on the powers of the delegations.

3. On the basis of these criteria, the Committee accepted the credentials of the 65 delegations mentioned in the Annex.

4. The Secretary of the Working Party was asked to get in touch with the heads of those delegations the credentials of which :

- were not accepted;
- are provisionally accredited;
- require translation;
- have not yet been received.

5. The Working Party urgently requests the delegations which have not yet done so to hand in their credentials to the Secretary of the Conference as soon as possible.

6. The Working Party of Committee 2 will meet again on 22 June 1971 to consider the remainder of the credentials.

7. The meeting adjourned at 1225 hrs.

W.W. SCOTT
Secretary,
Working Party

C.J. MARTÍNEZ
Chairman,
Committee 2

Annex : 1

A N N E X

CREDENTIALS ACCEPTED BY COMMITTEE 2 (CREDENTIALS)

(as on 15 June 1971 at 0930 hrs)

Albania (People's Republic of)

Saudi Arabia (Kingdom of)

Argentine Republic

Australia (Commonwealth of)

Belgium

Bielorussian Soviet Socialist Republic

Brazil

Cameroon (Federal Republic of)

Canada

Central African Republic

Ceylon

China

Cyprus (Republic of)

Vatican City State

Colombia (Republic of)

Korea (Republic of)

Ivory Coast (Republic of the)

Denmark

Group of French Overseas Territories

Spain

United States of America

Ethiopia

Finland

India (Republic of)

Indonesia (Republic of)

Iran

Ireland

Iceland

Israel (State of)

Italy

Jamaica

Japan

Kenya

Kuwait (State of)

Liberia (Republic of)

Liechtenstein (Principality of)

Luxembourg

Malaysia

Morocco (Kingdom of)

Mexico

Monaco

Nicaragua

Nigeria (Federal Republic of)

Norway

New Zealand

Uganda

Netherlands (Kingdom of the)

Philippines (Republic of the)

Poland (People's Republic of)

Portugal

Portuguese Oversea Provinces

Syrian Arab Republic

Federal Republic of Germany

Ukrainian Soviet Socialist Republic

Roumania (Socialist Republic of)

United Kingdom of Great Britain and Northern Ireland

Sweden

Tanzania (United Republic of)

Czechoslovak Socialist Republic

Territories of the United States of America

United Kingdom Overseas Territories

Thailand

Union of Soviet Socialist Republics

Venezuela (Republic of)

Viet-Nam (Republic of)

Document No. 155-E
16 June 1971
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SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

WORKING GROUP 4B

Note by the Chairman of Working Group 4B

Enclosed please find in the Annex the proposed partial text of Section VII of Article 7 as approved by Working Group 4B during its third meeting on 16 June 1971. The text would need to be supplemented by the addition of a paragraph(s) after 470CA which would indicate the frequency bands allocated for reception by space stations. This paragraph(s) would be added as soon as the decisions of Committee 5 are known.

G.C. BROOKS
Chairman,
Working Group 4B

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A N N E X

ARTICLE 7

PROPOSED PARTIAL TEXT OF SECTION VII

Section VII. Terrestrial services sharing frequency bands with space services above 1 Gc/s

Choice of sites and frequencies

470A 18. Sites and frequencies for terrestrial stations, operating in frequency bands shared with equal rights between terrestrial and space services, shall be selected having regard to the relevant recommendations of the C.C.I.R. with respect to geographical separation from earth stations.

470AA 18bis (1) As far as practicable, sites for transmitting*) stations, in the fixed or mobile service, employing maximum values of equivalent isotropically radiated power exceeding 35 dbW in the frequency bands between 1 and 10 Gc/s, should be selected so that the direction of maximum radiation of any antenna will be at least 2° away from the geostationary satellite orbit, taking into account the effect of atmospheric refraction.**)

470AB (2) As far as practicable, sites for transmitting*) stations, in the fixed or mobile service, employing maximum values of equivalent isotropically radiated power exceeding 45 dbW in the frequency bands between 10 and 15 Gc/s, should be selected so that the direction of maximum radiation of any antenna will be at least 1.5° away from the geostationary satellite orbit, taking into account the effect of atmospheric refraction.**)

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*)470AA.1 For their own protection receiving stations in the fixed or mobile services operating in bands shared with space services (satellite-to-earth) should also avoid directing their antennae towards the geostationary satellite orbit if their sensitivity is sufficiently high so that interference from space transmissions may be significant.

**)470AA.2 Information on this subject is given in C.C.I.R. Report No. 393.1

470AC (3) In the frequency bands above 15 Gc/s there shall be no restriction as to the direction of maximum radiation for stations operating in the fixed or mobile service.

Power Limits

470B 19. (1) The maximum equivalent isotropically radiated power of the transmitter and associated antenna, of a station in the fixed or mobile service, shall not exceed + 55 dbW.

470BA (1bis) Where compliance with 470AA is impracticable the maximum equivalent isotropically radiated power of the transmitter and associated antenna of a station in the fixed or mobile service shall not exceed :

- + 47 dbW in any direction within 0.5° of the geostationary satellite orbit; or
- + 47 dbW to + 55 dbW, on a linear decibel scale (8 db per degree), in any direction between 0.5° and 1.5° of the geostationary satellite orbit, taking into account the effect of atmospheric refraction.**)

470C (2) The power delivered by a transmitter to the antenna of a station in the fixed or mobile service in frequency bands between 1 and 10 Gc/s, shall not exceed + 13 dbW.

470CA (2bis) The power delivered by a transmitter to the antenna of a station in the fixed or mobile service in frequency bands above 10 Gc/s, shall not exceed + 10 dbW.

**) 470AA.2 Information on this subject is given in C.C.I.R. Report No. 393.1

SPACE
CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 156-E
16 June 1971
Original : French

BUDGET CONTROL COMMITTEE

Note by the Secretary-General

BUDGET OF THE CONFERENCE

The budget of the Space Conference, as approved by the Administrative Council of the Union at its 25th Session, Geneva, 1970, and adjusted at its 26th Session, 1971, is attached to this document for the information of the Budget Control Committee.

It is emphasized that the scheduled expenditure of the Space Conference forms part of the Union's regular budget and that it is therefore covered by the annual contributions of the Members of the Union for 1971.

However, under Nos. 224 and 225 of the International Telecommunication Convention, Montreux, 1965, recognized private operating agencies and international organizations not enjoying exemption under Administrative Council Resolution No. 574 and participating in the Conference are required to share in defraying the expenses of the Conference. Reference is made to Document No. 157 on this subject.

Mohamed MILI
Secretary-General

Annex : 1

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ANNEX

Section 7. Conference of the Union (No. 208 of the Convention)

7.1 WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS, GENEVA, 1971

	For comparison: Space Conference 1963	Budget 1971	Revised Budget 1971
	Swiss francs		
Chapter 1 - Staff			
Salaries and related expenditure		1,005,000	1,050,000
Travel expenses		40,000	40,000
Insurance		13,000	13,000
	701,000	1,058,000	1,103,000
Chapter 2 - Premises and equipment			
Premises, furniture, machines	92,000	140,000	140,000
Document reproduction	48,000	50,000	50,000
Supplies and overheads	32,000	33,000	33,000
Technical installations	14,000	14,000	14,000
Sundry and unforeseen	6,000	20,000	20,000
	192,000	257,000	257,000
Chapter 3 - Exceptional expenditure			
Preparatory work	17,000	40,000	40,000
Publication of proposals	75,000	65,000	65,000
Final Acts	73,000	80,000	80,000
	165,000	185,000	185,000
Total Section 7	1,058,000	1,500,000	1,545,000

SPACE
CONFERENCE

Document No. 157-E
16 June 1971
Original : French

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

BUDGET CONTROL COMMITTEE

Note by the Secretary-General

CONTRIBUTIONS OF RECOGNIZED PRIVATE OPERATING AGENCIES AND INTERNATIONAL ORGANIZATIONS NOT ENJOYING EXEMPTION

In accordance with the provisions of No. 231 of Article 16 of the International Telecommunication Convention, Montreux, 1965,

> ..."The amount of the contribution per the unit payable towards the expenses of administrative conferences by recognized private operating agencies which participate in accordance with 621 of the General Regulations and by participating international organizations shall be fixed by dividing the total amount of the budget of the conference in question by the total number of units contributed by Members and Associate Members as their share of Union expenses. The contributions shall be considered as Union income. They shall bear interest from the sixtieth day following the day on which accounts are sent out, at the rates fixed in 222."

Since the total budget of the Space Conference is 1,545,000 Swiss francs and the total number of contributory units of Members is 479 the amount of the contributory unit for recognized private operating agencies and international organizations not enjoying exemption under Resolution No. 574 of the Administrative Council is 3,226 Swiss francs.

A list of recognized private operating agencies and international organizations not enjoying exemption and participating in the Conference, together with an indication of the number of contributory units chosen, will be published later.

Mohamed MILI
Secretary-General

SPACE
CONFERENCE

Document No. 158-E
16 June 1971
Original : French

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 3

Report by the Secretary-General

COST OF PRINTING THE FINAL ACTS

Administrative Council Resolution No. 83 (amended) entitled :

ORGANIZATION, FINANCING AND LIQUIDATION
OF THE ACCOUNTS OF CONFERENCES AND MEETINGS

provides, on the subject of publication of the Final Acts of Conferences or meetings, that

"20.1 If a conference ... prints, for its own use, documents of which 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;

20.2 ....

20.3 The percentage of the composition cost mentioned in 20.1 above ... shall be decided by the Plenary Assembly of the Conference ..."

The Budget Control Committee has to submit a proposal to the plenary meeting on the share of the composition cost to be debited to the Conference. This share was fixed by the Plenipotentiary Conference at Montreux for its Final Acts, as well as by all other conferences held in recent years, at one-third, and it is proposed that the present conference should do the same.

It is estimated, on the basis of a one-third share, that the amount to be borne by the Space Conference would be 140,000 Swiss francs. This sum is based on the following figures :

Number of pages : 320

Expenses :

	Total	Attributable to	
		the Conference	Publications budget
Cost of composition and proof reading	60,000	20,000	40,000
Cost of printing	60,000	60,000	
Overtime for printing staff (night work, Saturdays and Sundays and waiting time)	60,000	60,000	
	180,000	140,000	40,000

Mohamed MILI
Secretary-General

SPACE CONFERENCE

1971

Document No. 159-E
16 June 1971
Original : French

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS — GENEVA — 1971

BUDGET CONTROL COMMITTEE

Report by the Secretary-General

SITUATION CONCERNING EXPENDITURE FOR THE SPACE CONFERENCE

AT 1 JUNE 1971

Rule 5 of Chapter 9 of the General Regulations annexed to the International Telecommunication Convention, Montreux, 1965, specifies that the budget control committee shall be responsible for approving the accounts for expenditure incurred throughout the duration of the Conference. It shall moreover present a report to the Plenary Meeting showing, as accurately as possible, the estimated total expenditure at the end of the Conference.

In accordance with the above-mentioned provisions, a statement of expenditure for the Space Conference up to 1 June 1971 is submitted to the budget control committee for consideration. This statement is accompanied by an estimate of the expenditure up to the end of the Conference.

Credit transfers

According to the provisions of Article 15, paragraph 3, of the Financial Regulations of the Union, the budget control committee may authorize credit transfers from one chapter to another, while transfers from one item to another within the same sub-head are the responsibility of the Secretary-General.

It is therefore proposed that the budget control committee should authorize the credit transfer of 65,000 Swiss francs

from Chapter III - Exceptional expenditure

to Chapter II - Premises and equipment.

It is very difficult, if not impossible, to make a distinction between the expenses incurred in preparing the preparatory documents, the credits for which are provided in Chapter III, from those for the actual Conference documents, so it is proposed that the expenses for all the documents with the exception, however, of the Final Acts, should be entered under a single item.

Position of the accounts

It can be seen from the Annex to this document that the total expenditure is at present estimated at 1,731,000 Swiss francs, that is to say 186,000 Swiss francs more than estimated in the budget. This excess is mainly due to the following items :

Document production : (excess credit of 115,000.- Sw. fr.)

The Special Joint Meeting of the C.C.I.R. Study Groups, held in February 1971, produced a document of 492 pages for the Space Conference. It should have been possible to reproduce that document immediately in the document reproduction section of the Union; however, as a result of various amendments made in the texts, the whole original had to be redrafted. The time available had by then become insufficient for all the typesetting and printing to be carried out by the various services of the Union, especially since at that time the internal reproduction services were fully occupied, mainly with reproducing the documents of the 26th Session of the Administrative Council of the Union. As a result we had to entrust part of the typesetting and the whole of the printing and binding to local printers who, incidentally, had to work overtime in order to produce the documents within the time limit. These factors resulted in considerable expenditure (120,000 Swiss francs) for which no provision had been made in the Conference budget.

Final Acts (excess credit of 75,000 Sw. fr.)

The Conference budget includes a credit of 65,000 Swiss francs for the expenditure incurred in the production of the documents, of which the typographical composition could be used again for printing the Final Acts. Since the budget was prepared, certain factors have arisen which will result in the credits being exceeded.

For one thing, there has been a considerable increase in the printing tariff, which is of the order of 30% for ordinary work and 50% for overtime bonuses for work done at night or on public holidays. Moreover, it has now been possible to estimate more accurately the volume of documents to be produced, which has resulted in an increase of 15% over the estimates. These factors as a whole have considerably altered the data originally used for estimating the credits required and, as can be seen from Document No. 158, the estimated cost now amounts to 140,000 Swiss francs to be borne by the Conference, representing an excess of 75,000 Swiss francs.

*

* *

The budget control committee is requested to examine the situation in the light of the provisions of Rule 5 of Chapter 9 of the General Regulations annexed to the International Telecommunication Convention, Montreux, 1965.

Mohamed MILI
Secretary-General

Annex : 1

ANNEX

SITUATION CONCERNING EXPENDITURE FOR THE SPACE CONFERENCE AT 1 JUNE 1971

Chapters and items	BUDGET including add.cred.	Credit transfers		Total credits available	Actual expenditure	Commitments to expenditure	Estimated expenditure	Total estimated expenditure
		item to item	chapter to chapter					
I. Staff								
7.101 - Salaries and related expenses								
- Salaries					43,451.40	738,019.--	158,000.--	939,470.40
- Overtime					111.45	3,400.05	80,000.--	83,511.50
- Sundry expenses					-	-	18.10	18.10
	1,050,000		-	1,050,000	43,562.85	741,419.05	238,018.10	1,023,000.--
7.102 - Travel expenses								
- Travel expenses and subsistence allowances					4,189.40	16,763.55	9,047.05	30,000.--
	40,000	- 4,000	-	36,000	4,189.40	16,763.55	9,047.05	30,000.--
7.103 - Insurance								
- Accident insurance					-	-	5,800.--	5,800.--
- Sickness insurance					693.80	-	7,100.--	7,793.80
- Other insurances					739.80	-	2,666.40	3,406.20
	13,000	+ 4,000	-	17,000	1,433.60	-	15,566.40	17,000.--
TOTAL, CHAPTER I	1,103,000	-	-	1,103,000	49,185.85	758,182.60	262,631.55	1,070,000.--

SITUATION CONCERNING EXPENDITURE FOR THE SPACE CONFERENCE AT 1 JUNE 1971

Chapters and items	BUDGET including add.cred.	Credit transfers		Total credits available	Actual expenditure	Commitments to expenditure	Estimated expenditure	Total estimated expenditure
		item to item	chapter to chapter					
II. Premises and equipment								
7.201 - Premises, furniture, machines								
- Renting of Palais des Expositions					52,500.--	52,500.--	-	105,000.--
- Upkeep of Palais des Expositions premises					-	-	10,500.--	10,500.--
- Electricity					-	-	6,000.--	6,000.--
- Installation					-	2,300.--	3,700.--	6,000.--
- Renting and upkeep of furniture and machines					-	-	5,000.--	5,000.--
- Renting of vehicles					-	7,850.--	-	7,850.--
- Sundry expenses					-	1,925.--	2,725.--	4,650.--
	140,000	-	-	140,000	52,500.--	64,575.--	27,925.--	145,000.--
7.202 - Document production								
- Cost of producing Conference documents					10,432.--		39,568.--	50,000.--
- Printing of C.C.I.R. Study Group Report					-	120,000.--	-	120,000.--
- Printing Doc. DT/1					-	60,000.--	-	60,000.--
- Other expenses					-	-	-	-
	50,000	-	+ 65,000	115,000	10,432.--	180,000.--	39,568.--	230,000.--
7.203 - Office supplies and overheads								
- Office supplies and equipment					1,287.10	-	10,000.--	11,287.10
- Postage, telephones, telegrams					10,325.50	-	10,000.--	20,325.50
- Guide, badges, etc.					-	3,360.--	12,000.--	15,360.--
- Sundry expenses					-	4,525.--	5,502.40	10,027.40
	33,000	-	-	33,000	11,612.60	7,885.--	37,502.40	57,000.--

SITUATION CONCERNING EXPENDITURE FOR THE SPACE CONFERENCE AT 1 JUNE 1971

Chapters and items	BUDGET including add.cred.	Credit transfers		Total credits available	Actual expenditure	Commitments to expenditure	Estimated expenditure	Total estimated expenditure
		item to item	Chapter to chapter					
Article II. (cont.)								
7.204 - Simultaneous interpretation and other technical installations								
- Rental of equipment, Palais des Expositions					-	-	12,000.--	12,000.--
- Cost of installing I.T.U. equipment					-	-	2,000.--	2,000.--
	14,000		-	14,000	-	-	14,000.--	14,000.--
7.205 - Sundry and unforeseen								
	20,000		-	20,000	77.50	-	19,922.50	20,000.--
	20,000		-	20,000	77.50	-	19,922.50	20,000.--
TOTAL, CHAPTER II	257,000		+ 65,000	322,000	74,622.10	252,460.--	138,917.90	466,000.--

SITUATION CONCERNING EXPENDITURE FOR THE SPACE CONFERENCE AT 1 JUNE 1971

Chapters and items	BUDGET including add.cred.	Credit transfers		Total credits available	Actual expenditure	Commitments to expenditure	Estimated expenditure	Total estimated expenditure
		item to item	chapter to chapter					
Article III. Exceptional expenditure								
7.301 - Preparatory work								
- Supernumerary staff for the I.F.R.B.					13,195.80	5,743.--	-	18,398.80
- Electronic computer					-	-	-	-
- Other expenses					20,828.90	-	232.30	21,061.20
	40,000		-	40,000	34,024.70	5,743.--	232.30	40,000.--
7.302 - Publication of proposals							-	-
	65,000		- 65,000	-	-	-	-	-
7.303 - Final Acts								
- Printing of Final Acts					-	-	140,000.--	140,000.--
- Translation into Russian					-	-	7,500.--	7,500.--
- Translation into Chinese					-	-	7,500.--	7,500.--
	80,000		-	80,000	-	-	155,000.--	155,000.--
TOTAL, CHAPTER III	185,000		- 65,000	120,000	34,024.70	5,743.--	155,232.30	195,000.--
TOTAL, SECTION 7 SPACE CONFERENCE	1,545,000	-	-	1,545,000	157,832.65	1,016,385.60	556,781.75	1,731,000.--

SPACE
CONFERENCE

Document No. 160-E
17 June 1971
Original : French

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS — GENEVA — 1971

COMMITTEE 4

SECOND REPORT BY WORKING GROUP 4A

REVISION OF SECTION I OF ARTICLE 1

1. Working Group 4A postponed examination of proposals D/4/2-3 until Ad hoc Group 5 had examined the related proposals covered by its terms of reference.

2. The Group considered proposals CHN/82/1-5 and IND/38/25. It considered that the other Working Groups of Committee 4 as well as the other Committees should express their views on the advisability of including the definitions of the following terms in the Radio Regulations :

Multiplex operation	CHN/82/1
Multi-destination transmission	CHN/82/2
Multiple access operation	CHN/82/3 and IND/38/25
Phase-shift telegraphy	CHN/82/4
Data transmission	CHN/82/5

The Group would draw attention to the fact that, if the term "data transmission" is adopted, the present definition of "telegraphy" will have to be amended.

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22 June 1971
Original : French

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 5

SUMMARY RECORD

OF THE

SECOND MEETING OF COMMITTEE 5

Thursday, 17 June 1971, at 1500 hrs

Chairman : Mr. H.A. KIEFFER (Switzerland)

Subjects discussed

1. Vice-Chairmanship of the Committee.
2. Approval of the summary record of the 1st meeting - Document No. 145.
3. General principle of making allocations above 40 Gc/s.
4. Oral reports of Chairmen of Working Groups.
5. Apportionment of documents to Committee 5 - Document No. 109 (Rev.).

1. Vice-Chairmanship of the Committee

The Chairman announced that, as the Vice-Chairman had been obliged to leave for professional reasons, he was being replaced by Mr. Zahradníček (Czechoslovakia).

2. Approval of the summary record of the 1st meeting (Document No. 145)

The Chairman said that the word "provisional" should be deleted from the title of Document No. 145.

In the light of that deletion, the summary record of the 1st meeting was approved.

3. General principle of making allocations above 40 Gc/s (Document Nos. 5, 28, 41, 51, 62, 114, 125 and 132)

The Chairman pointed out that, with the exception of the Mexican proposal (Document No. 114), the documents relating to the revision of the frequency allocation table were in favour of the allocation of bands above 40 Gc/s, although in most cases they did not specify the details of that allocation.

After explaining briefly the reasons why his Administration had suggested that frequency bands should be allocated only up to 40 Gc/s and having stressed that bands above that limit should be allocated only where that was indispensable, the delegate of Mexico withdrew the proposal set out in Document No. 114.

There being no contrary views, the Committee decided to proceed with the examination of the proposals concerning allocations in the bands above 40 Gc/s.

4. Oral reports of Chairmen of Working Groups

a) The Chairman of the Ad hoc Group (Definitions) said that the Group had held four meetings. With regard to the definitions of space services and systems, it had been decided to retain the general principles set out in the proposals submitted by France and a Sub-Working Group had been established to revise the relevant definitions of the Radio Regulations. The definitions of distribution services had given rise to a long discussion and the Group had deferred the adoption of a decision. On the other hand, it had modified the definitions concerning the meteorological-satellite service. The texts of all the definitions considered would be drawn up shortly and a report on the matter would be submitted to Committee 5.

b) The Chairman of Working Group 5A said that the Group had met twice and had been divided into two Sub-Groups, one to consider proposals for new communication-satellite services in all parts of the spectrum and the other, proposals concerning bands shared with other services. So far, the frequencies between 4 200 and 4 400 Mc/s had been considered.

Sub-Group 5A had been entrusted with the preliminary study of all the frequencies between 10.55 and 13.25 Gc/s; Sub-Group 5A-2 would study the proposals submitted by the administrations of Region 2 on frequency bands between 6 425 and 7 250 Mc/s.

If the Working Group had time during its meeting that afternoon, it would also consider questions relating to frequencies between 13.4 and 17.7 Gc/s.

The delegation of Cuba pointed out that Working Group 5A had rejected two proposals by the United States and Brazil to the effect that, in Region 2, the 6 425-7 250 Mc/s band should be used for the communication-satellite service, which, incidentally, had erroneously been referred to as a broadcasting service. Nevertheless, a Sub-Group had been set up to examine that question exclusively in respect of Region 2. He asked the Chairman for an explanation of the situation.

In view of the specific nature of that remark, the Chairman said he would consult the Chairmen of the Sub-Groups concerned, with a view to reaching a solution.

c) The Chairman of Working Group 5B said that the Group had met twice and had decided to examine frequencies in ascending numerical order. It had also begun to study the allocation of frequency bands to the radio astronomy and space research services and would, moreover, prepare a draft report which would bear the symbol DT/25.

d) The Chairman of Working Group 5C announced that the Group had held three meetings, at which it had discussed proposals concerning the use of space techniques in the amateur service. A draft report would be prepared for submission to Committee 5.

e) The Chairman of Working Group 5D said that the Group had held two meetings during which it had carried out a general study of the proposals submitted to it and had then examined frequency bands in ascending numerical order.

A search and rescue plan for manned space vehicles was to be prepared. Work had been begun on the maritime mobile service and problems concerning the 200, 400 and 600 Mc/s bands would be dealt with in the near future. With regard to the aeronautical mobile service, the check list had been completed and all the proposals had been examined up to the 118-136 Mc/s band. Some difficulties would no doubt arise when No. 273A of the Radio Regulations and the 1 530-1 660 Mc/s bands were considered. The Working Group had also taken note of Document No. 148 submitted by India, to which it expected to provide a reply on the following day.

f) The Chairman of Working Group 5E said that the Group had held two meetings at which it had studied the various opinions expressed in the documents assigned to it and had begun to study proposals on the 25 600-26 100 kc/s frequency band. In response to a request by the Italian delegation, an extract from the Master Frequency Register had been prepared by the I.F.R.B.

After a long discussion, the delegations of the United States and Canada had withdrawn their proposals concerning the use of the 87.5-100 Mc/s band for satellite broadcasting.

The Danish and United States documents dealing with the 100-108 Mc/s band had been examined, but no decision had yet been taken on that question, for which a group of delegates was seeking a compromise solution.

5. Apportionment of documents to Committee 5 (Document No. 109 (Rev.))

The Chairman read out the following list of documents to be studied by Committee 5 in addition to those enumerated in Document No. 109 (Rev.) :

Documents Nos. 101, 104, 105, 108, 110, 113; 114 (proposals 43 to 45 and 48), 115, 119, 124, 125, 132, 133, 134, 136 and 144.

In reply to a question by the delegate of Israel, the Chairman said that the documents would be apportioned among the working groups of the Committee by the Chairmen of those groups.

The meeting rose at 1600 hrs.

The Chairman :

H.A. KIEFFER

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 162-E
17 June 1971
Original : English

COMMITTEE 5

REPUBLIC OF INDONESIA

PROPOSAL FOR AMENDMENT OF FOOTNOTE 311A OF THE RADIO REGULATIONS

Ref.

INS/162/1 Since the Indonesian Administration has not had the opportunity to propose an amendment after 1 January 1969 in footnote No. 311A of the Radio Regulations, the Indonesian delegation would like to see "Indonesia" in the above-mentioned footnote due to the fact that the frequency 400 MHz is utilized by the Indonesian Administration in the fixed service.

SPACE CONFERENCE

1971

Document No. 163-E
18 June 1971
Original : English/French

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

WORKING GROUP 4B

Note by the Chairman of Working Group 4B

ARTICLE 7

PROPOSED PARTIAL TEXT OF SECTION VIII

Enclosed please find in the Annex the proposed partial text of Section VIII of Article 7 concerning choice of sites and frequencies, power limits and minimum angles of elevation of earth stations in the space services sharing frequency bands with terrestrial services. The text was approved by Working Group 4B during its fourth meeting on 18 June 1971. The text would need to be supplemented by the addition of suitable paragraphs after 470I and 470LA of the Annex to indicate the frequency bands in which the power limits and minimum angles of elevation would be applicable. These paragraphs will be added as soon as the decisions of Committee 5 are known. Consequential drafting amendments will also be made to the proposed text as necessary.

G.C. BROOKS
Chairman
Working Group 4B

Annex : 1

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ANNEX

ARTICLE 7

PROPOSED PARTIAL TEXT OF SECTION VIII

Section VIII. Space services sharing frequency bands with terrestrial services above 1 Gc/s

Choice of sites and frequencies

470E § 20. Sites and frequencies for earth stations, operating in frequency bands shared with equal rights between terrestrial and space services, shall be selected having regard to the relevant recommendations of the C.C.I.R. with respect to geographical separation from terrestrial stations.

Power limits

470F § 21.(1) Earth stations

470G (2) The equivalent isotropically radiated power transmitted in any direction towards the horizon by an earth station operating in frequency bands between 1 and 15 Gc/s, shall not exceed the following limits except for the provisions of Nos. 470H or 470HA :

$+ 40$ dbW in any 4 kc/s band for $\vartheta \leq 0°$

$+ 40 + 3\,\vartheta$ dbW in any 4 kc/s band for $0 < \vartheta \leq 5°$

where ϑ is the angle of elevation of the horizon viewed from the centre of radiation of the antenna of the earth station and measured as positive above the horizontal plane and negative below it.

470GA (2bis) The equivalent isotropically radiated power transmitted in any direction towards the horizon by an earth station operating in frequency bands above 15 Gc/s shall not exceed the following limits except for the provisions of Nos. 470H or 470HB :

$$+ 64 \text{ dbW in any 1 Mc/s band for } \theta \leq 0^\circ$$

$$+ 64 + 3\,\theta \text{ dbW in any 1 Mc/s band for } 0 < \theta \leq 5^\circ$$

where θ is as defined in 470G.

470GB (2ter) For angles of elevation of the horizon greater than 5° there shall be no restriction as to the equivalent isotropically radiated power transmitted by an earth station towards the horizon.

470H (3) The limits of 470G or 470GA, as applicable, may be exceeded by up to a maximum of 10 db. However, when the resulting / coordination zone / extends into the territory of another administration, such increase shall be subject to agreement of that administration.

470HA (3bis) As an exception to the limits of 470G, the equivalent isotropically radiated power towards the horizon for space research earth station (deep-space) shall not exceed + 55 dbW in any 4 kc/s band.

470HB (3ter) As an exception to the limits of 470GA, the equivalent isotropically radiated power towards the horizon for space research earth station (deep-space) shall not exceed + 79 dbW in any 1 Mc/s band.

470I SUP

Minimum angle of elevation

470K § 22.(1) Earth stations

470L (2) Earth station antennae shall not be employed for transmission at elevation angles of less than 3° measured from the horizontal plane to the direction of maximum radiation, except when agreed to by administrations concerned or affected. In case of reception by earth station, the above value shall be used for coordination purposes if the operating angle of elevation is less than the above value.

470LA (2bis) As an exception to 470L, earth station antennae in the space research service (near-earth) shall not be employed for transmission at elevation angles of less than 5°, and earth station antennae in the space research service (deep-space) shall not be employed for transmission at elevation angles of less than 10°, both angles being those measured from the horizontal plane to the direction of maximum radiation. In case of reception by earth station, the above values shall be used for coordination purposes if the operating angle of elevation is less than the above values.

1971

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 164-E
18 June 1971
Original : English

COMMITTEE 5

JOINT ALTERNATE PROPOSAL
BY THE U.S.A. AND CANADA

PROPOSED AMENDMENTS TO ARTICLE 5 OF THE RADIO REGULATIONS

The proposals set forth in CAN/14/50 (1 435-1 535 MHz), USA/28/78 (2 150-2 200 MHz) and, in part, USA/28/82 Rev. (2 500-2 550 MHz) were intended to satisfy similar requirements for multiple access systems for low-demand users in remote areas.

Recognizing the desirability of a common allocation to satisfy these needs, the U.S.A. and Canada submit the alternate proposal attached hereto.

Annex : 1

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ANNEX

ALTERNATIVE PROPOSAL

Mc/s

<table>
<tr><th>Ref.</th><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td rowspan="3">CAN-USA/164/1</td><td rowspan="3">1 790-2 200

FIXED
Mobile

356 356A 356AB</td><td>1 790-2 075

FIXED
MOBILE

356A 356AB</td><td rowspan="3">1 790-2 200

FIXED
MOBILE

356A 356AB</td></tr>
<tr><td>2 075-2 110

ADD COMMUNICATION-SATELLITE (Space-to-earth)
FIXED
MOBILE

356AB 374A</td></tr>
<tr><td>2 110-2 200

FIXED
MOBILE</td></tr>
<tr><td></td><td>2 200-2 290

FIXED
ADD SPACE RESEARCH (Space-to-earth)

Mobile

356</td><td colspan="2">2 200-2 290

FIXED
MOBILE
ADD SPACE RESEARCH (Space-to-earth)</td></tr>
</table>

Ref.

CAN-USA/164/2 MOD 356A

The band ~~2 110-2 120~~ 1 750-1 850 Mc/s may also be used for ~~telecommand in conjunction~~ earth-to-space ~~with space-craft engaged in deep space research,~~ transmissions in the space research service subject to agreement ~~between~~ among the administrations concerned and those having services operating in accordance with the Table, which may be affected.

CAN-USA/164/3 ADD 356AB

In the band 2 025-2 120 Mc/s earth-to-space transmissions in the space research and earth sciences satellite services may be authorized, subject to agreement among the administrations concerned and those having services operating in accordance with the Table, which may be affected.

Modify CAN/14/70 and USA/28/82 with respect to the band 2 450-2 690 Mc/s to read as follows :

Mc/s

	Region 1	Region 2	Region 3
CAN-USA/164/4	2 450-2 500 FIXED MOBILE Radiolocation 357 361	2 450-2 500 FIXED MOBILE RADIOLOCATION 357	
	2 500-2 550 ADD BROADCASTING-SATELLITE 361B 361C FIXED 364C MOBILE ~~Radiolocation~~ 361A	2 500-2 550 ADD BROADCASTING-SATELLITE 361B 361C FIXED 364C MOBILE ~~RADIOLOCATION~~ 361A	

Ref.

Mc/s

CAN-USA/164/4 (cont.)

Region 1	Region 2	Region 3
2 550-2 655 ADD BROADCASTING-SATELLITE 361B 361C FIXED 364C MOBILE 362 363 ~~364~~		
2 655-2 690 ADD BROADCASTING-SATELLITE 361B 361C FIXED 364C MOBILE	2 655-2 690 ADD BROADCASTING-SATELLITE 361B 361C ADD COMMUNICATION-SATELLITE (Earth-to-space) 392A FIXED 364C ~~MOBILE~~	2 655-2 690 ADD BROADCASTING-SATELLITE 361B 361C FIXED 364C MOBILE

CAN-USA/164/5 MOD 361

In France and the United Kingdom, the band 2 450-~~2 550~~ 2 500 Mc/s is allocated on a primary basis to the radiolocation service and, on a secondary basis, to the fixed and mobile services.

CAN-USA/164/6 ADD 361A

In France and the United Kingdom, the band 2 500-2 550 Mc/s is also allocated on a primary basis to the radiolocation service and, on a secondary basis, to the fixed and mobile services. In Canada, the band 2 500-2 550 Mc/s, is also allocated on a primary basis to the radiolocation service.

Ref.

CAN-USA/164/7 ADD 361B

The use of the band 2 500-2 690 Mc/s by the broadcasting-satellite service is limited to domestic systems for community-type reception including educational and instructional television and such use is subject to agreement among administrations concerned and having services operating in accordance with the Table, which may be affected. The power flux-density at the surface of the earth shall not exceed - 104 $dbW/m^2/20$ Mc/s.

CAN-USA/164/8 ADD 361C

This band may also be used for the transmission of tracking and telemetering signals associated with broadcasting-satellite space stations operating in the same band.

CAN-USA/164/9 SUP 364

CAN-USA/164/10 ADD 364C

New tropospheric scatter systems are prohibited in the band 2 500-2 690 MHz. Existing tropospheric scatter systems may continue to operate in this band.

1971

SPACE CONFERENCE

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21 June 1971
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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 4

REPUBLIC OF INDONESIA

1. Several proposals indicate that the power limit in 470BA, as in F/86/290-297 or in any other documents concerning such a limitation, is not more than + 47 dbW. The Indonesian Administration is setting up terrestrial microwave links with a length of about 2 000 km. Therefore, to avoid limitations in planning and implementations of above-mentioned construction, the Indonesian Delegation wishes to make a reservation regarding 470BA as set out in F/86/290-297.

2. The Indonesian Administration is also constructing tropospheric scatter systems. In this case, the Indonesian Delegation is not in favour of the limitation of the date as stated in Document No. B/72/108 ADD 470CE or in any other documents concerning such a limitation.

SPACE
CONFERENCE

1971

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 165-E
18 June 1971
Original : English

COMMITTEE 4

REPUBLIC OF INDONESIA

1. Several proposals indicate that the limitation of power in 470BA, as stated in F/86/290-297 or in any other documents concerning such a limitation, is until + 47 dbW. The Indonesian Administration is setting up terrestrial microwave links with a length of about 2000 km. Therefore, to avoid limitations in planning and implementations of above-mentioned construction, the Indonesian delegation requests reservation on 470BA as stated in F/86/290-297.

2. The Indonesian Administration is also constructing tropospheric weather systems. In this case, the Indonesian delegation is not in favour of the limitation of the date as stated in Document No. B/72/108 ADD 470CE or in any other documents concerning such a limitation.

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 166-E
18 June 1971
Original : French

COMMITTEE 4

THIRD REPORT OF WORKING GROUP 4A

REVISION OF ARTICLE 1, SECTION IIB

1. The Working Group has examined proposals CAN/13/20-21, ARG/21/1-6, B/70/5-22, MEX/77/5-16, F/83/261-275, and paragraph 1.1 of the Report of the S.J.M. of the C.C.I.R. It has decided to take the C.C.I.R. Report as a basis for revising the terms and definitions of Section IIB and possibly adding certain terms contained in this Report.

2. The Working Group proposes the replacement of the present Section IIB by the set of definitions contained in Annex to the present document.

3. The Working Group proposes that the C.C.I.R. should be requested :

- to re-examine the definition of "deep space" in connection with similar definitions which might be advocated by other organizations dealing with space problems;

- to consider the possibility of defining the lower limit of "extra-terrestrial space" in collaboration with the other organizations concerned, particularly with the appropriate United Nations Committee.

4. The Working Group deems it necessary that the other Working Groups of Committee 4, as well as the other Committees, should express their views on the advisability of adding the definitions of the following terms to the Radio Regulations :

Primary body	CCIR/1.1.5 - ARG/21/2 - F/83/273
Unperturbed orbit	CCIR/1.1.7 - ARG/21/4
Orbital elements	CCIR/1.1.8
Orbital plane	CCIR/1.1.9 - ARG/21/3 - F/83/274
Ascending node	CCIR/1.1.10 - ARG/21/3
Direct orbit	CCIR/1.1.11 - ARG/21/4 - B/70/9 - F/83/275
Circular orbit	CCIR/1.1.13 - ARG/21/4 - B/70/16
Elliptical orbit	CCIR/1.1.14 - ARG/21/4
Equatorial orbit	CCIR/1.1.15 - ARG/21/4 - B/70/11

Polar orbit	CCIR/1.1.16 - ARG/21/4
Inclined orbit	CCIR/1.1.17 - ARG/21/4
Apoastron	CCIR/1.1.18 - ARG/21/3
Periastron	CCIR/1.1.19 - ARG/21/3
Apogee	CCIR/1.1.20 - ARG/21/4 - B/70/12 - F/83/276
Perigee	CCIR/1.1.21 - ARG/21/4 - B/70/12 - F/83/277
Period (anomalistic)	CCIR/1.1.23
Nodal period	CCIR/1.1.24
Sidereal period of revolution	CCIR/1.1.25
Sidereal period of rotation	CCIR/1.1.26
Station-keeping satellite	CCIR/1.1.27 - ARG/21/6
Synchronized satellite	CCIR/1.1.28
Attitude-stabilized satellite	CCIR/1.1.29
Synchronous satellite	CCIR/1.1.30 - ARG/21/6 - B/70/17
Sub-synchronous satellite	CCIR/1.1.31 - ARG/21/6 - B/70/18
Object in space	ARG/21/2
Principal plane of reference	ARG/21/3

Annex : 1

ANNEX

REVISION OF SECTION IIB OF ARTICLE 1

MOD 84BH Spacecraft

A man-made vehicle which is intended to go beyond the major part of the earth's atmosphere. ~~Any type of space vehicle, including an earth satellite or a deep-space probe, whether manned or unmanned~~.

MOD 84BA Deep space

Space at distances from the earth approximately equal to or greater than the distance between the earth and the moon.

ADD 84BHA Satellite

A body which revolves round another body of preponderant mass and which has a motion primarily and permanently determined by the force of attraction of this body.

Note : A body so defined which revolves round the sun is called a planet or planetoid.

MOD 84BB Orbit

~~The path in space described by the centre of mass of a satellite or other object in space~~.

1. The path, relative to a specified frame of reference, described by the centre of mass of a satellite or other object in space, subjected solely to natural forces, mainly gravitational attraction.

2. By extension, the path described by the centre of mass of an object in space subjected to natural forces and occasional low-energy corrective forces exerted by a propulsive device in order to achieve and maintain a desired path.

MOD 84BC ~~Angle of~~ inclination of an orbit (of satellite)

The ~~acute~~ angle between the plane containing an orbit and the plane of the earth's equator.

MOD 84BD Period (of an ~~object in space~~ satellite)

The time elapsing between two consecutive passages of ~~an object~~ satellite or planet ~~in space~~ through ~~the~~ a characteristic ~~same~~ point on its ~~closed~~ orbit.

MOD 84BE Altitude of the apogee [perigee]

~~Altitude above the surface of the earth of the point on a closed orbit where a satellite is at its maximum distance from the centre of the earth.~~

The altitude of the apogee [perigee] above a specified reference surface serving to represent the surface of the earth.

SUP 84BF

MOD 84BG Geostationary ~~Stationary~~ satellite

A satellite, the circular orbit of which lies in the plane of the earth's equator and which turns about the polar axis of the earth in the same direction and with the same period as those of the earth's rotation.

The orbit on which a satellite should be placed to become a geostationary satellite is called "geostationary orbit".

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Corrigendum No. 1 to
Document No. 167-E(Rev.)
8 July 1971
Original : English

COMMITTEE 2

CORRIGENDUM TO

SUMMARY RECORD

OF THE

SECOND MEETING OF COMMITTEE 2

(CREDENTIALS)

Annex 1 - Page 3

Amend to read "Taiwan" in lieu of "Formosa".

Annex 17 - Page 35

Amend to read "Taiwan" in lieu of "Formosa".

C.J. MARTÍNEZ
Chairman
Committee 2

SPACE
CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 167-E(Rev.)
1 July 1971
Original : English

COMMITTEE 2

SUMMARY RECORD

OF THE

SECOND MEETING OF COMMITTEE 2

(CREDENTIALS)

Thursday, 17 June 1971, at 1500 hrs

Chairman : Mr. C.J. MARTÍNEZ (Venezuela)

Subjects discussed :		Document No.
1.	Approval of the Summary Record of the first meeting	128
2.	First report of the Working Group	154

1. Approval of summary record of 1st meeting (Document No. 128)

The Chairman said that the names of Mr. F. Molina Negro and Mr. B. Mvilakani were to be inserted against Western Europe/Mediterranean Basin and Africa, respectively, in the Committee 2 Working Group membership.

The summary record was approved.

2. First Report by the Working Party of Committee 2 (Document No. 154)

In connection with the report on credentials, the following statements were submitted for inclusion in the summary record :

Union of Soviet Socialist Republics	–	Annexes 1 and 10
People's Republic of Albania	–	Annex 2
France	–	Annex 3
Czechoslovak Socialist Republic	–	Annex 4
Socialist Federal Republic of Yugoslavia	–	Annex 5
Republic of Korea	–	Annex 6
China	–	Annex 7
Socialist Republic of Roumania	–	Annex 8
Italy	–	Annex 9
United States of America	–	Annex 11
Republic of Viet-Nam	–	Annex 12
Japan	–	Annex 13
Australia	–	Annex 14
People's Republic of Poland	–	Annex 15
Bielorussian Soviet Socialist Republic	–	Annex 16
People's Republic of Bulgaria	–	Annex 17
Ukrainian Soviet Socialist Republic	–	Annex 18

The meeting rose at 1545 hrs

The Secretary :
W.W. SCOTT

The Chairman :
C.J. MARTÍNEZ

Annexes : 18

ANNEX 1

STATEMENT BY THE DELEGATE OF THE U.S.S.R.

The list of credentials examined shows that the Conference is being attended by the so-called Delegations of South Viet-Nam, South Korea and China. In this connection, I am authorized to state the following :

- the Saigon regime does not represent the people of South Viet-Nam and is not entitled to speak or to sign the Final Acts of the W.A.R.C. on behalf of South Viet-Nam;
- the South Korean authorities do not represent the Korean people and are in no way entitled to speak or to sign the Final Acts of the W.A.R.C. on behalf of Korea;
- the Formosa authorities do not represent the Chinese people and are not entitled to speak or to sign the Final Acts of the W.A.R.C. on behalf of China.

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A N N E X 2

STATEMENT BY THE DELEGATE OF THE PEOPLE'S REPUBLIC OF ALBANIA

Mr. Chairman,

The Delegation of the People's Republic of Albania protests strongly against the participation in the work of this Conference of elements of the Chiang Kai-Chek clique, which has been forever rejected by the great Chinese people and has taken refuge in the Chinese province of Taiwan, under the protection of American bayonets.

This abnormal and inadmissible situation whereby representatives of the great People's Republic of China are denied participation in the work of the Conference is a direct result of the hostile and aggressive policy which the United States of America is implementing against the great Chinese people and their socialist state. This is prejudicial to the solution of the problems with which the Conference is dealing and deprives the Conference of the important contribution of the People's Republic of China, whose great achievements in the sphere of space science are well known to everybody.

The People's Republic of China is progressing with giant strides in the socialist rebuilding of the country and is achieving vast successes in industry and agriculture and in various fields of science and technology, to the delight of all progressive peoples throughout the whole world.

Socialist China is a great world power, which plays an important part in safeguarding international peace and security; it has become an insurmountable barrier to the two great Powers' plans for world hegemony and an impregnable fortress in the peoples' struggle for national and social liberation against the American imperialists and the new Soviet imperialists.

The Delegation of the People's Republic of Albania, strongly denouncing this flagrant injustice towards the People's Republic of China, protests energetically against the presence here of elements of the Chiang Kai-Chek clique who represent nothing and demands that the latter should be immediately expelled from this Conference.

The Albanian Delegation also expresses its reservations concerning the presence at this Conference of the Delegations of the cliques of South Viet-Nam and South Korea, whose credentials should not be recognized as valid.

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A N N E X 3

STATEMENT BY THE DELEGATE OF FRANCE

My Delegation wishes to point out that, in the opinion of the French Government, the seat of China should be occupied by a representative of the People's Republic of China, not by a representative of the Taipei authorities.

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ANNEX 4

STATEMENT BY THE DELEGATION OF THE CZECHOSLOVAK SOCIALIST REPUBLIC

The Delegation of the Czechoslovak Socialist Republic fully shares the views expressed by the Delegation of the Soviet Union and associates itself with that Delegation's statement.

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ANNEX 5

STATEMENT BY THE DELEGATE OF THE SOCIALIST FEDERAL REPUBLIC OF YUGOSLAVIA

The Yugoslav Government considers that only the Government of the People's Republic of China can represent that country and not the regime installed in Taiwan which was rejected by the people of China twenty-two years ago. We consider that the participation of the People's Republic of China is of the utmost importance to the International Telecommunication Union and to cooperation in the field of space communications and telecommunications in general. We do not think it possible fully to resolve the problems we are faced with in this Conference without the representation of one-fourth of mankind, nor at further conferences held under the auspices of I.T.U.

We request that the representatives of the People's Republic of China be re-established in their legal rights in the I.T.U.

Nor do we consider the regimes in South Viet-Nam and South Korea as representative of Viet-Nam and Korea.

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ANNEX 6

STATEMENT BY MR. W. H. LEE OF THE KOREAN DELEGATION

Thank you, Mr. Chairman. I wish to speak very briefly with reference to the remarks made by some representatives from the Eastern European Socialist countries concerning the credentials of my delegation. The statements just made by these representatives were politically motivated and completely unrelated to the substance of the present conference and therefore should be ruled out of order.

This is a highly technical conference: the terms of reference of the present conference, let alone this committee, do not empower it to question the representativeness of any government. Any such statement of highly political nature goes far beyond the conference's competence and therefore should not be permitted.

At this stage, the Korean Delegation wishes merely to reaffirm the declaration the Government of the Republic of Korea made on signing the 1965 Montreux Convention. It is so clearly stated under XXI of the Final Protocol to the Convention that I do not feel the necessity of repeating it here.

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ANNEX 7

STATEMENT BY H.E. AMBASSADOR CHENG PAONAN

I am compelled to register a protest against the derogatory remarks just made by the previous speakers concerning the representation of my country in this Conference. Such statements do not serve any purpose other than to disturb the harmonious atmosphere and inject politics into this technical organization.

The Government which my delegation has the honour to represent here is the only legally constituted Government of China and has been recognized as such by the majority of the States of the world, as well as by the United Nations and all its specialized agencies, including the International Telecommunication Union. Once again, I wish to reaffirm the statement made by the Delegation of the Republic of China to the Plenipotentiary Conference of the International Telecommunication Union at Montreux in 1965, in signing the Final Acts of the Montreux Conference that any declarations or reservations made in connection with or attached to the present Convention by any members of the Union, incompatible with the position of the Republic of China are illegal and therefore null and void.

The credentials of my delegation have been found in good order and accepted by the Working Party of Committee 2. Consequently, there are no grounds whatsoever for questioning the rights of my delegation to represent China in this Conference. Any statement or reservations made here contrary to these established rights and facts must be considered entirely out of order.

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ANNEX 8

STATEMENT BY THE DELEGATION OF THE SOCIALIST REPUBLIC OF ROUMANIA

With regard to the first report of the Working Group of Committee 2, contained in Document No. 154, the Delegation of the Socialist Republic of Roumania, speaking on behalf of its Government, considers that the only rightful representatives of China to this Conference are those of the Government of the People's Republic of China, and that the credentials of the envoys from Taiwan are therefore not valid.

On behalf of its Government, the Roumanian Delegation also regards as invalid the credentials of the envoys of the Saigon authorities and considers that the only rightful representative of the Republic of Viet-Nam is the Provisional Revolutionary Government of the Republic of South Viet-Nam.

We also deny the validity of the credentials of South Korea, which has no right to represent the whole of Korea at this Conference.

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ANNEX 9

STATEMENT BY THE DELEGATE OF ITALY

My Government considers that the seat of China at this Conference should be occupied by a representative of the People's Republic of China, not by a delegation of the Taipei authorities.

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ANNEX 10

STATEMENT BY THE DELEGATE OF THE U.S.S.R.

Mr. Chairman, I have taken the floor, not in order to engage in polemics, but only in order to state that we most categorically refute and censure the undignified and slanderous allegations which the Albanian delegate saw fit to make in his statement.

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ANNEX 11

STATEMENT BY THE DELEGATE OF THE UNITED STATES OF AMERICA

Speaking for the United States of America, I reject categorically all allegations made here today that the representatives of the Republic of Korea, the Republic of China and the Republic of Viet-Nam are not the legal representation of those countries. All three of the delegations referred to have been duly accredited and the credentials found in order.

I am very sorry that a meeting of the I.T.U. is engaged in such a useless debate. I submit there should be no more political bickering; political debates should be confined to the appropriate forums of the United Nations.

My statement applies to those who have spoken or may be about to speak.

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ANNEX 12

STATEMENT BY THE DELEGATE OF THE REPUBLIC OF VIET-NAM

My delegation is surprised that certain delegates who took the floor before me saw fit to use this forum for tendentious political propaganda against my country. My delegation considers that these statements are out of order.

We are assembled here, Mr. Chairman, not to discuss political matters or to indulge in polemics, but to examine technical questions. I should therefore be glad if we could refrain from all political discussion and could begin our substantive work.

My delegation reserves the right to make further statements, should it consider them necessary.

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A N N E X 13

STATEMENT BY THE DELEGATE OF JAPAN

I merely wish to point out that this is not the first committee of the United Nations General Assembly. The task of this Committee is the verification of credentials, and for that purpose the Committee nominated a Working Group, which examined the credentials so far presented. The Working Group found the credentials of the three delegations in question to be in good order and in conformity with Rule 633 of our General Regulations, as reported by you, Mr. Chairman, to this Committee. I do not think this Committee is the forum for political discussions such as have been taking place, and my delegation is willing to accept the credentials of the three countries concerned.

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ANNEX 14

STATEMENT BY THE DELEGATE OF AUSTRALIA

The Australian Delegation agrees with the Delegation of Japan and others who pointed out that the present meeting is concerned with technical issues and not with political matters connected with relations between States. The delegation considers that the credentials of the Delegations of the Republics of Viet-Nam, Korea and China are in order and that these delegations correctly represent their Governments. These three countries are, furthermore, legally constituted members of the I.T.U. and, as such, the Australian Delegation considers that they have every right to attend the Conference.

These factors, together with the fact that the actual credentials of the three delegations have been found to be in order by the Committee's Working Group, lead the Australian Delegation to declare that they cannot associate themselves with those delegations who have queried the credentials of Viet-Nam, Korea and China.

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A N N E X 15

STATEMENT BY THE DELEGATE OF POLAND

The Delegation of the People's Republic of Poland fully associates itself with the statement made by the Delegate of the U.S.S.R. (Annex 1 to Document No. 167) concerning the illegality of the participation of representatives of the Saigon regime, the South Korean authorities and the Taiwan regime in the deliberations of our World Administrative Radio Conference for Space Telecommunications. They have no right to speak on behalf of the peoples of South Viet-Nam, Korea and China, respectively, and, a fortiori, to sign the Final Acts which will be adopted by our Conference.

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ANNEX 16

STATEMENT BY THE DELEGATE OF THE BIELORUSSIAN S.S.R.

The Delegation of the Bielorussian S.S.R. completely refutes the statement of the Albanian Delegate, in which he permitted himself to make offensive remarks concerning the Soviet Union.

At the same time, our Delegation wishes to lend its full support to the statements made by the Soviet and other Delegations concerning the illegal presence at this Conference of representatives from Taiwan, South Korea and South Viet-Nam.

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ANNEX 17

STATEMENT BY THE DELEGATION OF THE PEOPLE'S REPUBLIC OF BULGARIA

The Delegation of the People's Republic of Bulgaria fully shares the views expressed in the statement made by the Delegation of the Soviet Union concerning the unlawful presence at the Conference of the representatives of South Korea, South Viet-Nam and Formosa.

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ANNEX 18

STATEMENT BY THE DELEGATE OF THE UKRAINIAN SOVIET SOCIALIST REPUBLIC

The Delegation of the Ukrainian S.S.R. supports the views of delegations which have spoken against the acceptance of the credentials of the representatives of the Saigon regime, South Korea and Taiwan, which do not represent the peoples of Viet-Nam, Korea and China, respectively.

The Delegation of the Ukrainian Soviet Socialist Republic refutes the undignified attack of the Delegate of Albania against the Soviet Union.

SPACE
CONFERENCE

Document No. 167-E
23 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 2

SUMMARY RECORD

OF THE

SECOND MEETING OF COMMITTEE 2

(CREDENTIALS)

Thursday, 17 June 1971, at 1500 hrs

Chairman : Mr. C.J. MARTÍNEZ (Venezuela)

Subjects discussed :	Document No.
1. Approval of the Summary Record of the first meeting	128
2. First report of the Working Group	154

1. Approval of summary record of 1st meeting (Document No. 128)

The Chairman said that the names of Mr. F. Molina Negro and Mr. B. Mvilakani were to be inserted against Western Europe/Mediterranean Basin and Africa, respectively, in the Committee 2 Working Group membership.

The summary record was approved.

2. First Report by the Working Party of Committee 2 (Document No. 154)

In connection with the report on credentials, the following statements were submitted for inclusion in the summary record :

Union of Soviet Socialist Republics	–	Annexes 1 and 10
People's Republic of Albania	–	Annex 2
France	–	Annex 3
Czechoslovak Socialist Republic	–	Annex 4
Socialist Federal Republic of Yugoslavia	–	Annex 5
Republic of Korea	–	Annex 6
China	–	Annex 7
Socialist Republic of Roumania	–	Annex 8
Italy	–	Annex 9
United States of America	–	Annex 11
Republic of Viet-Nam	–	Annex 12
Japan	–	Annex 13
Australia	–	Annex 14

The meeting rose at 1545 hrs.

The Secretary :

W.W. SCOTT

The Chairman :

C.J. MARTÍNEZ

Annexes : 14

A N N E X 1

STATEMENT BY THE DELEGATE OF THE U.S.S.R.

The list of credentials examined shows that the Conference is being attended by the so-called Delegations of South Viet-Nam, South Korea and China. In this connection, I am authorized to state the following :

- the Saigon regime does not represent the people of South Viet-Nam and is not entitled to speak or to sign the Final Acts of the W.A.R.C. on behalf of South Viet-Nam;
- the South Korean authorities do not represent the Korean people and are in no way entitled to speak or to sign the Final Acts of the W.A.R.C. on behalf of Korea;
- the Taiwan authorities do not represent the Chinese people and are not entitled to speak or to sign the Final Acts of the W.A.R.C. on behalf of China.

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ANNEX 2

STATEMENT BY THE DELEGATE OF THE PEOPLE'S REPUBLIC OF ALBANIA

Mr. Chairman,

The Delegation of the People's Republic of Albania protests strongly against the participation in the work of this Conference of elements of the Chiang Kai-Chek clique, which has been forever rejected by the great Chinese people and has taken refuge in the Chinese province of Taiwan, under the protection of American bayonets.

This abnormal and inadmissible situation whereby representatives of the great People's Republic of China are denied participation in the work of the Conference is a direct result of the hostile and aggressive policy which the United States of America is implementing against the great Chinese people and their socialist state. This is prejudicial to the solution of the problems with which the Conference is dealing and deprives the Conference of the important contribution of the People's Republic of China, whose great achievements in the sphere of space science are well known to everybody.

The People's Republic of China is progressing with giant strides in the socialist rebuilding of the country and is achieving vast successes in industry and agriculture and in various fields of science and technology, to the delight of all progressive peoples throughout the whole world.

Socialist China is a great world power, which plays an important part in safeguarding international peace and security; it has become an insurmountable barrier to the two great Powers' plans for world hegemony and an impregnable fortress in the peoples' struggle for national and social liberation against the American imperialists and the new Soviet imperialists.

The Delegation of the People's Republic of Albania, strongly denouncing this flagrant injustice towards the People's Republic of China, protests energetically against the presence here of elements of the Chiang Kai-Chek clique who represent nothing and demands that the latter should be immediately expelled from this Conference.

The Albanian Delegation also expresses its reservations concerning the presence at this Conference of the Delegations of the cliques of South Viet-Nam and South Korea, whose credentials should not be recognized as valid.

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A N N E X 3

STATEMENT BY THE DELEGATE OF FRANCE

My Delegation wishes to point out that, in the opinion of the French Government, the seat of China should be occupied by a representative of the People's Republic of China, not by a representative of the Taipei authorities.

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A N N E X 4

STATEMENT BY THE DELEGATION OF THE CZECHOSLOVAK SOCIALIST REPUBLIC

The Delegation of the Czechoslovak Socialist Republic fully shares the views expressed by the Delegation of the Soviet Union and associates itself with that Delegation's statement.

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ANNEX 5

STATEMENT BY THE DELEGATE OF THE SOCIALIST FEDERAL REPUBLIC OF YUGOSLAVIA

The Yugoslav Government considers that only the Government of the People's Republic of China can represent that country and not the regime installed in Taiwan which was rejected by the people of China twenty-two years ago. We consider that the participation of the People's Republic of China is of the utmost importance to the International Telecommunication Union and to cooperation in the field of space communications and telecommunications in general. We do not think it possible fully to resolve the problems we are faced with in this Conference without the representation of one-fourth of mankind, nor at further conferences held under the auspices of I.T.U.

We request that the representatives of the People's Republic of China be re-established in their legal rights in the I.T.U.

Nor do we consider the regimes in South Viet-Nam and South Korea as representative of Viet-Nam and Korea.

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ANNEX 6

STATEMENT BY MR. W. H. LEE OF THE KOREAN DELEGATION

Thank you, Mr. Chairman. I wish to speak very briefly with reference to the remarks made by some representatives from the Eastern European Socialist countries concerning the credentials of my delegation. The statements just made by these representatives were politically motivated and completely unrelated to the substance of the present conference and therefore should be ruled out of order.

This is a highly technical conference: the terms of reference of the present conference, let alone this committee, do not empower it to question the representativeness of any government. Any such statement of highly political nature goes far beyond the conference's competence and therefore should not be permitted.

At this stage, the Korean Delegation wishes merely to reaffirm the declaration the Government of the Republic of Korea made on signing the 1965 Montreux Convention. It is so clearly stated under XXI of the Final Protocol to the Convention that I do not feel the necessity of repeating it here.

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ANNEX 7

STATEMENT BY H.E. AMBASSADOR CHENG PAONAN

I am compelled to register a protest against the derogatory remarks just made by the previous speakers concerning the representation of my country in this Conference. Such statements do not serve any purpose other than to disturb the harmonious atmosphere and inject politics into this technical organization.

The Government which my delegation has the honour to represent here is the only legally constituted Government of China and has been recognized as such by the majority of the States of the world, as well as by the United Nations and all its specialized agencies, including the International Telecommunication Union. Once again, I wish to reaffirm the statement made by the Delegation of the Republic of China to the Plenipotentiary Conference of the International Telecommunication Union at Montreux in 1965, in signing the Final Acts of the Montreux Conference that any declarations or reservations made in connection with or attached to the present Convention by any members of the Union, incompatible with the position of the Republic of China are illegal and therefore null and void.

The credentials of my delegation have been found in good order and accepted by the Working Party of Committee 2. Consequently, there are no grounds whatsoever for questioning the rights of my delegation to represent China in this Conference. Any statement or reservations made here contrary to these established rights and facts must be considered entirely out of order.

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ANNEX 8

STATEMENT BY THE DELEGATION OF THE SOCIALIST REPUBLIC OF ROUMANIA

With regard to the first report of the Working Group of Committee 2, contained in Document No. 154, the Delegation of the Socialist Republic of Roumania, speaking on behalf of its Government, considers that the only rightful representatives of China to this Conference are those of the Government of the People's Republic of China, and that the credentials of the envoys from Taiwan are therefore not valid.

On behalf of its Government, the Roumanian Delegation also regards as invalid the credentials of the envoys of the Saigon authorities and considers that the only rightful representative of the Republic of Viet-Nam is the Provisional Revolutionary Government of the Republic of South Viet-Nam.

We also deny the validity of the credentials of South Korea, which has no right to represent the whole of Korea at this Conference.

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A N N E X 9

STATEMENT BY THE DELEGATE OF ITALY

My Government considers that the seat of China at this Conference should be occupied by a representative of the People's Republic of China, not by a delegation of the Taipei authorities.

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ANNEX 10

STATEMENT BY THE DELEGATE OF THE U.S.S.R.

Mr. Chairman, I have taken the floor, not in order to engage in polemics, but only in order to state that we most categorically refute and censure the undignified and slanderous allegations which the Albanian delegate saw fit to make in his statement.

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ANNEX 11

STATEMENT BY THE DELEGATE OF THE UNITED STATES OF AMERICA

Speaking for the United States of America, I reject categorically all allegations made here today that the representatives of the Republic of Korea, the Republic of China and the Republic of Viet-Nam are not the legal representation of those countries. All three of the delegations referred to have been duly accredited and the credentials found in order.

I am very sorry that a meeting of the I.T.U. is engaged in such a useless debate. I submit there should be no more political bickering; political debates should be confined to the appropriate forums of the United Nations.

My statement applies to those who have spoken or may be about to speak.

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ANNEX 12

STATEMENT BY THE DELEGATE OF THE REPUBLIC OF VIET-NAM

My delegation is surprised that certain delegates who took the floor before me saw fit to use this forum for tendentious political propaganda against my country. My delegation considers that these statements are out of order.

We are assembled here, Mr. Chairman, not to discuss political matters or to indulge in polemics, but to examine technical questions. I should therefore be glad if we could refrain from all political discussion and could begin our substantive work.

My delegation reserves the right to make further statements, should it consider them necessary.

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A N N E X 13

STATEMENT BY THE DELEGATE OF JAPAN

I merely wish to point out that this is not the first committee of the United Nations General Assembly. The task of this Committee is the verification of credentials, and for that purpose the Committee nominated a Working Group, which examined the credentials so far presented. The Working Group found the credentials of the three delegations in question to be in good order and in conformity with Rule 633 of our General Regulations, as reported by you, Mr. Chairman, to this Committee. I do not think this Committee is the forum for political discussions such as have been taking place, and my delegation is willing to accept the credentials of the three countries concerned.

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ANNEX 14

STATEMENT BY THE DELEGATE OF AUSTRALIA

The Australian Delegation agrees with the Delegation of Japan and others who pointed out that the present meeting is concerned with technical issues and not with political matters connected with relations between States. The delegation considers that the credentials of the Delegations of the Republics of Viet-Nam, Korea and China are in order and that these delegations correctly represent their Governments. These three countries are, furthermore, legally constituted members of the I.T.U. and, as such, the Australian Delegation considers that they have every right to attend the Conference.

These factors, together with the fact that the actual credentials of the three delegations have been found to be in order by the Committee's Working Group, lead the Australian Delegation to declare that they cannot associate themselves with those delegations who have queried the credentials of Viet-Nam, Korea and China.

SPACE CONFERENCE

1971

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 168-E
21 June 1971
Original : English

COMMITTEE 4

UNITED STATES OF AMERICA

Ref.

USA/168/290 Replace Recommendation No. 5A (Spa 5) with the following :

RECOMMENDATION No. I

to the C.C.I.R. relating to the broadcasting satellite service

The World Administrative Radio Conference for Space Telecommunications, Geneva 1971,

considering

a) that frequency bands have been allocated to the broadcasting satellite service and that the use of satellite transmissions for reception by the general public of sound and television broadcasts may be possible in the future;

b) that the C.C.I.R. is studying the conditions under which sharing between the broadcasting satellite service and other services may be possible;

recommends

that the C.C.I.R. expedite its studies and make early recommendations regarding the conditions for sharing in those bands allocated to the broadcasting satellite service by the W.A.R.C., in order that Administrations and the International Frequency Registration Board shall have the necessary technical data required to carry out examination procedures, in particular regarding Articles 9 and 9A of the Radio Regulations.

SPACE
CONFERENCE

Document No. 169-E
June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 4

SUMMARY RECORD

OF THE

SECOND MEETING OF COMMITTEE 4

(TECHNICAL)

Thursday, 17 June 1971, at 0940 hrs

Chairman : Mr. E. SANDBACH (Australia)

Subjects discussed	Document No.
1. Approval of Summary Record of first meeting	127
2. Members of Committee 4 Drafting Group	127 (paragraph 5)
3. Progress report by Working Group Chairmen	146 155

1. Approval of Summary Record of first meeting (Document No. 127)

Approved

2. Members of Committee 4 Drafting Group (Document No. 127, paragraph 5)

In pursuance of paragraph 5 of Document No. 127, the Delegations of France and the United States of America proposed Mr. Chaux and Mr. Reinhart, respectively, to serve on the Drafting Group.

The Delegation of Spain proposed Mr. Morales (Chile), who accepted nomination.

It was decided that the Drafting Group should consist of those three delegates.

3. Progress report by Working Group Chairmen (Documents Nos. 146, 155)

Working Group 4A

The Chairman of Working Group 4A said that the Working Group had completed the consideration of Sections I, IIB and III of Article 1 of the Radio Regulations. Section III had been dealt with first, because the Working Group's findings, which appeared in Document No. 146, were needed for the consideration of the Section in Committee 6. In paragraphs 1 and 2 of that document, the Working Group proposed the addition of No. 98A, a definition of e.i.r.p. and the modification of No. 93, the definition of harmful interference. As stated in paragraph 3, the Working Group had prepared a set of definitions concerning frequency bands, particularly frequency sharing, but it had been considered by some delegations that these definitions might not be necessary in the Radio Regulations and that the other Working Groups of Committee 4 and Committees 5 and 6 should be consulted concerning their applicability. In the same paragraph, the Working Group proposed the addition of a footnote relating to the title of Article 5, containing a reference to Resolution No. 6, where the conditions of use of the terms "allocation", "allotment" and "assignment" were specified.

In a discussion concerning the modification of No. 89 the representative of the I.F.R.B. stressed the need to retain the idea given by the words "the centre of which coincides with the frequency assigned to the station", because it provided a useful link with No. 85, which had stood the test of time. That view was supported by the Delegate of the United Kingdom. The Chairman of Committee 4 requested the Chairman of Working Group 4A to take into account the suggestion made by the I.F.R.B. In that connection the competence of the Space Conference to modify definitions affecting other services was questioned and finally confirmed. The proposals in paragraphs 1, 2 and 3 were noted and it was decided that other organs of the Conference should be consulted with regard to the need to include the definitions referred to in paragraphs 3 and 4 in the Radio Regulations. Final consideration of the suggestion by the I.F.R.B. regarding No. 89 would be left until the order of the definitions could be decided following receipt of suggestions by other Committees.

The Chairman of Working Group 4A said that documents containing the Group's conclusions on Sections I and IIB would be issued shortly. No modifications had been proposed for Section I, but a revision of all the definitions in Section IIB had been prepared, mainly on the basis of the C.C.I.R. proposals, although the list was shorter than that of the C.C.I.R. and some of the definitions had been simplified. The Working Group suggested that lists for both Sections, as well as a list of the C.C.I.R. proposals which had not been taken up, should be circulated to the other organs of the Conference for their comments. Finally, the Group had concluded that it could not make any proposals concerning the order of the definitions in Article 1 until it could hold joint discussions with the ad hoc Group of Committee 5, which was dealing with Sections II and IIA of Article 1.

The Working Group's suggestions were approved.

Working Group 4B

The Chairman of Working Group 4B said that the Group had met twice, discussion centring on Sections VII and VIII of Article 7. With regard to Section VIII, power limits and minimum angular elevation for earth stations had been extensively discussed in small working groups; proposals would be submitted at the next meeting. Power flux-density had not been thoroughly discussed although the general feeling appeared to be to accept the points agreed on by the C.C.I.R. Special Joint Meeting. With regard to Section VII, discussion had been completed and a proposed partial text for the section (Document No. 155) was before the Committee. The proposals in Document No. 155 were consistent with those of the Special Joint Committee except for proposal 470 AA as regards e.i.r.p.'s below 35 dbW. It should further be noted that the inclusion of frequency bands in this section would have to be deferred until Committee 5 had finished its deliberations.

The Delegate of Pakistan said that his delegation considered the terms of proposal 470 BA too stringent and wished its reservations on the subject to be recorded.

Upon a suggestion by the Director of the C.C.I.R. that the word "recommendations" (page 3, proposal 470 A 18, fourth line) be replaced by "conclusions", there was some discussion as to whether or not the intention was to refer to recommendations by the C.C.I.R. exclusive of any background material contained in C.C.I.R. publications. As the relation between the Radio Regulations and C.C.I.R. publications was due for examination under a subsequent item on the agenda, it was decided that discussion of that point of principle would be deferred until that time.

The meeting rose at 1045 hrs.

The Secretary
I. DOLEZEL

The Chairman
E. SANDBACH

SPACE
CONFERENCE

Document No. 170-E (Rev.
21 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

WORKING GROUP 6A

UNITED KINGDOM

DRAFT RESOLUTION No. I

concerning the use of the band 11.95-12.75 GHz in
the European and African broadcasting areas

The World Administrative Radio Conference, Geneva 1971,

considering

a) that ultimately the broadcasting satellite service may be the prime user of this band;

b) that the broadcasting satellite service will not fully develop for many years;

c) that other services in the European broadcasting area having allocations in this band need to use the band in advance of the development of the broadcasting satellite service or the distribution-satellite service;

d) that the disposition of these services is dependent upon assignments made in the broadcasting satellite service;

resolves

1) that a broadcasting satellite assignment planning conference for the European and African areas, be convened with the following objectives :

a) to agree the technical characteristics of channels to be assigned within the band 11.95-12.75 GHz and the number of channels available for assignment;

b) to assign channels to individual administrations;

c) to frame consistent with Articles 9 and 9A any necessary procedures to ensure the successful implementation of assignments in the band;

2) that the conference should be held not later than 1975.

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 170-E
21 June 1971
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SPACE
CONFERENCE

Document No. 171-E
21 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 4

UNITED KINGDOM

PROTECTION RATIO MEASUREMENTS AND INTERFERENCE CALCULATIONS FOR FM TELEVISION SIGNALS AFFECTING V.S.B. AM TELEVISION RECEPTION IN THE SAME CHANNEL (625 LINES PAL COLOUR SYSTEM)

Introduction

The Special Joint Meeting of the C.C.I.R. (Geneva 1971) considered the protection ratio required to prevent interference to vestigial sideband amplitude modulated colour television transmission from a frequency modulated television transmission operating in the same radio frequency channel. Although a provisional value of protection ratio was included in the report of the S.J.M., some administrations regarded this value as too low and it was accepted that further measurements would be desirable. The present contribution summarizes the results of recent experimental work undertaken in the United Kingdom.

Experimental conditions

Except where otherwise indicated the results apply to the following conditions :

The wanted picture was a coloured still, which was fairly sensitive to the effects of interference. The interfering picture was colour bars, and the peak-to-peak deviation was 8 MHz. Standard pre-emphasis (C.C.I.R. Recommendation 405, curve B) was used in the interfering modulation. The viewing distance was five times the picture height. The weighted signal-to-noise ratio of the modulation and demodulation system was 50 db.

Protection ratio for high signal-to-noise ratio

For a mean impairment grade *) of 1.5, the protection ratio is about 56 db. For grade 2 impairment, it is about 54 db. Above grade 2 impairment, the protection ratio decreases at a rate of about 5 db per grade. Some experimental results for a high wanted signal-to-noise ratio (about 47 db weighted) are shown in Figure 1.

Effect of deviation

As a rough rule, if the deviation is increased by x db, the required protection ratio is decreased by x/2 db.

Effect of pre-emphasis

An experiment in which pre-emphasis was not used showed that about 1.5 db more protection is needed against a transmission with pre-emphasis than one without.

Effect of added random noise

If the signal-to-noise ratio of the wanted signal is significantly reduced by the addition of random noise, the visibility of the interfering FM signal is reduced. However, for weighted signal-to-noise ratios down to 43 db (the value adopted in the S.J.M. report for a good domestic installation with 70 db (μV/m) wanted signal level at about 800 MHz) the protection ratio required for grade 2 impairment *) was found to be little changed at about 54 db. Furthermore, even at levels of interference which are not distinguishable as a coherent pattern, the picture quality is degraded by the interference which produces an apparent increase in the level of random noise.

The combined effect of noise and interference is summarized in Figure 2 which shows, by means of curves, the boundaries between conditions corresponding to difference impairment grades. Considering the situation for a weighted signal-to-noise ratio of 43 db, it may be seen that at high values of protection ratio the picture impairment remains fairly constant within grade 2. However, the impairment grade worsens significantly if the protection ratio is reduced below about 54 db.

---

*) C.C.I.R. Report 405-1, Note 8

Effect of energy dispersal

An added modulation consisting of a sine-wave with 1.6 MHz peak-to-peak deviation, gave some reduction in the protection ratio. This was 2 db for colour bars and 5 db for a signal corresponding to a full picture at black level.

Comparison with earlier results

The evidence presented to the S.J.M. regarding FM to AM interference was confined to 525 line systems with NTSC colour. The protection ratios discussed are for "just perceptible" interference. The provisional S.J.M. estimate for 625 line systems was 51 db protection ratio for low noise levels and 45 db for a 43 db signal-to-noise ratio (weighted). The present results would suggest 54 db protection ratio for low noise levels and, further, that the relaxation due to the presence of noise is quite small so that 54 db would appear desirable as a working protection ratio. Apart from system differences, it is thought that the viewing distance of five times picture height is more reasonable than six to eight times picture height used in some of the contributions to the S.J.M., and the closer-viewing distance was found to make interference effects appreciably more visible.

Interference calculations for the UHF band about 800 MHz

Using the experimentally derived protection ratio of 54 db it is possible to calculate limits for permissible power-flux density (pfd) of an interfering FM television signal from a satellite. This involves a consideration of the ratio of wanted to interfering signals at the aerial of a viewer receiving the wanted signal at a level of 70 db (μV/m).

The following factors must be taken into account :

i) Ground reflection - This is considered a serious omission in arriving at Figure 3.4-1 of the S.J.M. report (page 40). The phenomenon is covered by footnote (5) to Annex 3-4B. Although increases of interfering signal up to 6 db can occur, it is felt that in view of the combination of circumstances involved an allowance of 3 db would be reasonable to take account of this effect.

ii) Receiving aerial directivity - The diagram of C.C.I.R. Recommendation 419 for UHF aerials is considered reasonable even for the vertical plane when using a horizontally polarized aerial. It is true the broadside pattern tends to be less good in the "H-plane" of a yagi, but the calculations have assumed a high gain (17 db over isotropic) aerial when arriving at the noise level in the picture.

iii) Polarization - At UHF the satellite transmission would always be circularly polarized. The stated satellite field strength (or flux) would normally represent the total power rather than that confined to the horizontal field component. In these circumstances a 3 db relaxation could be applied to signals arriving within the main lobe of a plane polarized terrestrial receiving antenna but only if they emanated from the main lobe of the satellite transmitting antenna. This could not in general be applied to interference from the side lobes of the satellite transmitting antenna and has therefore not been included in the following calculations.

Maximum permitted flux density.

For the case of interference from FM television to AM v.s.b. television the signal levels indicated in S.J.M. report Figure 3.4-1 (page 40) require modification as follows :

a) For angles of arrival 0° - 20° (No advantage from receiving aerial directivity)

Wanted signal	70 db (μV/m)
Protection ratio	54 db
Maximum interfering signal	16 db (μV/m)
Allowance for ground reflection	3 db
Maximum incident interfering signal	13 db (μV/m)
	= - 133 db (W/m^2)

b) For angles of arrival greater than 60°, receiving aerial directivity permits 16 db greater discrimination so

Maximum incident interfering signal = - 117 db (W/m^2)

Frequency offset and adjacent channels

The experimental results and derived calculations apply to nominal zero frequency offsets, i.e. the centre frequency of the FM signal close to the AM vision carrier. Brief tests with the offset of the FM carrier in the range - 1 MHz to + 5 MHz relative to the AM carrier gave protection ratios varying in the range + 2 to - 3 db. Offsets in the range - 2 to - 5 MHz (part of the adjacent channel) showed decreases in required protection ratio up to about 7 db. Wider offsets were not tested.

Annex : 1

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ANNEX

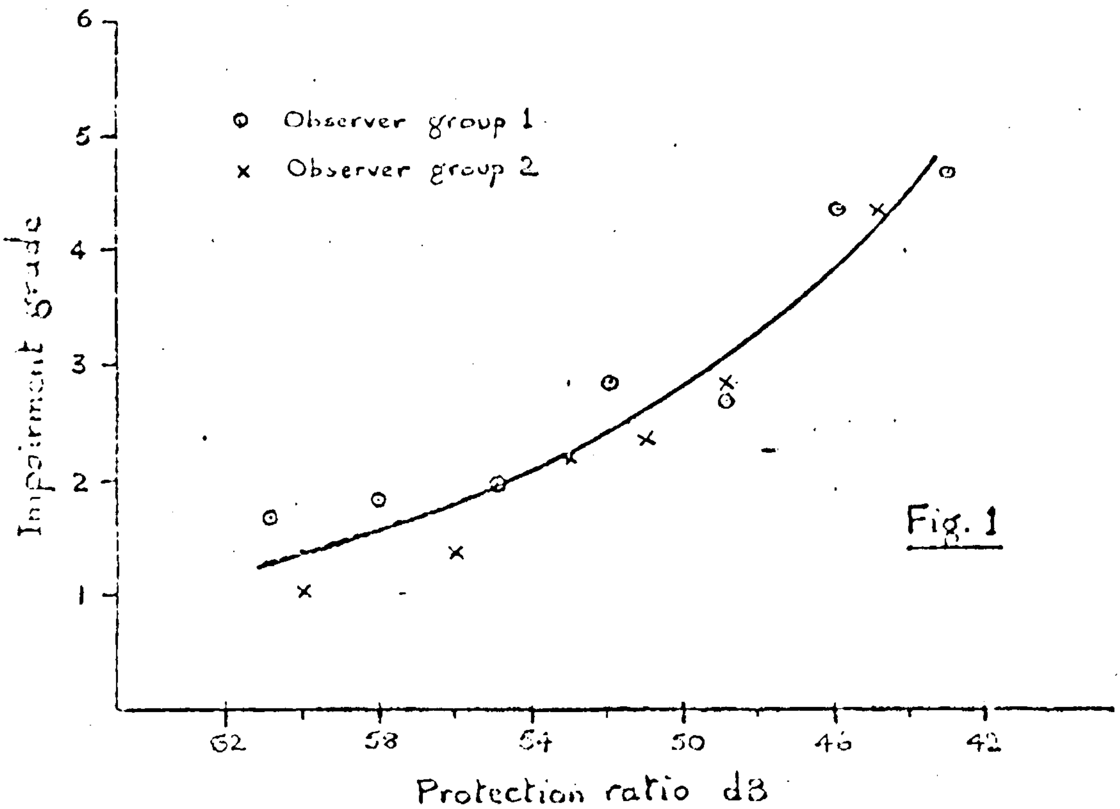

Fig. 1

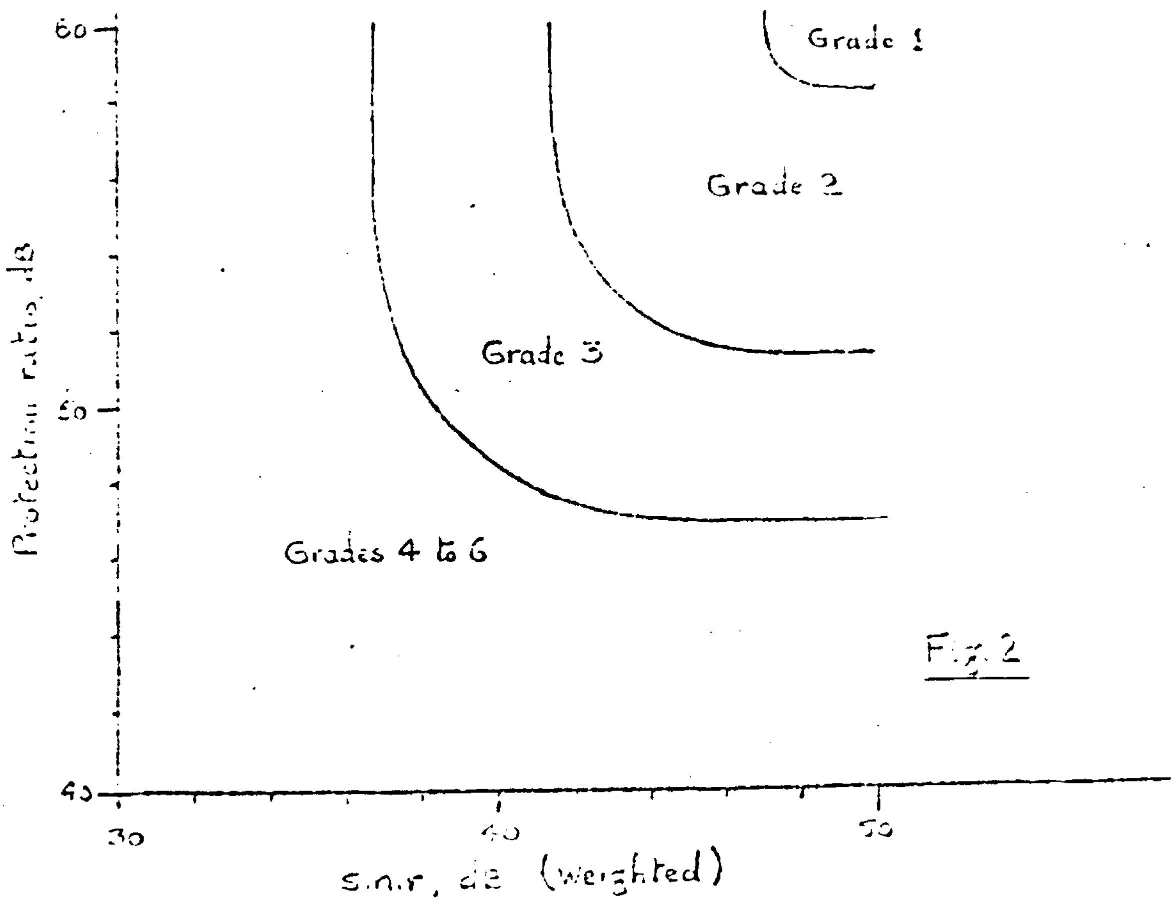

Fig. 2

CONFÉRENCE
SPATIALE

Corr. au/to/al
Doc. No. 172-F/E/S
22.VI.1971

CONFÉRENCE ADMINISTRATIVE MONDIALE DES TÉLÉCOMMUNICATIONS SPATIALES – GENÈVE – 1971

COMMISSION 5
COMMITTEE 5
COMISIÓN 5

Dans le titre, lire :

ROYAUME-UNI

LES SERVICES AERONAUTIQUE ET MARITIME PAR SATELLITE
DANS LA BANDE DES 1 535-1 660 MHz

In the title, read:

UNITED KINGDOM

AERONAUTICAL AND MARITIME SATELLITE SERVICES

IN THE BAND 1 535-1 660 MHz

En el título, léase:

REINO UNIDO

SERVICIOS MÓVILES AERONÚTICO Y MARÍTIMO POR SATÉLITE
EN LA BANDA 1 535-1 660 Mc/s

SPACE CONFERENCE

Document No. 172-E
21 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 5

AERONAUTICAL AND MARITIME SATELLITE SERVICES IN THE BAND 1 535-1 660 MHz

1. A number of administrations have made proposals for new allocations to aeronautical and maritime mobile services in the band 1 535-1 660 Mc/s which involve various methods of sub-dividing the band. In general, these divisions appear to have been based on the concept that there are similarities in the requirements of the two services. Some of these proposals would impose unnecessary restrictions on the development of the separate aeronautical and maritime services. In particular, there would be severe limitations on an aeronautical satellite in the operational phase. The C.C.I.R. S.J.M. (Geneva 1971) examined a number of sharing possibilities (excluding SAR and radiodetermination) and concluded that sharing was inappropriate. The sole exception was the possibility that should the extension of public correspondence in the aviation service be required in the future, some integration of the two services might be feasible (S.J.M. Report 4.2.1.3).

The differences between the various national proposals can be summarized under five headings :

(a) Sub-bands reserved for future expansion of either or both the aeronautical mobile and maritime mobile services.

(b) Common frequency separation between UP and DOWN sub-bands for both aeronautical mobile and maritime mobile services.

(c) Sequence of sub-band arrangements.

(d) Common sub-bands for combined aeronautical and maritime SAR.

2. (a) Reserved sub-bands for future expansion

The allocation of joint sub-bands would only be effectively useful in the long term if common translation frequencies were used for both aeronautical and maritime services. The principal operational requirements and present planning indicate that common translation frequencies are unlikely and may well be impractical for the two services.

There are advantages for the aeronautical service which are important to the whole aviation infrastructure in using the fixed linka (satellite earth station) in the same frequency band as the mobile/satellite links. For example, using simplex operation, as exists in the present well-disciplined aviation ATC environment together with the very limited number of earth stations required, a simple method of access can be used. If, however, the fixed links are placed in another band, this simple method of access cannot be used and the operational penalties may not be acceptable. The impact of this cross band working on access would necessitate an upward revision of the channel requirements.

In the maritime service, where a significant amount of traffic is in the public correspondence category, duplex working is essential and the large number of earth stations desiring access requires the employment of more sophisticated access techniques. For complex systems of access, greater scope is available by putting the fixed links in a higher frequency band where more frequency space may be available.

One important aspect of utilizing the total allocated spectrum for initial systems stems from consideration of the intermodulation products in the satellite transponder. If the total allocated spectrum is available for use, channels can be selected throughout the sub-band, so that the intermodulation products can be avoided without recourse to biassing off the satellite transponder, thus enabling the full power of the transponder to be used. In later satellite systems, when larger numbers of channels would be used, the power penalty would not be critical.

3. (b) Common frequency separation between UP and DOWN sub-bands for both aeronautical and maritime satellite services

Common frequency separation between the UP and DOWN bands only serves a useful purpose if the two services use the same system of operation (i.e. simplex or duplex) and all the links are contained in the same band. Initially the aeronautical service will probably use simplex operation with all links in the same band whereas the maritime service will use duplex operation with only the mobile links in the same band. Thus, the common frequency separation offers no particular advantage to a common system.

4. (c) Sequence of sub-band arrangements

The impracticability of providing common translation frequencies for the two services, as shown in (a), also implies that sub-band arrangements to provide common frequency separation are unnecessary and provide no advantage to either service.

Proposals for locating the aeronautical mobile sub-bands immediately above and below the 80 MHz aeronautical radionavigation band would allow for the development of integrated terrestrial/satellite systems particularly in the field of data transmission concerned with aeronautical radiodetermination and surveillance. These proposals have no disadvantages for the maritime service but could result in considerable frequency and financial economies for the aeronautical services.

5. (d) Common sub-bands for combined aeronautical and maritime SAR

In examining common SAR requirements, the S.J.M. recognized that the need for a common aeronautical/maritime SAR requirement had not been established but nevertheless concluded that a frequency or frequencies should be provided to permit the introduction of a system if required (S.J.M. Report 4.2.2.3.).

Aircraft can and do fly anywhere in the world regardless of sea, land or ice and consequently their requirements must take this into account, particularly in the future when considerable numbers of aircraft may be flying over vast tracts where the only means of quick access is from the air.

Aeronautical services already have efficient distress and safety procedures which will continue to satisfy the aviation requirements providing highly reliable communication systems are available.

SAR aircraft are unlikely to need satellite services when on location or relief work for intercommunication aircraft/ship. The main requirement will be good line-of-sight communication. If this is true of SAR aircraft, then it is even more valid in the case of scheduled aircraft. If a requirement for a few common satellite aircraft/ship channels did emerge at some future date it would be improper to tie the aeronautical and maritime services solely on this basis, particularly when it could not fulfil the world-wide needs of aeronautical services.

The SAR requirement can be met by providing contiguous sub-bands. Special frequency sub-bands employing common separation of UP and DOWN links are unnecessary particularly when different bands are used for the satellite/earth station links or different modes of operation are used (i.e. simplex or duplex).

6. Other considerations

One significant difference in channel bandwidth between maritime and aeronautical services is due to the Doppler shift. This is negligible for ships, but for SST aircraft at 1 600 MHz this amounts to 11 kHz at Mach 3. Furthermore the extreme operational environmental conditions in aircraft necessitate additional margins which could further increase the extent of the channel bandwidth. Greater spectrum economy can be obtained by allowing each service to utilize the minimum channel bandwidth practicable for each service.

In the aeronautical field it may be necessary to provide a three-dimensional radiodetermination system whereas the maritime requirement will remain two-dimensional. The coverage required for the aeronautical system will in the longer term cover other than ocean areas. Additionally, more rapid updating of information is needed for the aeronautical service, compared with the maritime service.

7. Summary

(i) It is not appropriate for this conference to determine system characteristics for either the aeronautical or maritime mobile services.

(ii) The C.C.I.R. has concluded that sharing between the aeronautical and maritime mobile services would not be appropriate, owing to the divergent operational requirement of the two services.

(iii) There would be no value in common separation frequencies unless common translation frequencies were also adopted; consideration of other factors indicates that this is unlikely and may well be impracticable.

(iv) Suitable allocations can be made to the maritime service while retaining a continuous frequency band for the aeronautical services.

(v) Serious penalties in the design and development of satellite systems for either service would be incurred if an attempt were made to reserve spectrum for future re-allocation by designation of joint bands. An exception can be made for SAR purposes by allocation of narrow bands, to be used specifically for a common service.

(vi) The foregoing considerations have been taken into account in the formulation of the U.K. proposals set out in Document No. 54.

SPACE CONFERENCE

Document No. 173-E
21 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

MEMORANDUM BY THE CHAIRMAN

I have received the enclosed letter and accompanying papers from the Deputy Head of the Delegation of the People's Republic of Poland, presenting certain proposals and technical data.

In my capacity as Chairman of the Conference, I consider :

a) that some parts of the proposals seek to confer rights on a second party which is not party to the International Telecommunication Convention; and

b) that consideration in itself on conferring such rights is outside the competence of this World Administrative Radio Conference for Space Telecommunications.

I rule therefore that the proposed changes and additions affecting that second party cannot be considered at this Conference. To the extent that they affect that second party, the papers are attached only for information.

Gunnar PEDERSEN
Chairman of the Conference

Annex : 1

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ANNEX

Geneva, 16 June 1971

Chairman
of the World Administrative
Radio Conference for Space
Telecommunications

Mr. Gunnar PEDERSEN

Dear Sir,

In the name of the Administration of Posts and Telecommunications of People's Republic of Poland, I have the honour to submit to you the proposals of our Administration concerning the amendments of Article 5 of the Radio Regulations for publication as a document of the Conference.

(signed) J. RUTKOWSKI
Deputy Head
of the Delegation
of People's
Republic of Poland

PEOPLE'S REPUBLIC OF POLAND

PROPOSALS FOR AMENDMENT OF ARTICLE 5 OF THE RADIO REGULATIONS

The Administration of Posts and Telecommunications of the People's Republic of Poland was informed by the Administration of Posts and Telecommunications of the German Democratic Republic about the frequency band usage in its country, which is brought out in the annex to this document for the information of the Conference.

The Administration of the People's Republic of Poland has prepared the following detailed proposals of amendments of the Article 5 taking into account the informations contained in the above mentioned document.

kc/s

	Region 1	Region 2	Region 3
POL/173/1	2 170-2 194 MOBILE (distress and calling) 201 201A		

POL/173/2 ADD 201A The frequencies 2 182 kc/s, 3 023,5 kc/s, 5 680 kc/s, 8 364 kc/s, 10 003 kc/s, 14 993 kc/s, 19 993 kc/s, 121,5 Mc/s, 156,8 Mc/s and 243 Mc/s can also be used in search und rescue operations for spacecraft.

Ref.

kc/s

Ref.	Region 1	Region 2	Region 3
POL/173/3	2 850-3 025 AERONAUTICAL MOBILE (R) 201A		

(201A, see POL/173/2 - 2 170-2 194 kc/s)

kc/s

Ref.	Region 1	Region 2	Region 3
POL/173/4	5 480-5 680 AERONAUTICAL MOBILE (R) 201A		

(201A, see POL/173/2 - 2 170-2 194 kc/s)

kc/s

Ref.	Region 1	Region 2	Region 3
POL/173/5	8 195-8 815 MARITIME MOBILE 201A		

(201A, see POL/173/2 - 2 170-2 194 kc/s)

Ref.

kc/s

POL/173/6

Region 1	Region 2	Region 3
9 995-10 005 STANDARD FREQUENCY 201A 204 214 215		

(201A, see POL/173/2 - 2 170- 2 194 kc/s)

kc/s

POL/173/7

Region 1	Region 2	Region 3
14 990-15 010 STANDARD FREQUENCY 201A 204 219		

(201A, see POL/173/2 - 2 170-2 194 kc/s)

kc/s

POL/173/8

Region 1	Region 2	Region 3
18 036-19 990 FIXED 221B		

POL/173/9 ADD 221B The band 18 052-18 068 kc/s is allocated, on a secondary basis, to space research.

Ref.

kc/s

Ref.	Region 1	Region 2	Region 3
POL/173/10	19 990-20 010 STANDARD FREQUENCY 201A 204 220 221 221A		

(201A, see POL/173/2 - 2 170-2 194 kc/s)

Mc/s

Ref.	Region 1	Region 2	Region 3
POL/173/11	117.975-132 AERONAUTICAL MOBILE (R) 201A 273 273A		

(201A, see POL/173/2 - 2 170-2 194 kc/s)

Mc/s

Ref.	Region 1	Region 2	Region 3
POL/173/12	137-138 METEOROLOGICAL SATELLITE SPACE RESEARCH (Telemetering and tracking) 281E SPACE (Telemetering and tracking) 275A 279A 281C 281D 281E		

POL/173/13 MOD 281C In Algeria, Bulgaria, German D. R., Hungary, Kuwait, Lebanon, Marocco, Poland, the United Arab Republic, Yugoslavia, Roumania, Czechoslovakia and the U.S.S.R., the band 137-138 Mc/s is also allocated to the aeronautical mobile (OR) service. ~~In the remaining countries of Region 1, the band 137-138 Mc/s is also allocated to the~~

Ref.

POL/173/13 (cont.) ~~aeronautical mobile (OR) service until 1 January, 1969.~~

Mc/s

	Region 1	Region 2	Region 3
POL/173/14	156-174 FIXED MOBILE (except aeronautical mobile) 201A 285 287 288	150.05-174 FIXED MOBILE 201A 285A 287	150.05-170 FIXED MOBILE 201A 285A 287 290

(201A, see POL/173/2 - 2 170-2 194 kc/s)

Mc/s

	Region 1	Region 2	Region 3
POL/173/15	223-235 AERONAUTICAL RADIO-NAVIGATION Fixed Mobile 299 300 302 303 304 305 305A	225-235 FIXED MOBILE 305A	225-235 FIXED MOBILE AERONAUTICAL RADIONAVIGATION 305A

POL/173/16 ADD 305A In the bands 230-300 and 344-390 Mc/s, satellites can be used for the aeronautical and maritime mobile services. The sharing conditions for these bands must be agreed between the administrations concerned.

Ref.

Mc/s

Ref.	Region 1	Region 2	Region 3
POL/173/17	235-267		
	FIXED MOBILE 201A 305 305A 309		
	267-272		
	FIXED MOBILE Space (telemetering) 305A 309A 309B		
	272-273		
	FIXED MOBILE SPACE (telemetering) 305A 309A		
	273-328.6		
	FIXED MOBILE 305A 310		

(201A, see POL/173/2 - 2 170-2 194 kc/s)
(305A, see POL/173/16 - 223-235 Mc/s)

Mc/s

Ref.	Region 1	Region 2	Region 3
POL/173/18	335.4-399.9		
	FIXED MOBILE 305A		

(305A, see POL/173/16 - 223-235 Mc/s)

Ref.

POL/173/19	MOD 313 Spa	In Albania, Bulgaria, the German D. R., Greece, Hungary, Poland, the United Arab Republic, Yugoslavia, Roumania, Czechoslovakia and the U.S.S.R., the band 400.05-401 Mc/s, is also allocated to the fixed and mobile services.
POL/173/20	MOD 316	In Albania, Bulgaria, the German D. R., Greece, Hungary, Iran, Norway, Poland, Y ugoslavia, Roumania, Sweden, Switzerland, Czechoslovakia, Turkey and the U.S.S.R., the band 401-406 Mc/s is also allocated, on a primary basis, to the fixed service and mobile, except aeronautical mobile, service.
POL/173/21	MOD 318A Spa	In Bulgaria, Cuba, the German D.R., Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the band 460-470 Mc/s may be used, on a primary basis, by the meteorological-satellite service subject to agreement among administrations concerned and those having services, or intending to introduce services, operating in accordance with the Table, which may be affected.
POL/173/22	MOD 331	In Albania, Bulgaria, the German D.R., Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the band 645-960 Mc/s is also allocated to the aeronautical radionavigation service.
POL/173/23	MOD 350C Spa	In Albania, Bulgaria, France, the German D.R., Hungary, Kuwait, Lebanon, Morocco, Poland, the United Arab Republic, Yugoslavia, Roumania, Czechoslovakia an the U.S.S.R., the band 1 525-1 535 Mc/s is also allocated, on a primary basis, to the mobile, except aeronautical mobile, service. As regards the category of this service, see Resolution NoSpa3.

Ref.

POL/173/24	MOD 352	In Albania, Bulgaria, the German D.R., Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the band 1 535-1 660 Mc/s is also allocated to the fixed service. As regards the category of the fixed service in the band 1 535-1 540 Mc/s, see Resolution NoSpa3.
POL/173/25	MOD 354	In Albania, Bulgaria, the German D.R., Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the bands 1 660-1 690 Mc/s, 3 165-3 195 Mc/s, 4 800-4 810 Mc/s, 5 800-5 815 Mc/s and 8 680-8 700 Mc/s are also used for radio astronomy observations.
POL/173/26	MOD 354A Spa	In Algeria, Bulgaria, Cuba, the German D.R., Hungary, Kuwait, Lebanon, Morocco, Pakistan, Poland, the United Arab Republic, Yugoslavia, Roumania, Czechoslovakia and the U.S.S.R., the bands 1 660-1 670 Mc/s and 1 690-1 700 Mc/s are also allocated to the fixed service and the mobile, except aeronautical mobile, service.
POL/173/27	MOD 356AA Spa	In Bulgaria, Cuba, the German D.R., Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the meteorological-satellite service, in the band 1 770-1 790 Mc/s, shall be on a primary basis, subject to co-ordination with the administrations concerned and those having services operating in accordance with the Table, which may be affected by the siting of earth stations.
POL/173/28	MOD 357	The frequency 2 450 Mc/s is designated for industrial, scientific and medical purposes except in Albania, Bulgaria, the German D.R., Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., where the frequency 2 375 Mc/s is used. Emissions must be confined within ± 50 Mc/s of the frequencies designated. Radiocommunications services

Ref.

Ref.		
POL/173/28 (cont.)		operating within these limits must accept any harmful interference that may be experienced from the operation of industrial, scientific and medical equipment.
POL/173/29	MOD 368	In Albania, Austria, Belgium, Bulgaria, the German D.R., Hungary, Poland, Roumania, Sweden, Switzerland, Czechoslovakia and the U.S.S.R., the band 3 100-3 300 Mc/s is also allocated to the radionavigation service.
POL/173/30	MOD 370	In Albania, Austria, Bulgaria, the German D.R., Hungary, Poland, Portugal, Roumania, Switzerland, Czechoslovakia and the U.S.S.R., the band 3 300-3 400 Mc/s is also allocated to the radionavigation service.
POL/173/31	MOD 384 Spa	In Albania, Austria, Bulgaria, the German D.R., Hungary, Poland, Roumania, Switzerland, Czechoslovakia and the U.S.S.R., the band 5 250-5 350 Mc/s is also allocated to the radionavigation service.
POL/173/32	MOD 390 Spa	In Albania, Bulgaria, the German D.R., Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the band 5 800-5 850 Mc/s is ~~also~~ allocated to the fixed, mobile and communication-satellite services.
POL/173/33	MOD 392G Spa	In Algeria, Austria, Bulgaria, Cyprus, Cuba, Ethiopia, Finland, the German D.R., Hungary, Japan, Kuwait, Lebanon, Liberia, Malaysia, Morocco, the Philippines, Poland, the United Arab Republic, Yugoslavia, Roumania, Sweden, Switzerland, Czechoslovakia and the U.S.S.R., the band 7 250-7 300 Mc/s is also allocated to the fixed and mobile services.

Ref.

POL/173/34 MOD 392 H Spa

In Algeria, Bulgaria, Cuba, Ethiopia, Finland, the German D.R., Hungary, Japan, Kuwait, Lebanon, Morocco, Poland, the United Arab Republic, Yugoslavia, Roumania, Sweden, Switzerland, Czechoslovakia and the U.S.S.R., the band 7 975-8 025 Mc/s is also allocated to the fixed and mobile services.

POL/173/35 MOD 395

In Albania, Austria, Bulgaria, the German D.R., Hungary, Poland, Roumania, Sweden, Czechoslovakia and the U.S.S.R., the band 8 500-8 750 Mc/s is also allocated to the radionavigation service.

POL/173/36 MOD 398

In Albania, Austria, Bulgaria, the German D.R., Hungary, Poland, Roumania, Sweden, Switzerland, Czechoslovakia and the U.S.S.R., the bands 8 850-9 000 Mc/s, 9 200-9 300 Mc/s and 9 500-9 800 Mc/s are also allocated to the radionavigation service.

POL/173/37 MOD 405B Spa

In Algeria, Bulgaria, Cuba, the German D.R., Hungary, Japan, Kuwait, Lebanon, Pakistan, Poland, the United Arab Republic, Yugoslavia, Roumania, Czechoslovakia and the U.S.S.R., the band 10.68-10.7 Gc/s is also allocated to the fixed and mobile services.

Gc/s

Ref.	Region 1	Region 2	Region 3
POL/173/38	10.7-11.7 FIXED MOBILE ADD COMMUNICATION-SATELLITE (Satellite-to-earth) (Earth-to-satellite) 374A		

Ref.

POL/173/38 (cont.)

11.7-12.2 FIXED MOBILE except aeronautical mobile ~~BROADCASTING~~ ADD DIRECT BROADCASTING FROM SATELLITES 392B

POL/173/39 ADD 382B

For direct broadcasting from satellites, certain frequency bands in the 11.7-12.2 Gc/s range can be used.

POL/173/40 MOD 407 Spa

In Albania, Bulgaria, the German D.R., Hungary, Poland, Roumania, Czechoslovakia, and the U.S.S.R., the bands 13.25-13.5 Gc/s, 14.175-14.3 Gc/s, 15.4-17.7 Gc/s, 21-22 Gc/s, 23-24.25 Gc/s and 33.4-36 Gc/s are also allocated to the fixed and mobile services.

POL/173/41 MOD 409

In Albania, Bulgaria, the German D.R., Hungary, Poland, Roumania, Czechoslovakia, and the U.S.S.R., the band 13.5-14 Gc/s is also allocated to the radionavigation service.

POL/173/42 MOD 409A Spa

In Algeria, Bulgaria, Cuba, the German D.R., Hungary, Kuwait, Lebanon, Morocco, Pakistan, Poland, The United Arab Republic, Yugoslavia, Roumania, Czechoslovakia and the U.S.S.R., the band 15.25-15.35 Gc/s is also allocated to the fixed and mobile services.

Gc/s

POL/173/43

Region 1	Region 2	Region 3
17.7-19.3 FIXED MOBILE ADD COMMUNICATION-SATELLITE (Satellite-to-earth) 374A		

Ref.

Gc/s

Ref.	Region 1	Region 2	Region 3
POL/173/43 (cont.)	19.3-19.4 ~~RADIO ASTRONOMY~~ ADD FIXED ADD MOBILE ADD COMMUNICATION-SATELLITE (Satellite-to-earth) 374A		

Gc/s

Ref.	Region 1	Region 2	Region 3
POL/173/44	19.4-19.7 FIXED MOBILE ADD COMMUNICATION-SATELLITE (Satellite-to-earth) 374A		
POL/173/45	19.7-21 ~~FIXED~~ ~~MOBILE~~ ADD COMMUNICATION-SATELLITE (Satellite-to-earth) 374A		

Ref.

Gc/s

Ref.	Region 1	Region 2	Region 3
POL/173/46	21.0-21.2	~~AMATEUR~~ ADD COMMUNICATION-SATELLITE (Satellite-to-earth) 374A 407	

Gc/s

Ref.	Region 1	Region 2	Region 3
POL/173/47	27.5-29.5	FIXED MOBILE ADD COMMUNICATION-SATELLITE (Earth-to-satellite) 392A	
POL/173/48	29.5-31	~~FIXED~~ ~~MOBILE~~ ADD COMMUNICATION-SATELLITE (Earth-to-satellite) 392A	

POL/173/49 MOD 412A Spa In Bulgaria, Cuba, the German D.R., Hungary, Poland, the United Arab Republic, Roumania, Czechoslovakia and the U.S.S.R., the band 31.3-31.5 Gc/s is also allocated to the fixed and mobile services.

Ref.

POL/173/50	MOD 412B Spa	In Bulgaria, Cuba, the German D.R., Hungary, Poland, Yugoslavia, Roumania, Czechoslovakia and the U.S.S.R., the space research service is a primary service in the band 31.8-32.3 Gc/s.
POL/173/51	MOD 412C Spa	In Bulgaria, Cuba, the German D.R., Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the space research service is a primary service in the band 34.2-35.2 Gc/s.
POL/173/52	MOD 412E Spa	In Bulgaria, Cuba, the German D.R., Hungary, Poland, Yugoslavia, Roumania, Czechoslovakia and the U.S.S.R., the band 36.5-37.5 Gc/s is also allocated to the radio astronomy service.

GERMAN DEMOCRATIC REPUBLIC

Communication on Telecommunication Services

Special frequency band usage in the German Democratic Republic to be taken account of when reexamining the Radio Regulations (Edition of 1968) at the World Administrative Radio Conference for Space Telecommunications (WARC-St)

1. Introduction

The Ministry of Posts and Telecommunications of the German Democratic Republic has taken notice of the fact that the International Telecommunication Union at the World Administrative Radio Conference for Space Telecommunications (WARC-St) will reconsider the stipulations of the Radio Regulations with regard to satellite communications.

So far, the Ministry of Posts and Telecommunications of the German Democratic Republic has been deprived of the possibility of taking into account the special conditions of its frequency usage in the Radio Regulations.

It is indispensable that the World Administrative Radio Conference for Space Telecommunications takes due regard of the special frequency band usage in the German Democratic Republic.

2. Frequency band usage in the German Democratic Republic

Reference: Article 5 of the Radio Regulations (Edition 1968)

kHz

Allocation to Services	
2 170 - 2 194	MOBILE (distress and calling) 201 201A
2 850 - 3 025	AERONAUTICAL MOBILE (R) 201A
5 480 - 5680	AERONAUTICAL MOBILE (R) 201A
8 195 - 8 815	MARITIME MOBILE 201A
9 995 - 10 005	STANDARD FREQUENCY 201A 204 214 215
14 990 - 15 010	STANDARD FREQUENCY 201A 204 219
18 036 - 19 990	FIXED 221C
19 990 - 20 010	STANDARD FREQUENCY 201A 204 220 221 221A

ADD 201A The frequencies 2182 kHz, 3 023,5 kHz, 5 680 kHz, 8 364 kHz, 10 003 kHz, 14 993 kHz, 19 993 kHz, 121,5 MHz, 156,8 MHz and 243 MHz may also be used for search and rescue of spacecraft crew

ADD 221C In the band 18 036-19 990 kHz, the band 18 052-18 068 kHz is allocated for space research on a secondary basis

MHz

Allocation to Services		
117,975 - 132		AERONAUTICAL MOBILE (R) 201A 273 273A
137 - 138	MOD	METEOROLOGICAL SATELLITE SPACE RESEARCH (Telemetering and tracking)281F SPACE (Telemetering and tracking) Aeronautical mobile (OR) 281C
156 - 174		FIXED MOBILE except aeronautical mobile 201A 285A 287
223 - 235		AERONAUTICAL RADIONAVIGATION Fixed Mobile 305A
235 - 267		FIXED MOBILE 201A 305A 309
267 - 272		FIXED MOBILE Space (Telemetering) 309A 309B 305A
272 - 273		FIXED MOBILE SPACE (Telemetering) 309A 305A
273 - 328,6		FIXED MOBILE 305A 309A
335,4 - 399,9		FIXED MOBILE 305A

ADD 305A In the bands 230-300 MHz and 344-390 MHz satellites may be used for mobile aeronautical and maritime services. The condition for the common use of these bands are subject of agreement by the Administrations concerned.

MHz

		Allocation to Services
400,05 - 401		METEOROLOGICAL AIDS METEOROLOGICAL SATELLITE (Maintenance telemetering) SPACE RESEARCH (Telemetering and tracking)
	ADD	Fixed
	ADD	Mobile
		313
401 - 402		METEOROLOGICAL AIDS SPACE (Telemetering) 315A
	MOD	FIXED
	MOD	MOBILE except aeronautical mobile
		316
402 - 406		METEOROLOGICAL AIDS
	MOD	FIXED
	MOD	MOBILE
		316
460 - 470		FIXED MOBILE
	MOD	METEOROLOGICAL SATELLITE
		318A
606 - 790		BROADCASTING
	ADD	Aeronautical radionavigation 331
		332
790 - 890		FIXED BROADCASTING
	ADD	Aeronautical radionavigation 331
		333
890 - 942		FIXED BROADCASTING Radiolocation
	ADD	Aeronautical radionavigation 331
		333 339A
942 - 960		FIXED BROADCASTING
	ADD	Aeronautical radionavigation 331
		333 339A

MHz

		Allocation to Services
1 525 - 1 535	 MOD	FIXED 350B SPACE (Telemetering) 350A MOBILE except aeronautical mobile 350C
1 535 - 1 540	 ADD	SPACE (Telemetering) Fixed 352 350A
1 540 - 1 660	 ADD	AERONAUTICAL RADIONAVIGATION Fixed 352 352A 352B
1 660 - 1 664,4	 ADD ADD	METEOROLOGICAL AIDS METEOROLOGICAL SATELLITE 324A Fixed Mobile except aeronautical mobile 354A 354
1 664,4 - 1 668,4	 ADD	METEOROLOGICAL AIDS METEOROLOGICAL SATELLITE 324A Fixed Mobile except aeronautical mobile 354A 354 353A
1 668,4 - 1 670	 ADD ADD	METEOROLOGICAL AIDS METEOROLOGICAL SATELLITE 324A Fixed Mobile except aeronautical mobile 354A 354
1 670 - 1 690		METEOROLOGICAL AIDS FIXED MOBILE except aeronautical mobile 354
1690 - 1 700		METEOROLOGICAL AIDS METEOROLOGICAL SATELLITE 324A Fixed Mobile except aeronautical mobile 354A
1 770 - 1 790	 MOD	FIXED METEOROLOGICAL SATELLITE 356AA Mobile

MHz

Allocation to Services		
2 300 - 2 450		FIXED Amateur Mobile Radiolocation 357
3 100 - 3 300	 ADD	RADIOLOCATION Radionavigation 368 354 369
3 300 - 3 400	 ADD	RADIOLOCATION Radionavigation 370
4 700 - 4 990		FIXED MOBILE 354 365
5 250 - 5 255	 ADD	RADIOLOCATION Space Research Radionavigation 384
5 255 - 5 350	 ADD	RADIOLOCATION Radionavigation 384
5 725 - 5 850		RADIOLOCATION COMMUNICATION SATELLITE (Earth-to-satellite) 392A Amateur 354 390
7 250 - 7 300	 ADD ADD	COMMUNICATION SATELLITE (Satellite-to-earth) Fixed Mobile 392G 374A 392D
7 975 - 8 025	 ADD ADD	COMMUNICATION SATELLITE (Earth-to-satellite) Fixed Mobile 392H 392A

357 The frequency 2 375 MHz $\pm$ 50 MHz is designated for industrial, scientific and medical purposes.

MHz

Allocation to Services		
8 500 - 8 750		RADIOLOCATION 354 395
8 850 - 9 000	 ADD	RADIOLOCATION Radionavigation 398
9 200 - 9 300	 ADD	RADIOLOCATION Radionavigation 398
9 500 - 9 800	 ADD	RADIOLOCATION Radionavigation 398

GHz

10,68 - 10,7	 ADD ADD	RADIOASTRONOMY Fixed Mobile 405B
10,7 - 11,7	 ADD	FIXED MOBILE COMMUNICATION SATELLITE (Satellite-to-Ea h) 374A (Earth-to-Satellite)
13,25 - 13,4	 ADD ADD	AERONAUTICAL RADIONAVIGATION 406 Fixed Mobile 407
13,4 - 14	 ADD ADD ADD	RADIOLOCATION Fixed Mobile 407 Radionavigation 409
14 - 14,3	 ADD ADD	RADIONAVIGATION Fixed Mobile 407

GHz

Allocation to Services		
15,25 - 15,35		SPACE RESEARCH
	ADD	Fixed
	ADD	Mobile 409A
15,4 - 15,7		AERONAUTICAL RADIONAVIGATION
	ADD	Fixed
	ADD	Mobile 407
15,7 - 17,7		RADIOLOCATION
	ADD	Fixed
	ADD	Mobile 407
17,7 - 19,3		FIXED
		MOBILE
	ADD	COMMUNICATION SATELLITE (Satellite-to-Earth) 374A
19,3 - 19,4	SUP	~~RADIOASTRONOMY~~
	ADD	FIXED
	ADD	MOBILE
	ADD	COMMUNICATION SATELLITE (Satellite-to-Earth) 374A
19,4 - 19,7		FIXED
		MOBILE
	ADD	COMMUNICATION SATELLITE (Satellite-to-Earth) 374A
19,7 - 21	SUP	~~FIXED~~
	SUP	~~MOBILE~~
	ADD	COMMUNICATION SATELLITE (Satellite-to-Earth) 374A
21 - 21,2	SUP	~~AMATEUR~~
	ADD	COMMUNICATION SATELLITE (Satellite-to-Earth) 374A 407
27,5 - 29,5		FIXED
		MOBILE
	ADD	COMMUNICATION SATELLITE (Earth-to-Satellite) 392A

GHz

Allocation to Services		
29,5 - 31	SUP	~~FIXED~~
	SUP	~~MOBILE~~
	ADD	COMMUNICATION SATELLITE (Earth-to-Satellite)
		392A
31,3 - 31,5		RADIO ASTRONOMY
		412A
31,8 - 32,3		RADIONAVIGATION
		Space Research
		412B
34,2 - 35,2		RADIOLOCATION
	MOD	SPACE RESEARCH
		407 412C 412D
36 - 40		FIXED
		MOBILE
		412E

SPACE
CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 174(Rev.)-E
24 June 1971
Original : English

COMMITTEE 4

FIRST REPORT OF WORKING GROUP 4D TO COMMITTEE 4

Enclosed please find in the Annex the revision of the proposed addition to Article 7 related to the station keeping of space stations in which Note*) was reviewed by Working Group 4D.

J.K.S. JOWETT
Chairman
Working Group 4D

Annex : 1

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A N N E X

PROPOSED ADDITION TO ARTICLE 7 (New Section)

ADD Station keeping of space stations*)

Space stations on geostationary satellites

ADD /‾a_/ shall have the capability of maintaining their positions within ±1° of the longitude of their nominal positions, but they shall endeavour to achieve the capability of maintaining their positions within at least ±0.5° of the longitude of their nominal positions,

ADD /‾b_/ shall maintain their positions within ±1° of longitude of their nominal positions irrespective of the cause of variation, but

ADD /‾c_/ need not comply with /‾b_/ as long as the /‾space system_/ to which the space station belongs does not produce an unacceptable interference**) into any other /‾space system_/ whose space station complies with the limits given in /‾b_/.

Notes :

*) In the case of space stations on /‾synchronous_/ satellites in orbits having an angle of inclination greater than 5° the positional tolerance shall relate to the nodal point.

**) /‾Unacceptable levels of interference shall be assessed according to the latest /‾recommendations_/ of the C.C.I.R._/.

SPACE
CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 174-E
21 June 1971
Original : English

COMMITTEE 4

FIRST REPORT OF WORKING GROUP 4D TO COMMITTEE 4

Enclosed please find in the Annex the proposed addition to Article 7 as approved by Working Group 4D after having considered proposals CAN/15Rev/124; F/86/310-313; G/81/272, 273; USA/28Cor/327, 328.

C.W. SOWTON

for K. JOWETT
Chairman of Working Group 4D

Annex : 1

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A N N E X

PROPOSED ADDITION TO ARTICLE 7

Station keeping of space stations *)

Space stations on geostationary satellites

/ a / shall have the capability of maintaining their positions within ± 1° of the longitude of their nominal positions, but they shall endeavour to achieve the capability of maintaining their positions within at least ± 0.5° of the longitude of their nominal positions,

/ b / shall maintain their positions within ± 1° of longitude of their nominal positions irrespective of the cause of variation, but

/ c / need not comply with / b / as long as the / space system / to which the space station belongs does not produce an unacceptable interference **) into any other / space system / whose space station complies with the limits given in / b /.

Notes :

*) In the case of space stations on synchronous satellites in inclined orbits the provisions of / b / apply but their positional tolerance shall relate to the nodal point.

**) / Unacceptable levels of interference shall be assessed according to the latest / recommendations / of the C.C.I.R. /.

1971

SPACE CONFERENCE

Document No. 175-E
21 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

MINUTES OF THE SECOND PLENARY MEETING

Tuesday, 8 June 1971, at 0930 hrs

Chairman : Mr. Gunnar PEDERSEN (Denmark)

Subjects discussed :	Document No.
1. Programme of work of the Conference	107
2. Distribution of proposals to Committees	109
3. Miscellaneous	-

1. Programme of work of the Conference (Document No. 107)

The Chairman introduced Document No. 107, pointing out that it would only be regarded as a target for the organization of work.

Document No. 107 was noted.

2. Distribution of proposals to Committees (Document No. 109)

The Chairman said that the document referred to in the title on page 3 should be No. 99, not No. 67. Moreover, the Chairmen of Committees 4, 5 and 6 considered that Sections I, IIB and III of Article 1 should be referred to Committee 4, Sections II and IIA should be dealt with by Committee 5 and Section III should also be considered by Committee 6, on a secondary basis.

The Delegate of France said that, at first sight, it seemed more appropriate to allocate Sections II and IIA to Committee 6 than to Committee 5.

The Chairman of Committee 5 said that the Chairmen of the three Committees concerned had all thought that the basic service definitions in Sections II and IIA had the greatest impact on the work of Committee 5. In any case, the work of the three Committees would be closely coordinated by their Chairmen and further action would be taken if necessary.

The Chairman of Committee 6 added that the distribution was preliminary and would be reviewed as the discussions proceeded. Delegations would be kept informed in Committee meetings of any changes that might be made.

The Delegate of Canada suggested that it should be made clear on page 3 that the discussion of Appendices 1, 1A and 1B would begin in Committee 6 and that the work would be subsequently verified in Committee 4.

The Delegate of New Zealand said that the reference to a New Zealand proposal five lines from the bottom of page 6 should read "NZL/66/67-72".

Document No. 109, as amended, was approved.

3. Miscellaneous

The Chairman of Committee 5 asked whether it would be possible to fix a time limit for the submission of proposals to be dealt with by the Committees.

The Delegate of the United Kingdom said that a distinction should be made between new proposals which should normally have been submitted before the opening of the Conference, and compromise proposals which were bound to emerge from the deliberations of Working Groups. Care should be taken not to impose an unduly rigid procedure.

The Delegate of India endorsed those views and suggested that delegations should be urged to submit proposals as soon as possible and that compromise proposals could be submitted at any time.

The Delegate of Canada also supported the United Kingdom Delegate's views, which fully conformed with Nos. 683 to 690 of the Montreux Convention.

The Chairman appealed to delegations to submit their basic proposals as rapidly as possible.

The Delegate of Equatorial Guinea made the statement reproduced in Annex 1.

The Delegate of Spain reserved the right to reply at a future Plenary meeting to some of the points raised in that statement.

The Representative of UNESCO made the statement reproduced in Annex 2.

The meeting rose at 1040 hours.

The Secretary :	The Secretary-General :	The Chairman :
C. STEAD	Mohamed MILI	Gunnar PEDERSEN

Annexes : 2

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A N N E X 1

STATEMENT BY THE REPRESENTATIVE OF EQUATORIAL GUINEA

I have the great honour to speak for my country - the Republic of Equatorial Guinea - at this World Conference of the I.T.U. and at the same time to present its cordial greetings to the I.T.U. Secretariat and to all delegates on behalf of its President and Commander-in-Chief of the Armed Forces - Mr. Francisco Macias Nguema.

As Minister of the Interior, and consequently political head of the Cabinet of Ministers of Equatorial Guinea, I shall not venture into the technical aspects of telecommunications, but will speak rather of their significance for a country like ours, which, although small, has nevertheless a high sense of its historical value and its responsibilities among the free countries of the world.

This is the first time we have attended a World Conference of such importance and significance, and we are very happy to do so because we have the satisfaction of feeling that we are thereby fulfilling our duty towards our people and towards all participating countries, especially to those which are described symbolically as belonging to the "Third World".

It is now two years and eight months since the light of liberty and independence brought to our land the gleam of hope and new expectations. During this period we have been absent from international gatherings, not on grounds of isolationism, but because we have been devoting oursevles to the study and analysis of conditions in our own country and trying to determine its future by our own achievements and realistic decisions. In this work we have received the help of United Nations expert missions and technicians sent to us by the O.A.U. and those friendly countries whose solidarity and understanding have enabled us to find the true diagnosis of our ills and to plan the efforts we need to make to speed up our development and to set the people of Equatorial Guinea on the path of progress, welfare and freedom within a framework of true democracy.

One of the most urgent problems facing our country is that of telecommunications. Yesterday we were a colony and today a free country which is constantly struggling to eradicate, and cut all remaining ties with, a system of domination which imposed on us a form of thinking, an ideology, a way of life and even a particular religion. This spiritual domination, which is more terrible and more lasting than economic domination, was based precisely on the lack of communications, on the manipulation of our information media, on the obscurantism of our own culture and the restricted intellectual development of our people.

This is why we were so glad to some to this Conference, and why, as participants in this great Assembly, we raise our voice without hatred, rancours or recriminations but simply to point out facts and truths, because our attitude is progressive, forward looking and entirely well-intentioned.

What is our position with regard to telecommunication? Utter backwardness. The last investments in telephone and telegraph equipment were made by the Spanish Government in 1947 and only partially cover the periphery of the country. With regard to television, our country possesses a fully equipped transmitter installed at a height of 3,008 metres, with a power of 10 kW, with its own generating sets capable of generating 150 kW and a transformer capacity of 100. This television transmitter, which was operated by Spain, was abandoned by the former colonial power merely because Equatorial Guinea did not permit televised public educational programmes prepared in Madrid and containing a great deal of violence, when it would have been more reasonable to produce them in our Republic. All this was done to confuse our young and peaceful society by projecting films and recordings on world politics which tended to jeopardize our relations with our brother countries, forgetting that our policy had already been laid down by our leader, the President of the Republic and of our single National Party, Mr. Macias Nguema.

We have entered a new era and, as at the beginning of every historical epoch, man tries to understand his fellow-men and to make himself understood by them. Man's genius has raised civilization beyond the boldest dreams of the visionaries of the past, but man is now beginning to realize that, with every step forward, he loses something of his intrinsic nature, as if technology, the bringer of progress, took away something of his spirituality, of his very soul. We have also realized that communications - the act of receiving and transmitting words and messages, of taking part in and feeling oneself part of a whole, of identifying and banishing one's fears - is one of the first gifts of man as man and one of his best hopes of survival.

Scientists in different disciplines have sought indices to measure the degree of underdevelopment of peoples; they have referred to hunger, ignorance, poverty, diseases, dependence, instability, insecurity, fear, etc. Today we can add that the lack of communications is an important index of underdevelopment. The difference between our ancestors and ourselves is that they, for lack of knowledge, were afraid of natural phenomena, whereas we moderns, who are able to explain natural phenomena and their causes, fear our own fellow-men because we do not know each other, because we have no communication.

My country is small, but its economic, social and cultural indices place it among the most advanced countries of Africa and above a number of brother countries in Asia and Latin America. So far as telecommunications are concerned, however, we are still in the middle ages. In his opening statement yesterday, the Secretary-General of the I.T.U. referred to the disasters which had occurred in a number of countries and to how the I.T.U. should help them in the matter of telecommunications; I would add, Mr. President, that the I.T.U. should give special attention to the developing countries. That is why we are here at this Conference - to listen and learn, to make contacts among members of the I.T.U., because we wish to speed up the development of our country.

Distinguished delegates, the desire to achieve political liberty by breaking down the colonial system is now a thing of the past. The African seems to be free, but he is not really so, because he does not understand all the new forces to which he is subject. Communications are making the world ever smaller and are creating barriers between those countries which have mastered space and control telecommunication systems and those of us who live side by side with them in the same planet but cannot succeed in making ourselves understood.

We in the new countries need to improve our telecommunication systems to achieve political, territorial and ideological unity. We need integration, primarily amongst ourselves and then in the community of nations. But how can we do this when it takes 2, 3 or 4 days to receive an official report about what is happening 100, 200 or 300 km from the capital? On the other hand, we are - paradoxically - able to see, hear and almost feel the first footfall of man on the moon.

Mr. Macias Nguema, President of Equatorial Guinea, has instructed me to say that our country strongly asserts its right to take an active part in the free and united world. Within the limits of the available resources, our Government will take all appropriate measures to achieve this so that at a later conférence we shall be able to present a favourable report on our progress and it will then, in all probability, not be the Minister of the Interior who expresses our views on telecommunications from a political angle, but one of our technicians, such as those who are with me, who will report on our successes and achievements.

Gentlemen, our conception of democracy is dynamic and humanist because it relates to and expresses the individual himself. We are well aware that a government with a defective communications service, which precludes any dialogue between the people and its representatives, cannot progress because it lacks the confidence, mystique, patriotism and faith of those who, conscious of their destiny, are willing to stake even their lives for their fatherland.

In conclusion, may I thank you for your attention and express the hope, on behalf of my country and of all my people, that the progress of telecommunications will promote the peace and happiness of mankind.

ANNEX 2

STATEMENT BY THE REPRESENTATIVE OF THE DIRECTOR-GENERAL OF UNESCO

I should like to convey to you the best wishes of the Director-General of UNESCO for the success of this historic Conference and to supplement briefly the message of the Secretary-General of the U.N. who spoke on behalf of the U.N. family.

We at UNESCO regard this Conference as another significant step in the spectacular progress that has been made in using space communication for the benefit of mankind and particularly in advancing the free flow of information, the spread of education and greater cultural exchange, which are our constitutional responsibilities. Decisions taken during the coming weeks will, we believe, profoundly influence the evolution of education and communication systems throughout the world for decades to come.

But first let me take this opportunity of expressing our satisfaction at the close and cordial cooperation we enjoy with the International Telecommunication Union and our appreciation of their assistance to us in many aspects of our programme in space communication.

Since the first communication satellite, TELSTAR, was placed in orbit in 1962, giant strides have been made in extending the network of global telecommunications, which have brought to the television screens of people all over the world, the great events of our time.

Space communication now offers the possibility of world-wide television reporting that can both increase and help to equalize the flow of information in developed and developing countries alike.

Likewise in the cultural field, television via satellite will facilitate the exchange of programmes which will enhance the enjoyment and appreciation of other peoples and other lands.

And again, in the midst of the information explosion we are now experiencing, the use of satellites for the transmission of scientific data may prove to be one of the very fruitful applications of space technology.

But no aspect of space communication holds greater promise than its use in support of education through the expanded application of television. We see space communication as one of the new technologies which are opening up great possibilities of reforming the whole process of education, of removing the barriers which have stood in the way of equality of access to education and for so long have retarded the social and economic progress of two-thirds of the world's population.

Many of the uses of space communication I have referred to so far will be accommodated in what the Radio Regulations define as the "communication-satellite service". For the most part, the telecommunication administrations will provide to media and educational institutions, facilities for relays of radio and television programmes, transmission of news and photographs for newspapers and news agencies, facsimile transmissions, retrieval and transmission of scientific data, exchanges between universities, and computer assisted instruction. Such requirements will, no doubt have been taken into account in their assessments of traffic loads and frequency needs for the communication-satellite service.

UNESCO, however, is particularly interested in the phase of satellite broadcasting directly into community television receivers, which presumably must be accommodated in the "broadcasting-satellite service". This type of reception, as you know, is expected to be feasible by the mid-1970's, and, indeed, is the technology which will be first demonstrated in the Indian satellite experiment in 1974.

The great significance of space communication, in its phase of direct broadcasting to community receivers, is its ability to deliver programmes far beyond the range of the terrestrial television systems which, in most cases, serve only the centres of major population. A satellite can anticipate, in some cases by decades, the slow extension of a ground-based telecommunication network capable of relaying television programmes to remote areas. Indeed, a space system may be the only economic option available to secure full coverage of dispersed populations.

Studies which UNESCO has made have pointed to the fact that educational television by satellite, is potentially the most promising way to improve both the spread and the quality of education in the rural areas. It probably constitutes the best practical solution to one of the most perplexing and crucial problems of the countries in development - the ever widening gap between the educational levels and opportunities of the rural and urban populations.

We use the word education in its widest sense. We refer not only to lessons in the classroom by radio and television - important as these are - but also to programme for adult audiences. Education is a life-long process; it is relevant to man's daily life; it may help him to be a better farmer, to maintain better standards of health for himself and his family; to learn new skills; to particpate in the development of his community and the making of his nation; to enjoy the cultural riches of his society.

Space communication systems devised for direct community reception may be used flexibly for school broadcasts at all levels, for "open university" courses, for adult literacy, for the training of teachers and other vocations, for programmes for adults on agriculture, health, family planning or similar development topics, and on current affairs and cultural subjects.

UNESCO's concern is that the Conference, in its assessment of long-term needs, should make adequate provision for the likely future space frequency requirements for these purposes.

We want to suggest that when consideration is given to the appropriate allocation of frequency bands for the broadcasting-satellite service, the special problems of developing countries should be borne in mind. Many developing countries are only just beginning to consider the potentialities of space communication for education and development. Though they may not see any likelihood of launching their own satellite for domestic purposes, they may well have an opportunity in the future, of participating in a communication system shared by a number of countries. Their anxiety is that the "first come first served principle" might preclude the possibility of their obtaining, in due course, an appropriate frequency assignment when they need one.

The trend toward a regional approach to space communication problems is illustrated by the requests received by UNESCO from a number of its Member States to carry out studies on the potentialities of space communication for education and development. Regional surveys have been undertaken, in association with the International Telecommunication Union, in Latin America and in the Arab States and another in Africa is planned later this year.

The initial Latin American mission led to a request by eight countries for a feasibility, planning and pre-investment study of a South American regional system, using advanced communication technology including satellites, for purposes of education, culture and development. The study is being financed by the United Nations Development Programme and carried out jointly by UNESCO and the International Telecommunication Union.

Some further details of this important project are included in the paper submitted by the Secretariat of UNESCO as a Conference document. Suffice it to say; that while the fullest possible use would be made of terrestrial communications, initial examination of the problem suggests that a satellite will prove to be the most economic way of distributing television programmes to the 40% of population in the region, residing in rural areas.

UNESCO has been interested to note the proposals of many I.T.U. members for frequency allocations for the communication and broadcasting satellite services which would accommodate the various educational uses of space systems. It is acknowledged, of course, that as the radio spectrum is a scarce resource, it is not possible to make all the frequency allocations requested by the various services. The spectrum must be reserved for the most important uses.

In the communication field, terrestrial telecommunications in the first place, will no doubt be fully exploited. But for many developing countries, Mr. Chairman, space communication may provide the only option, for decades to come, of reaching the millions of rural and isolated people, whose need is greatest, with a most powerful tool for development. In this Second Development Decade that is a high priority objective, one which, we are sure, the present Conference will accord all the importance it merits.

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 176-E
21 June 1971
Original : French

COMMITTEE 5

Note from Working Group 5D

to

Chairman of Committee 5

As a partial response to the request made on 17.6.1971 by the Chairman of Committee 4 concerning the text of definitions which appear in Document No. 146, Working Group 5D has considered, on 21 June 1971, the definitions which concern in particular the maritime mobile and aeronautical mobile services and the radiodetermination service. The Working Group arrived at the following opinion by a small majority :

In the present stage of its work, Working Group 5D sees no necessity, for the time being, to foresee any new definitions.

Maurice CHEF
Chairman

1971

SPACE CONFERENCE

Document No. 177-E(Rev.)
5 July 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 5

FIRST REPORT OF WORKING GROUP 5B TO COMMITTEE 5 (ALLOCATIONS)

Radio Astronomy Service

Frequency bands :

Guard-bands of the standard frequencies at 2.5 Mc/s, 5 Mc/s, 10 Mc/s, 15 Mc/s, 20 Mc/s and 25 Mc/s :

36.65- 36.85 Mc/s
37.75- 38.25 Mc/s
41.15- 41.35 Mc/s
45.65- 45.85 Mc/s
50.55- 50.95 Mc/s
72.55- 72.95 Mc/s
170.55-170.95 Mc/s
322 -328.6 Mc/s
406 -410 Mc/s

Space Research Service

Guard-bands of the standard frequencies at 2.5 Mc/s, 5 Mc/s, 10 Mc/s, 15 Mc/s, 20 Mc/s and 25 Mc/s.

1. Radio Astronomy Service

1.1 The Working Group unanimously agreed to the deletion of foot-note 204 from the guard-bands of the standard frequencies at 2.5 Mc/s, 5 Mc/s, 15 Mc/s, 20 Mc/s and 25 Mc/s as shown in Annex A to the present Report.

1.2 Frequency bands : 36.65-36.85 Mc/s, 41.15-41.35 Mc/s, 45.65-45.85 Mc/s, 50.55-50.95 Mc/s, 72.55-72.95 Mc/s and 170.55-170.95 Mc/s.

Proposals ARG/22/10, 11, 12, 13, 14, 15, 17, 18, 26 and 27 were not seconded and consequently were not considered further. The Delegation of Argentina reserved the right to revert to these Proposals in Committee 5, if it still so desires.

1.3 Frequency band : 322-328.6 Mc/s.

1.3.1 Proposals IND/35/4 and 5 were not seconded and consequently were not considered further. The Delegation of India reserved the right to revert to these Proposals in Committee 5, if it still so desires.

1.3.2 The Working Group unanimously agreed to the revised provisions of No. 310 of the Radio Regulations (Proposal F/41/77) as shown in Annex A to the present Report.

1.4 Frequency band : 37.75-38.25 Mc/s

Working Group 5B unanimously agreed to recommend the adoption of the provisions appearing in Annex A to the present Report.

1.5 Frequency band : 402-406 Mc/s

The Working Group unanimously agreed to delete foot-note 317 from the bands 402-406 Mc/s and 410-420 Mc/s and, for the band 406-410 Mc/s, to propose the adoption of the provisions appearing in Annex B attached to the present Report. The revised foot-note 317 has been so worded that it may be used in other frequency bands, e.g. in place of No. 365 of the Radio Regulations.

2. Space Research Service

The Working Group unanimously agreed to an allocation, on a secondary basis, to the space research service in part of the upper sideband of guard-band of the standard frequencies at 2.5 Mc/s, 5 Mc/s, 10 Mc/s, 15 Mc/s, 20 Mc/s and 25 Mc/s. Foot-note 203A has been worded so as to cover the six allocations as shown in Annex C to the present Report.

B. DESTA
Chairman

Annexes : 3

ANNEX A

kc/s

SUP 204 — /̅ Note to Committee 7 : SUP in the guard-bands of the standard frequencies at 2.5 Mc/s, 5 Mc/s, 10 Mc/s, 15 Mc/s, 20 Mc/s and 25 Mc/s _/

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* *

Mc/s

MOD

Region 1	Region 2	Region 3
37.75-38.25 FIXED 228 229 231 MOBILE Radio Astronomy 233A		

SUP 233 — /̅ Note to Committee 7 : SUP in all bands between 29.7-41 Mc/s _/

ADD 233A — In making assignments to stations of other services to which this band is allocated, administrations are urged to take all practicable steps to protect radio astronomy observations from harmful interference.

*

* *

MOD 310 — Radio astronomy observations in the band 322-328.6 Mc/s are carried out in a number of countries under national arrangements. Administrations should bear in mind the needs of the radio astronomy service in using this band.

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ANNEX B

Mc/s

	Region 1	Region 2	Region 3
MOD	402-406	METEOROLOGICAL AIDS Fixed Mobile except aeronautical mobile 314 315 316	
ADD	406-410	FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 314 317	
MOD	410-420	FIXED MOBILE except aeronautical mobile 314	

MOD 317 In making assignments to stations of other services to which this band is allocated, administrations are urged to take all practicable steps to protect radio astronomy observations from harmful interference.

/ Note to Committee 7 : MOD 317 contains the same text as ADD 233A at 37.75-38.25 Mc/s and MOD 286 at 151-153 Mc/s. /

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ANNEX C

ADD 203A The bands 2 501-2 502 kc/s, 5 003-5 005 kc/s, 10 003-10 005 kc/s, 15 005-15 010 kc/s, 19 990-19 995 kc/s, 20 005-20 010 kc/s and 25 005-25 010 kc/s are also allocated, on a secondary basis, to the space research service.

SUP 221

SUP 215

/ Note to Committee 7 : Foot-note 215 has been incorporated in ADD 203A /

SPACE
CONFERENCE

1971

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

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COMMITTEE 5

FIRST REPORT OF WORKING GROUP 5B
TO COMMITTEE 5
(ALLOCATIONS)

Radio Astronomy Service

Frequency bands :

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72.55- 72.95 Mc/s
170.55-170.95 Mc/s
322 -328.6 Mc/s
406 -410 Mc/s

Space Research Service

Guard-bands of the standard frequencies at 2.5 Mc/s, 5 Mc/s, 10 Mc/s, 15 Mc/s, 20 Mc/s and 25 Mc/s.

1. Radio Astronomy Service

1.1 The Working Group unanimously agreed to the deletion of foot-note 204 from the guard-bands of the standard frequencies at 2.5 Mc/s, 5 Mc/s, 15 Mc/s, 20 Mc/s and 25 Mc/s as shown in Annex A to the present Report.

1.2 Frequency bands : 36.65-36.85 Mc/s, 41.15-41.35 Mc/s, 45.65-45.85 Mc/s, 50.55-50.95 Mc/s, 72.55-72.95 Mc/s and 170.55-170.95 Mc/s.

Proposals ARG/22/10, 11, 12, 13, 14, 15, 17, 18, 26 and 27 were not seconded and consequently were not considered further. The Delegation of Argentina reserved the right to revert to these Proposals in Committee 5, if it still so desires.

1.3 Frequency band : 322-328.6 Mc/s

1.3.1 Proposals IND/35/4 and 5 were not seconded and consequently were not considered further. The Delegation of India reserved the right to revert to these Proposals in Committee 5, if it still so desires.

1.3.2 The Working Group unanimously agreed to the revised provisions of No. 310 of the Radio Regulations (Proposal F/41/77) as shown in Annex A to the present Report.

1.4 Frequency band : 37.75-38.25 Mc/s

Working Group 5B unanimously agreed to recommend the adoption of the provisions appearing in Annex A to the present Report.

1.5 Frequency band : 402-406 Mc/s

The Working Group unanimously agreed to delete foot-note 317 from the bands 402-406 Mc/s and 410-420 Mc/s and, for the band 406-410 Mc/s, to propose the adoption of the provisions appearing in Annex B attached to the present Report. The revised foot-note 317 has been so worded that it may be used in other frequency bands, e.g. in place of No. 365 of the Radio Regulations.

2. Space Research Service

The Working Group unanimously agreed to an allocation, on a secondary basis, to the space research service in part of the upper sideband of guard-band of the standard frequencies at 2.5 Mc/s, 5 Mc/s, 10 Mc/s, 15 Mc/s, 20 Mc/s and 25 Mc/s. Foot-note 203A has been worded so as to cover the six allocations as shown in Annex C to the present Report.

B. DESTA
Chairman

Annexes : 3

ANNEX A

kc/s

SUP 204 /Note to Com 7 : SUP in the guard-bands of the Standard frequencies at 2.5 Mc/s, 5 Mc/s, 10 Mc/s, 15 Mc/s, 20 Mc/s and 25 Mc/s/

* *
*

Mc/s

	Region 1	Region 2	Region 3
NOC	37.75-38.25 FIXED 228 229 231 MOBILE Radio Astronomy 233A		

SUP 233 /Note to Com 7 : SUP in all bands between 29.7 - 41 Mc/s/

ADD 233A In making assignments to stations of other services to which this band is allocated, administrations are urged to take all practicable steps to protect radio astronomy observations from harmful interference.

* *
*

MOD 310 Radio astronomy observations in the band 322 - 328.6 Mc/s are carried out in a number of countries under national arrangements. Administrations should bear in mind the needs of the radio astronomy service in using this band.

ANNEX B

Mc/s

	Region 1	Region 2	Region 3
	402-406 METEOROLOGICAL AIDS Fixed Mobile except aeronautical mobile 314 315 316		
ADD	406-410 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 314 317		
	410-420 FIXED MOBILE except aeronautical mobile 314		

MOD 317 In making assignments to stations of other services to which this band is allocated, administrations are urged to take all practicable steps to protect radio astronomy observations from harmful interference.

[Note to Com. 7 : MOD 317 contains the same text as ADD 233A at 37.75-38.25 Mc/s and MOD 286 at 151-153 Mc/s.]

ANNEX C

ADD 203A The bands 2 501 - 2 502 kc/s, 5 003 - 5 005 kc/s, 10 003 - 10 005 kc/s, 15 005 - 15 010 kc/s, 19 990 - 19 995 kc/s, 20 005 - 20 010 kc/s and 25 005 - 25 010 kc/s are also allocated, on a secondary basis, to the space research service.

SUP 221

/ Note to Com. 7 : Foot-note 215 has been incorporated in ADD 203A /

SPACE
CONFERENCE

Document No. 178-E
22 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 5

UNITED STATES OF AMERICA

INFORMATION DOCUMENT

Proposals in the band 2 500-2 690 MHz

The United States, together with a number of other delegations, has made proposals for an allocation to the space service in the vicinity of 2 500 MHz. The purpose of the United States proposal is to provide for the establishment of a low cost educational telecommunications service; other countries appear to have similar purposes in mind. The following potential applications of this service are offered as examples of the important needs that could be served by a space service allocation at 2 500 MHz :

Immediate and practical requirements for the type of satellite distribution service contemplated at 2 500 MHz are those of interconnection for educational television terrestrial facilities or the provision of service in a community mode when there is no terrestrial infrastructure.

A system of interconnection that links schools at the various levels of education with distribution centres that provide the best in programming, can vastly improve the educational system. In cases where an area does not enjoy an adequate school system, a satellite system can effectively provide classrooms in the form of community viewing installations. The cost of successful educational television programmes is quite large so it is essential to provide an economic distribution system to a large number of users to reduce the per capita cost. Studies reveal that satellite communication is the most cost-effective method of providing this service. It is felt to be the only economically feasible means of distributing large amounts of information over a large land mass, particularly where the existing terrestrial infrastructure is not capable of satisfying such requirements.

Studies have pointed out that the ability to exchange information readily among a nation's information resources - making available to all the resources of all - without the constraints of geography, mission, or discipline is a most desirable objective. Delay in achieving such a capability will not only encourage unnecessary duplication in the development of information resources but also make the eventual integration of these resources into a single network more difficult, as each limited programme develops different standards, different techniques, and different procedures. An effective information network has the potential of multiplying the effectiveness and efficiency of each teacher. Moreover, an information network can do much to satisfy the needs for communication and access to information about research conducted in universities. It offers a way toward removing many of the artificial barriers that tend to restrict the best education to a limited number of "centres of excellence".

Programmes in nutrition education would benefit many groups of people who can best be reached by the use of a satellite television system, providing a visual as well as verbal message.

The State of Alaska, because of its size, remoteness and diverse and sparse population, is a good example of a unique requirement for public service satellite communications. Direct distribution of educational television to the many small towns and villages of Alaska would represent an order of magnitude increase in the educational services they are now receiving.

Rural areas represent a situation to which satellite distributed instructional television could offer needed help. The percentage of uncertified teachers is generally much higher in rural areas as it is in urban areas. Reception of nationally produced instructional television would afford significant improvement in many rural schools. Programming and scheduling problems would be a relatively minor price to pay for the added resource of national instructional television via satellite.

In many countries the medical community has considered a number of biomedical communication services and the cost of providing these services using conventional common carrier facilities. It has been estimated that significant cost saving could be realized for a number of these proposed services if specialized satellite services were available. Representative examples include :

1) the communication of continuing medical education programming to practising physicians and nurses, and

2) the interconnection of medical schools to transmit programming in support of undergraduate medical education.

Any communication system designed to fully meet educational needs will have to include many technologies besides the satellite, but nevertheless an appropriately economic satellite system can be an important first step and a valuable component of the ultimate telecommunication system to serve education. It is essential that such a service have very favourable economics especially with respect to the terrestrial receiving equipment in as much as a very large number of receiving installations can be envisaged. The economic and operational constraints in respect to educational requirements are reflected in two important aspects that must be inherent in such a satellite system design. First, it is essential that the system be able to operate in a part of the frequency spectrum where present technology permits low cost receiving equipment to be produced, and second, that the present and planned terrestrial use of the frequencies permit somewhat higher power flux-densities than those normally associated with the communication satellite service. Representative technical characteristics which meet these criteria are given in Report 215 of the C.C.I.R. (New Delhi) under the community reception system of satellite broadcasting. The studies of the C.C.I.R. S.J.M. (Annex 3-4F and 3-4G) have shown that such a satellite service can share with certain types of terrestrial fixed service.

As an indication of the costs and type of technology currently available, the United States is preparing an experiment at 2 500 MHz using the NASA ATS-F satellite, to be launched in 1973, to distribute educational television over an area of 500 x 1,000 miles in the Rocky Mountain region of the United States. The satellite transmitter will have 20 Watts power into a 30 ft. antenna and will use frequency modulation with an RF bandwidth of 24 MHz. The receivers will be located directly at schools and in isolated communities to feed cable television systems. A prototype of the receiver to be used in this experiment has been developed and production costs are estimated at less than U.S. $200 in quantities as small as 500 units. These terminals have a 7 ft. antenna with a 7 db noise figure front end. A number of studies conducted within the United States indicate that a two to one cost advantage exists for receiving equipment at 2 500 MHz as opposed to equipment at 12 GHz.

With reference to the specific space service that would be appropriate for an allocation at 2 500 MHz for educational community use, there are alternative solutions. One component of the service, the distribution of television programme material to terrestrial educational broadcast stations and to cable television systems for further distribution under existing service definitions, could be a sub-category of the communication satellite service. However, because of the economic constraints, an educational satellite system could not conform to the power flux-density limitations normally associated with the communication satellite service in this portion of the spectrum. Another component of the service would be distribution of instructional TV and other broadband materials direct to schools, hospitals and various community locations and at least partly falls within the definition of community reception in the broadcasting-satellite service as developed by C.C.I.R. The third alternative would be the adoption of a distribution - satellite service with an added provision for two-way networking capability. However, we feel we can also accept the concepts advanced by some delegations of a broadcasting satellite (community reception) if it is qualified by a footnote to permit those other necessary educational functions not encompassed in the definitions of broadcasting.

Corrigendum No. 1 to
Document No. 179-E
30 June 1971
Original : Spanish

SPACE CONFERENCE

1971

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

ARGENTINA

This corrigendum does not concern the English version.

SPACE CONFERENCE

Document No. 179-E
22 June 1971
Original : Spanish

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

ARGENTINA

SURVEY OF EARTH RESOURCES

Argentina agrees to the allocation of frequency bands for the surveying of the natural resources of the earth, subject to prior agreement between the administrations concerned and of those other administrations whose plans or services, operated in conformity with the Table of Frequency Allocations, may be affected; the above is in pursuance of the proposal submitted to the United Nations in the document of which a copy is attached for information.

Annex : 1

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ANNEX

ARGENTINA

DRAFT INTERNATIONAL AGREEMENT ON ACTIVITIES CARRIED OUT THROUGH REMOTE-SENSING SATELLITE SURVEYS OF EARTH RESOURCES

(A/AC.105/C.2/L.73)

The States Parties to the present Agreement,

Considering that there is an urgent need for overall surveys of earth resources by means of remote sensors installed in satellites and that the expected benefits will only be obtained through a general international convention and agreements on collaboration,

Further considering that the principal economic assets of any country are human and natural resources, provided that these are identified and used,

Convinced that the promise of such benefits raises legal problems which must be solved without delay,

Reaffirming that these new techniques will act as an effective stimulus to economic and social development, and materially contribute to the welfare of all mankind by enabling the inventory, planning, development, exploitation and conservation of natural resources to be undertaken on the basis of international cooperation,

Bearing in mind United Nations General Assembly Resolution 2600 (XXIV) of 16 December 1969, which is concerned, in particular, with the techniques of remote earth resources surveying, and requests greater international cooperation with a view to reaping practical benefits from the new technology,

Believing that the rights of the States to which the resources belong should be established at the international level in relation to collective consumption requirements,

Recalling United Nations General Assembly Resolutions 1803 (XVII) of 14 December 1962 and 2158 (XXI) of 25 November 1966 on permanent sovereignty over natural resources, Bearing in mind United Nations General Assembly Resolution 1314 (XIII) of 12 December 1958, which declares that the permanent sovereignty of peoples and nations over their natural wealth and resources is a basic constituent of the right to self-determination,

Inspired by the Treaty on the Principles Governing the Activities of States in the Exploration and Use of Outer Space including the Moon and other Celestial Bodies, of 27 January 1967,

Have agreed on the following :

Article 1

The techniques of remote-sensing satellite inventory and study of earth resources shall be used in close international cooperation for the benefit of all mankind.

Article 2

Until such time as some other appropriate body is available, the United Nations Secretariat shall be responsible for the functions of planning, consultation, information, inventorying and coordination of such activities in the initial stage to meet immediate needs, with a view to internationalizing overall surveys of resources.

Article 3

A data bank shall be established for that purpose, to which all States shall have access. When appropriate, the data bank shall disseminate on a world-wide basis the findings and practical results in respect of the use of such techniques to inventory and survey earth resources, with special reference to the interests and needs of the developing countries.

Article 4

The programme for world-wide remote sensing will prevent the exploitation of natural resources from causing the spoilation or destruction of the environment, and will make for the preservation of a satisfactory balance through the increase of renewable resources in those areas which are best able to help maintain it.

Article 5

Until remote-sensing satellite surveys of earth resources have been placed on an international footing, the activities of the States which undertake such surveys must be based on the principle of equality between States and of the honourable fulfilment of international commitments, as well as the other principles of international law regarding friendly relations and cooperation between States.

Article 6

Surveys of natural resources and their findings with respect to the sea beyond State jurisdiction or of the ocean floor and subsoil beyond the limits of national jurisdiction shall be transmitted to the data bank. If the surveys involve the national territory and jurisdictional waters of one or more States, the facts and findings shall be promptly communicated to the State or States concerned and transmitted to the data bank.

Article 7

The principle of equality of rights and the self-determination of peoples embraces not only the right to internal sovereignty and independence, but also the economic aspect of the freedom to use and distribute their wealth, whereby the peoples may exercise their legitimate and exclusive rights over their natural resources. By virtue of this principle, the States shall exchange information among themselves on the discovery of new areas or of improved methods of exploiting natural resources, and shall transmit such information to the data bank.

Article 8

The exploitation of the natural resources of each State in its territory and in its jurisdictional waters shall be governed solely by national laws and regulations. Efforts shall be made by means of international agreements to improve the distribution of the resources and to plan concerted action to meet collective consumption requirements, with respect to the basic elements for subsistence, essential raw materials and natural processes, the knowledge of which would raise mankind's level of living.

(The final articles follow.)

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 180-E (Rev.)
23 June 1971
Original : English

COMMITTEE 6

NOTE BY THE CHAIRMAN, COMMITTEE 4
TO THE CHAIRMAN, COMMITTEE 6
ON PROPOSALS CONCERNING BROADCASTING SATELLITE SERVICE

1. Working Group 4B of Committee 4, at its 5th meeting on 21 June 1971, discussed the proposals ARG/23/52, USA/28 Corr./269-271, B/72/98-100, F/86/281-283 and MEX/114/49 which propose modifications to Section I of Article 7 of the Radio Regulations, which deals with special rules relating to the broadcasting service. The proposals are aimed at including in Article 7, Section I, certain rules relating to the broadcasting-satellite service.

2. While there was a consensus in the meeting that some provisions resulting from these proposals should be included in Article 7, the Working Group was of the opinion that the proposals are not of a technical nature and should be considered by Committee 6 to arrive at an agreed text to be included in Section I of Article 7.

3. At present and in the foreseeable future there would be technical difficulties in confining transmissions from space stations in the broadcasting-satellite service to specific limited geographical areas, such as territories of one or more countries interested in having this type of service, without a spill-over to neighbouring areas. Such a spill-over may create problems of harmful interference to radio services operating in these adjacent areas.

4. Committee 6 is requested to consider the proposals in the light of the points indicated above and communicate the results of its deliberations on these proposals to Committee 4 as soon as practicable.

E. SANDBACH
Chairman

SPACE CONFERENCE

1971

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 180-E
22 June 1971
Original : English

COMMITTEE 4

NOTE BY THE CHAIRMAN, COMMITTEE 4
TO THE CHAIRMAN, COMMITTEE 6
ON PROPOSALS CONCERNING BROADCASTING SATELLITE SERVICE

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2. While there was a consensus in the meeting that some provisions resulting from these proposals should be included in Article 7, the Working Group was of the opinion that the proposals are not of a technical nature and should be considered by Committee 6 to arrive at an agreed text to be included in Section I of Article 7.

3. At present and in the foreseeable future there would be technical difficulties in confining transmissions from space stations in the broadcasting-satellite service to specific limited geographical areas, such as territories of one or more countries interested in having this type of service, without a spill-over to neighbouring areas. Such a spill-over may create problems of harmful interference to radio services operating in these adjacent areas.

4. Committee 6 is requested to consider the proposals in the light of the points indicated above and communicate the results of its deliberations on these proposals to Committee 4 as soon as practicable.

E. SANDBACH
Chairman

SPACE CONFERENCE

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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 5

FIRST REPORT OF WORKING GROUP 5C

TO COMMITTEE 5

1. The Working Group considered the proposals concerning the use of space techniques in the Amateur Service.

2. The Working Group took note of the proposals of Cuba concerning the Amateur Service as contained in Document No. 144.

3. Frequency bands :

7 000-7 100	kc/s
14 000-14 350	kc/s
21 000-21 450	kc/s
28-29.7	Mc/s
144-146	Mc/s

The Working Group agreed by a majority to the introduction of the Amateur-Satellite Service in the Table with respect to the bands 7 000-7 100 kc/s, 21 000-21 450 kc/s, 28-29.7 Mc/s and 144-146 Mc/s and to add foot-note 211A in the Table with respect to the band 14 000-14 350 kc/s (see Appendix). As a consequence of this modification, foot-note 284A which concerns the band 144-146 Mc/s should be deleted.

4. Frequency bands :

50-54	Mc/s
146-148	Mc/s
220-225	Mc/s

The delegations of Argentina and Brazil withdrew the proposals they had submitted to the Conference concerning these bands.

The Working Group decided against the use of space techniques by the Amateur Service in these bands.

5. Frequency band 420-450 Mc/s

During the discussion of the proposals the Working Group had before it concerning this frequency band, two controversial opinions were expressed :

- delegations were against the introduction of use of space techniques by amateurs in this frequency band;
- delegations which supported the proposals put before the Working Group were ready to accept a more reduced portion of the band in which the use of space techniques by the Amateur Service should be permitted and agreed on the text of the following foot-note.

ADD 320A In the band 435-438 Mc/s, the Amateur-Satellite Service may be authorized, on condition that harmful interference shall not be caused to other services operating in accordance with the Table of Frequency Allocations. Administrations authorizing such use shall ensure that any harmful interference caused by emissions from amateur satellites is immediately eliminated.

6. Frequency bands :

1 215-1 300	Mc/s
2 300-2 450	Mc/s
3 300-3 500	Mc/s
5 650-5 925	Mc/s
10 000-10 500	Mc/s

The Working Group decided by a majority against the use of space techniques by the Amateur Service in these frequency bands.

K. OLMS
Chairman
Working Group 5C

Appendix : 1

APPENDIX

kc/s

	Region 1	Region 2	Region 3
MOD	7 000-7 100 AMATEUR AMATEUR-SATELLITE		
MOD	14 000-14 350 AMATEUR 211A 218		
MOD	21 000-21 450 AMATEUR AMATEUR-SATELLITE		

Mc/s

	Region 1	Region 2	Region 3
MOD	28-29.7 AMATEUR AMATEUR-SATELLITE		
MOD	144-146 AMATEUR AMATEUR-SATELLITE		

SUP 284A

ADD 211A The band 14 000-14 250 kc/s, is also allocated to the amateur-satellite service.

SPACE
CONFERENCE

1971

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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 5

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- Delegations were against the introduction of use of space techniques by amateurs in this frequency band.

- Delegations which supported the proposals put before the Working Group were ready to accept a more reduced portion of the band in which the use of space techniques by the amateur service should be permitted and agreed on the text of the following footnote :

ADD 320A The use of space techniques by the amateur service may be authorized in the band 435-438 Mc/s on condition that harmful interference shall not be caused to, or protection claimed from, other services operating in accordance with the Table of Frequency Allocations. Administrations authorizing such use shall ensure that any harmful interference caused by emissions from amateur satellites is immediately eliminated.

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1 215-1 300	Mc/s
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The Working Group decided by a majority against the use of space techniques by the amateur service in these frequency bands.

K. OLMS
Chairman
Working Group 5C

Appendix : 1

A P P E N D I X

kc/s

Region 1	Region 2	Region 3
7 000-7 100 AMATEUR 211A		
14 000-14 350 AMATEUR 211A 218		
21 000-21 450 AMATEUR 211A		

Mc/s

Region 1	Region 2	Region 3
28-29.7 AMATEUR 211A		
144-146 AMATEUR 284A 211A		

SUP 284A

ADD 211A In the bands 7 000-7 100 kc/s, 14 000-14 250, 21 000-21 450 kc/s, 28-29.7 Mc/s and 144-146 Mc/s space radiocommunication techniques may be used by the amateur service.

SPACE
CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

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COMMITTEE 5

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TO COMMITTEE 5

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146-148	Mc/s
220-225	Mc/s

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The Working Group decided against the use of space techniques by the amateur service in these bands.

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- Delegations were against the introduction of use of space techniques by amateurs in this frequency band.

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K. OLMS
Chairman
Working Group 5C

Appendix : 1

APPENDIX

kc/s

Region 1	Region 2	Region 3
7 000-7 100 AMATEUR 211A		
14 000-14 350 AMATEUR 211A 218		
21 000-21 450 AMATEUR 211A		

Mc/s

Region 1	Region 2	Region 3
28-29.7 AMATEUR 211A		
144-146 AMATEUR 284A 211A		

JP 284A

D 211A In the bands 7 000-7 100 kc/s, 14 000-14 250, 21 000-21 450 kc/s, 28-29.7 Mc/s and 144-146 Mc/s space radiocommunication techniques may be used by the amateur service.

SPACE
CONFERENCE

1971

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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

INTERNATIONAL AMATEUR RADIO UNION

SPACE TECHNIQUES IN THE AMATEUR SERVICE

This document is intended to provide some general background information in the light of questions asked by delegates during the present WARC-ST Conference.

The five OSCAR[1] amateur radio satellites, launched during the period 1961-1971 functioned - without any interference having been reported - in the amateur bands at 28 Mc/s, 144 Mc/s and 430 Mc/s, with various output power ranging from 50 mW to 3 W. A more detailed summary of the activities with these five OSCAR satellites is published in the May 1971 issue of the Telecommunication Journal of the I.T.U.

The proposals for authority to use space techniques in the frequency bands, which amateurs currently share with other services, find their origin in the following :

a) To be able to exploit the characteristics of representative parts of the spectrum for experimental and training purposes.

b) The need to use frequencies for which terrestrial antennae are practical electrically and mechanically for amateur construction and erection.

c) The need to use separate frequency bands for up and down links as has been found necessary in other services.

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1) Orbiting Satellite Carrying Amateur Radio, see Appendix 1 for technical details.

d) To be able to use frequencies for which components will be generally available throughout the world including the new and developing countries.

It is fully appreciated by the amateur service that the use of space techniques in these shared bands imposes a great responsibility toward the other spectrum users and the administration under which the launch and proper control of amateur satellites fall. The licensee provides the satellite and hands it over to the launching agency, meeting such requirements as may be imposed.

A basic concern is the possibility of interference from amateur satellites to other services in shared bands. In bands shared world-wide between radiolocation and the amateur service, radiolocation is indicated as the primary service in the Table, and amateur as a secondary service. The Radio Regulations make adequate provision for protection of a primary service, and thus radiolocation is entitled to protection from any amateur interference, whether it emanates from an amateur station that is fixed, mobile aeronautical or satellite-borne.

Document No. M/141, accepted by the C.C.I.R. and dated 24 November 1970, states that the receivers used in the radiolocation service employ special signal processing techniques which make them immune to signals from amateur transmissions.

By footnotes, in some countries these bands are used for services other than those in the Table, primarily fixed and mobile. There is a natural concern that amateur space activities might interfere with those established services.

In this respect, reference has been made to the report by the Special Joint Meeting of the C.C.I.R., 1971, (Conference Document No. 64). Paragraph 5.4.1 suggests that "amateur satellites ... may use relatively high e.i.r.p. per channel". Perhaps this phrase has been misunderstood and interpreted to suggest a finite "high power". In actuality, the powers of the five OSCAR satellites launched to date were 0.1 Watt, 0.14 Watt, 1.0 Watt, 3.0 Watts and 0.23 Watt. Even the 3.0 Watt OSCAR mentioned was a translator over a 10 kc/s passband and thus the power per channel was low. Plans for future OSCAR satellites are substantially in this same power range.

As to the required reliability of an amateur satellite, necessary for its proper functioning and control, optimum performance has and always will be sought by the application of the same design criteria and the use of the same high-grade components and workmanship as are applicable to professional satellites. Final acceptance tests on the amateur satellites conform to the same mechanical and environmental standards as applied to professional satellites. The relevant technical specifications can be made available upon request by interested administrations. The resulting reliability may therefore be expected to be of the same order as for professional satellites.

To comply with the Radio Regulations, the administration which licenses the transmitter and launches the satellite would specify and supervise the arrangement necessary for termination of any emissions causing interference, in the remote chance it should occur.

The administration which issues the licence for the transmitter is thus responsible for its emissions and control.

Appendix : 1

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APPENDIX

SUMMARY OF SATELLITES LAUNCHED IN THE AMATEUR RADIO SERVICE 1961-1970

OSCAR-1

Date launched :	12 December 1961
Date communications terminated :	1 January 1962
Orbit :	Inclined 81.2 degrees at equator
Initial apogee :	268 miles (450 km)
Frequency :	144.98 MHz approximately
Power output :	100 milliwatts, telemetry-beacon
Antenna :	Single monopole
Results :	More than 5,000 telemetry, beacon and tracking reports in 28 countries.

OSCAR-2

Date launched :	2 June 1962
Date communications terminated :	20 June 1962
Orbit :	Inclined 73 degrees at equator
Initial apogee :	249 miles (417 km)
Frequency :	144.99 MHz approximately
Power output :	140 milliwatts, telemetry-beacon
Antenna :	Single monopole
Results :	More than 6,000 telemetry, beacon and tracking reports were received from 700 radio stations throughout the world.

OSCAR-3

Date launched :	9 March 1965
Date communications terminated :	24 March 1965
Orbit :	Approximately polar
Initial apogee :	Approximately 585 miles (975 km)
Repeater input frequency :	50 kHz segment centred on 144.1 MHz
Repeater output frequency :	50 kHz segment centred on 145.9 MHz
Repeater system gain :	130 db (approximately)
Repeater output power :	1 Watt pep, for single signal in passband
Telemetry-beacon frequency :	145.85 MHz
Telemetry-beacon power output :	50 milliwatts
Antennae :	Four independant monopoles
Results :	World's first free-access active communications satellite. Nearly 100 amateur radio stations in 16 countries communicated through the satellite, including two-way trans-Atlantic contacts.

OSCAR-4

Date launched :	21 December 1965
Date communications terminated :	Mid-March 1966
Orbit :	Inclined 26 degrees at equator
Initial apogee :	Elliptical between 120 and 21,000 miles (200 to 35,000 km)
Repeater input frequency :	10 kHz band centred on 144.100 MHz
Repeater output frequency :	10 kHz band centred on 431.938 MHz
Repeater output power :	3 Watts pep, for single signal in passband
Telemetry-beacon frequency :	431.928 MHz
Antennae :	Four independant monopoles
Results :	A dozen 2-way contacts were established including the first between the U.S.A. and the Soviet Union.

OSCAR-5

Date launched :	23 January 1970
Date communications terminated :	Mid-March 1970
Orbit :	Inclined 102 degrees at equator
Initial apogee :	910 miles (1500 km)
VHF telemetry-beacon frequency :	144.05 MHz
VHF power output :	50 milliwatts
HF telemetry-beacon frequency :	29.45 MHz
HF power output :	180 milliwatts (operated on command)
Antennae :	1/4-wave monopole for VHF, dipole for HF
Results :	Satellite constructed in Australia, the previous four in the U.S.A. First amateur satellite to transmit on HF band. First amateur satellite to be ground controlled. First amateur satellite to be self-stabilized to reduce signal fading. First amateur satellite to have multi-channel telemetry system. Reception, telemetry and tracking reports received from several hundred amateur radio stations in at least 27 countries.

1971

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 183-E
22 June 1971
Original : Spanish

COMMITTEE 6

ARGENTINA

PROPOSED AMENDMENTS TO APPENDIX 10 OF THE RADIO REGULATIONS

SERVICE DOCUMENT SYMBOLS

We propose the following symbols :

ADD EA	Amateur satellite space station
ADD TA	Amateur satellite earth station
ADD EB	Broadcasting satellite space station
ADD TB	Broadcasting satellite earth station
MOD ~~FE~~ TE	Earth station ~~(Earth-Space-service)~~ (uplink)
ADD TO	Sound broadcasting satellite earth transmitting station
ADD TP	Sound broadcasting satellite earth receiving station
ADD TQ	Television satellite earth transmitting station
ADD TU	Television satellite earth receiving station
ADD TF	Fixed radiodetermination satellite earth station
ADD TL	Mobile radiodetermination satellite earth station
MOD ~~TD~~ TT	Space telecommand earth station
ADD TD	Earth station (downlink)
MOD TN	~~Radionavigation~~ Radiodetermination satellite earth station

Reason : To apply suitable symbols in service documents dealing with space techniques.

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 184-E
22 June 1971
Original : English

COMMITTEE 2

SECOND REPORT BY

THE WORKING PARTY OF COMMITTEE 2

(CREDENTIALS)

1. The Working Party of Committee 2 (Credentials) met on 22 June 1971, at 0930 hrs with Mr. C.J. Martínez (Venezuela), Chairman of Committee 2 in the chair.

2. Credentials received from the following countries were examined and found to be in order :

Algeria (Algerian Democratic and Popular Republic)
Austria
Chile
Cuba
France
Iraq (Republic of)
Hungarian People's Republic
Libyan Arab Republic
Mauritania (Islamic Republic of)
United Arab Republic
Rwanda (Republic of)
Senegal (Republic of the)
Singapore (Republic of)
South Africa (Republic of)
Switzerland (Confederation of)

3. Provisional credentials have been received on behalf of the following countries :

Congo (Democratic Republic of the)
Ghana
Greece
Jordan (Hashemite Kingdom of)
Yugoslavia (Socialist Federal Republic of)
Uruguay (Oriental Republic of)

Delegations of these countries have been advised that provisional credentials must be confirmed in accordance with Annex 4, Chapter 5 (General Regulations) of the Montreux Convention.

4. The Working Group noted that steps have been taken to regularize the credentials of Paraguay which were received via telegraph.

5. Credentials have not yet been received from the following countries and delegations have been asked to hand in their credentials to the Secretary of the Conference as soon as possible :

Bulgaria (People's Republic of)	Niger (Republic of the)
Congo (People's Republic of the)	Pakistan
Gabon Republic	Peru
Upper Volta (Republic of)	Togolese Republic
Malagasy Republic	Tunisia
Mali (Republic of)	Turkey

6. The Working Party of Committee 2 will meet again on 25 June 1971, at 0900 hrs, prior to the Committee 2 meeting at 0930 hrs.

7. The meeting adjourned at 1045 hrs.

W.W. SCOTT
Secretary
Working Party

C.J. MARTINEZ
Chairman
Committee 2

1971

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

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29 June 1971
Original : English

WORKING GROUP 5D

NOTE FROM WORKING GROUP 5C

TO WORKING GROUP 5D

When considering the proposals concerning the frequency band 460-470 Mc/s the Working Group 5C took note of proposals G/108/321 and 322 concerning the use of space techniques in this frequency band by the Maritime Mobile Service. The Working Group expressed its concern about the proposed introduction of that technique in this frequency band and decided to draw the attention of Working Group 5D to this fact.

K. OLMS
Chairman
Working Group 5C

SPACE CONFERENCE

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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

WORKING GROUP 5D

NOTE FROM WORKING GROUP 5C

TO

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K. OLMS
Chairman
Working Group 5C

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 186-E
22 June 1971
Original : English

WORKING GROUP 5 ad hoc

REPORT OF SUB-WORKING GROUP 5 ad hoc-1 TO WORKING GROUP 5 ad hoc

Terms and Definitions

Section IIA, Article 1 of the Radio Regulations

1. Sub-Working Group 5 ad hoc-1 has examined the service definitions contained in Section IIA of Article 1 of the Radio Regulations, following the philosophy of the French Proposals contained in Document No. 40 and pursuant to the Terms of Reference established by Working Group 5 ad hoc.

2. Delegates of the following Administrations have participated in the whole of the work of Sub-Working Group 5 ad hoc-1 :

Saudi Arabia, Argentine, Australia, Brazil, Canada, China, Spain, United States of America, France, India, Japan, Mexico, New Zealand, Federal Republic of Germany, United Kingdom.

3. The revised and new provisions appearing in the Annex to the present Report were unanimously agreed by Sub-Working Group 5 ad hoc-1. The revised provisions include, in some cases, the deletion of existing terms.

4. The Chairman would like to express his appreciation to all the members of the Group for their cooperation, particularly the small editorial group which sacrificed a good part of their rest-time to fulfil their task.

Ahmed ZAIDAN
Chairman

Annex : 1

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ANNEX

DRAFT TERMS AND DEFINITIONS

MOD 84AE Space station

A station located on an object which is beyond, is intended to go beyond, or has been beyond, the major portion of the earth's atmosphere.

MOD 84AD Earth station

A station located either on the earth's surface, including on board a ship, or on board an aircraft

- intended for communication with one or more space stations;
- or intended for communication with another station(s) using one or more passive satellites or other objects in space.

MOD 84AC Space radiocommunication

Any radiocommunication involving the use of one or more space stations or the use of one or more passive satellites or other objects in space.

MOD 84AA Terrestrial radiocommunication(1)

Any radiocommunication other than space radiocommunication or radio astronomy.

MOD 84AB Terrestrial station(2)

A station effecting terrestrial radiocommunication.

ADD(1) 84AA.1 In these Regulations, unless otherwise stated, any radiocommunication service relates to terrestrial radiocommunication.

ADD(2) 84AB.1 In these Regulations, unless otherwise stated, any station is a terrestrial station.

MOD 84AF Space system

Any group of cooperating earth or space stations employing space radiocommunication for specific purposes.

MOD 84AL Satellite system

A space system using one or more artificial earth satellites.

MOD 84AG Fixed-satellite service

A radiocommunication service :

- between specified fixed points on the earth when one or more satellites are used, including in some cases satellite to satellite links; or

- for connection between one or more specified fixed points on the earth and satellites used for a service other than the fixed service.

ADD 84AGA Mobile-satellite service

A radiocommunication service :

- between mobile earth stations and one or more space stations; or between space stations used by this service

- and in certain cases for connection between these space stations and one or more specific fixed points on the earth; optionally this connection may also be made within the fixed satellite service, depending on the technical system used.

ADD 84AGB Aeronautical mobile-satellite service

A mobile-satellite service in which mobile earth stations are located on board aircraft. Survival craft stations may also participate in this service.

ADD 84AGC Maritime mobile-satellite service

A mobile-satellite service in which mobile earth stations are located on board ships. Survival craft stations may also participate in this service.

ADD 84AGD Land mobile-satellite service

A mobile-satellite service in which mobile earth stations are located on land.

MOD 84AP Broadcasting-satellite service

*) A radiocommunication service in which signals transmitted or re-transmitted by space stations are intended for direct reception by the general public.

ADD 84APA Radiodetermination-satellite service

A radiocommunication service involving the use of radiodetermination and the use of one or more space stations.

MOD 84AQ Radionavigation-satellite service

A radiodetermination satellite service applied to navigation including, in certain cases, transmission or re-transmission of supplementary information necessary for the operation of the radionavigation systems.

ADD 84ASA Earth exploration-satellite service

A radiocommunication service :

- in which the results of measurements relating to earth sciences, including data concerning natural earth phenomena, made by instruments on board earth satellites are transmitted to earth stations from one or more space stations,

*) Possibly to be amended.

ADD 84ASA (cont.)

- or in which the results of such measurements are received from sensor platforms either airborne or located on earth and are re-transmitted to earth stations by one or more space stations,

- and in which earth exploration data may be received by one or more space stations and may be distributed to earth stations within the system concerned,

- this service may also include signals for platform interrogation.

MOD 84AT Meteorological-satellite service

An earth exploration satellite service for meteorological purposes.

MOD 84AM Space research service

A radiocommunication service in which spacecraft or other objects in space are used for scientific or technological research purposes.

ADD 84ACA Space operation service

A radiocommunication service concerned with the operation of spacecraft, in particular tracking, telemetry and telecommand.

These functions may also, in certain cases, be provided within the service in which the space station is operating.

ADD 84ACB Inter-satellite service

A radiocommunication service providing links between artificial earth satellites.

MOD 69 Safety service

A radiocommunication service used permanently or temporarily for the safeguarding of human life and property on the surface of the earth, in the air or in space.

NOC	84AJ	Active satellite
NOC	84AK	Passive satellite
NOC	84AW	Space telemetering
NOC	84AX	Maintenance space telemetering
NOC	84AY	Space telecommand
NOC	84AZ	Space tracking

SUP	84AH	Communication-satellite earth station
SUP	84AI	Communication-satellite space station
SUP	84AN	Space research earth station
SUP	84AO	Space research space station
SUP	84AR	Radionavigation-satellite earth station
SUP	84AS	Radionavigation-satellite space station
SUP	84AU	Meteorological-satellite earth station
SUP	84AV	Meteorological-satellite space station

SPACE CONFERENCE

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COMMITTEE 5

SECOND REPORT OF WORKING GROUP 5B

TO COMMITTEE 5 (ALLOCATIONS)

Radio Astronomy Service

Frequency bands : 21 850-21 870 kc/s
150.05-153 Mc/s
173 -174 Mc/s
602 -608 Mc/s
608 -614 Mc/s Region 3
608 -614 Mc/s World-wide

1. Frequency band : 21 850-21 870 kc/s

1.1 The Working Group, by a large majority, agreed to propose the adoption of the revised provisions appearing in Annex A to the present Report.

1.2 The Delegations of Bulgaria, Czechoslovakia and the U.S.S.R., while not formally opposing the proposed revision, explained that the frequency band 21 850-21 870 kc/s was very heavily used in their respective countries by the Aeronautical Fixed and Aeronautical Mobile (R) Services to which the band is allocated at present and consequently were obliged to reserve the right to revert to this subject in Committee 5, if they still so desired.

2. Frequency band : 150.05-153 Mc/s

2.1 Proposal F/41/75 to modify No. 286 of the Radio Regulations by extending the additional allocation from Region 1 to be of world-wide effect was supported but, by a large majority, was found unacceptable to Region 2 and Region 3 countries. Consequently, Proposal F/41/75 was withdrawn insofar as the extension from a Region 1 to a world-wide allocation was concerned.

2.2 Certain Region 1 countries expressed the wish to see the allocation included in the Region 1 box of the Table together with the standard foot-note containing the remaining provision of the existing No. 286 of the Radio Regulations. It was pointed out that in substance this constituted the status quo but had the advantage of including the allocations concerning the whole of Region 1 in the framed part of the Table. It was agreed that the Second Report of Working Group 5B would be drawn up thus (see Annex B to the present Report).

3. Frequency band : 173-174 Mc/s

3.1 Proposal B/71/52, in part, concerning the addition of a foot-note ADD 290B reading "In Region 2, the band 173-174 Mc/s is also allocated to the radio astronomy service etc", was not supported and, consequently, was not considered further.

3.2 The Delegation of Brazil reserved the right to revert to this proposal in Committee 5, should it still so desire.

4. Frequency band : 602-608 Mc/s

Proposal ARG/22/37, by which provision for an alternative allocation (RR 145 and 146) in Argentine to the Radio Astronomy Service, was unanimously agreed by the Working Group. The new provision appears in Annex C to the present Report.

5. Frequency band : 608-614 Mc/s in Region 3

5.1 Proposals IND/35/6 and 7, which sought to make provisions for a) RADIO ASTRONOMY to be shown as an allocation in the framed part of the Table for Region 3 with equal primary status as the FIXED and MOBILE Services and b) consequential changes of substance to Nos. 332, 336, 337 and 339, were fully discussed. Several Delegations having interests in Region 3, while expressing sympathy for radio astronomy, were unable to agree to the proposed primary allocation and preferred the present provisions of No. 332 of the Radio Regulations. The Working Group was unable to agree with the proposed new provisions.

5.2 The Delegation of India reserved the right to revert to these proposals in Committee 5, should it still be so desired.

6. Frequency band : 608-614 Mc/s world-wide

Proposal S/7/7 to modify No. 332 of the Radio Regulations, following conclusions reached by the Inter Union Commission for the Allocation of Frequencies for the Radio Astronomy and Space Research Services (IUCAF), so as to authorize the use of the band 608-614 Mc/s by the Radio Astronomy Service in Regions 1 and 3 to align with Region 2 (with the exception of Cuba) insofar as the band limits are concerned. After a thorough examination of different possible solutions, proposal S/7/7 was withdrawn in favour of the status quo, i.e. No. 332 unchanged.

B. DESTA
Chairman

Annexes : 3

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A N N E X A

kc/s

	Region 1	Region 2	Region 3
	21 850-21 870		
MOD		RADIO ASTRONOMY	
	21 870-22 000		
MOD		AERONAUTICAL FIXED AERONAUTICAL MOBILE (R)	

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A N N E X B

Mc/s

	Region 1	Region 2	Region 3
	150.05-151 FIXED MOBILE except aeronautical mobile (R)	150.05-174 FIXED MOBILE	150.05-170 FIXED MOBILE
ADD	RADIO ASTRONOMY 274 285 286 286A		
MOD	151-153 FIXED MOBILE except aeronautical mobile (R)		
ADD	RADIO ASTRONOMY Meteorological Aids /Permitted Service/ 285 286 286A		
MOD	153-154 FIXED MOBILE except aeronautical mobile (R) Meteorological Aids /Permitted Service/ 285 286A	287	287 290

MOD 286 In making assignments to stations of other services to which this band is allocated, administrations are urged to take all practicable steps to protect radio astronomy observations from harmful interference.

/Note to Com.7 : MOD 286 contains the same text as ADD 233A at 37.75-38.25 Mc/s and MOD 317 at 406-410 Mc/s./

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ANNEX C

Mc/s

ADD 325A In Argentina, the band 602-608 Mc/s is allocated to the Radio Astronomy Service.

SPACE CONFERENCE

1971

Document No. 187-E
23 June 1971
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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 5

SECOND REPORT OF WORKING GROUP 5B

TO COMMITTEE 5 (ALLOCATIONS)

Radio Astronomy Service

Frequency bands :	21 850-21 870 kc/s	
	150.05-153 Mc/s	
	173 -174 Mc/s	
	602 -608 Mc/s	
	608 -614 Mc/s	Region 3
	608 -614 Mc/s	World-wide

1. Frequency band : 21 850-21 870 kc/s

1.1 The Working Group, by a large majority, agreed to propose the adoption of the revised provisions appearing in Annex A to the present Report.

1.2 The Delegations of Bulgaria, Czechoslovakia and the U.S.S.R., while not formally opposing the proposed revision, explained that the frequency band 21 850-21 870 kc/s was very heavily used in their respective countries by the Aeronautical Fixed and Aeronautical Mobile (R) Services to which the band is allocated at present and consequently were obliged to reserve the right to revert to this subject in Committee 5, if they still so desired.

2. Frequency band : 150.05-153 Mc/s

2.1 Proposal F/41/75 to modify No. 286 of the Radio Regulations by extending the additional allocation from Region 1 to be of world-wide effect was supported but, by a large majority, was found unacceptable to Region 2 and Region 3 countries. Consequently, Proposal F/41/75 was withdrawn insofar as the extension from a Region 1 to a world-wide allocation was concerned.

2.2 Certain Region 1 countries expressed the wish to see the allocation included in the Region 1 box of the Table together with the standard foot-note containing the remaining provision of the existing No. 286 of the Radio Regulations. It was pointed out that in substance this constituted the status quo but had the advantage of including the allocations concerning the whole of Region 1 in the framed part of the Table. It was agreed that the Second Report of Working Group 5B would be drawn up thus (see Annex B to the present Report).

3. Frequency band : 173-174 Mc/s

3.1 Proposal B/71/52, in part, concerning the addition of a foot-note ADD 290B reading "In Region 2, the band 173-174 Mc/s is also allocated to the radio astronomy service etc", was not supported and, consequently, was not considered further.

3.2 The Delegation of Brazil reserved the right to revert to this proposal in Committee 5, should it still so desire.

4. Frequency band : 602-608 Mc/s

Proposal ARG/22/37, by which provision for an alternative allocation (RR 145 and 146) in Argentine to the Radio Astronomy Service, was unanimously agreed by the Working Group. The new provision appears in Annex C to the present Report.

5. Frequency band : 608-614 Mc/s in Region 3

5.1 Proposals IND/35/6 and 7, which sought to make provisions for a) RADIO ASTRONOMY to be shown as an allocation in the framed part of the Table for Region 3 with equal primary status as the FIXED and MOBILE Services and b) consequential changes of substance to Nos. 332, 336, 337 and 339, were fully discussed. Several Delegations having interests in Region 3, while expressing sympathy for radio astronomy, were unable to agree to the proposed primary allocation and preferred the present provisions of No. 332 of the Radio Regulations. The Working Group was unable to agree with the proposed new provisions.

5.2 The Delegation of India reserved the right to revert to these proposals in Committee 5, should it still be so desired.

6. Frequency band : 608-614 Mc/s world-wide

Proposal S/7/7 to modify No. 332 of the Radio Regulations, following conclusions reached by the Inter Union Commission for the Allocation of Frequencies for the Radio Astronomy and Space Research Services (IUCAF), so as to authorize the use of the band 608-614 Mc/s by the Radio Astronomy Service in Regions 1 and 3 to align with Region 2 (with the exception of Cuba) insofar as the band limits are concerned. After a thorough examination of different possible solutions, proposal S/7/7 was withdrawn in favour of the status quo, i.e. No. 332 unchanged.

B. DESTA
Chairman

Annexes : 3

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A N N E X A

kc/s

Region 1	Region 2	Region 3
21 850-21 870 RADIO ASTRONOMY		
21 870-22 000 AERONAUTICAL FIXED AERONAUTICAL MOBILE (R)		

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A N N E X B

Mc/s

Region 1	Region 2	Region 3
150.05-151 FIXED MOBILE except aeronautical mobile (R) RADIO ASTRONOMY 274 285 286 286A	150.05-174 FIXED MOBILE	150.05-170 FIXED MOBILE
151-153 FIXED MOBILE except aeronautical mobile (R) RADIO ASTRONOMY Meteorological Aids /Permitted Service/ 285 286 286A		
153-154 FIXED MOBILE except aeronautical mobile (R) Meteorological Aids /Permitted Service/ 285 286A	287	287 290

MOD 286 In making assignments to stations of other services to which this band is allocated, administrations are urged to take all practicable steps to protect radio astronomy observations from harmful interference.

/Note to Com.7 : MOD 286 contains the same text as ADD 233A at 37.75-38.25 Mc/s and MOD 317 at 406-410 Mc/s./

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A N N E X C

Mc/s

ADD 325A In Argentina, the band 602-608 Mc/s is allocated to the Radio Astronomy Service.

SPACE CONFERENCE

1971

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 188(Rev.)-E
24 June 1971
Original : French

COMMITTEE 4

FRANCE

Ref.

F/188/321

DRAFT RESOLUTION No. J

The WARC-ST (Geneva, 1971)

considering

a) that the co-ordination area of a receiving earth station is determined by taking a high value, arbitrarily fixed, of the e.i.r.p. of the terrestrial stations transmitting in the frequency bands allocated to the Fixed Service or the Mobile Service which are shared with equal rights with the Space Radio Services for reception by earth stations;

b) that the e.i.r.p. of some of those terrestrial stations exceeds the value mentioned in a);

c) that the imposition of the e.i.r.p. limit mentioned in a) would hamper the operation of certain links between terrestrial stations without good reason;

d) that the adoption of a higher e.i.r.p. value for terrestrial stations for the calculation of that area would lead to an excessive increase in the co-ordination area of earth stations;

e) that the directivity of the antennae of the terrestrial stations is such that when the e.i.r.p. exceeds the value mentioned in a), it does so in only a very small angle seen from the terrestrial station;

f) that as a result, the hindrance to the operation of an earth station caused by terrestrial stations with an e.i.r.p. exceeding the value mentioned in a) is confined to very small areas;

Ref.

F/188/321 (cont.)

considering further

g) that a similar situation exists with regard to the sensitivity of terrestrial stations receiving in the frequency bands allocated to the Fixed Service or the Mobile Service, which are shared with equal rights with the Space Radio Services for transmission by earth stations;

resolves

1) that by not later than . . . . /date of entry into force of the Final Acts of the present Conference/ each administration shall send the I.F.R.B., in addition to the information notified pursuant to No. 490, the following supplementary information concerning each terrestrial station with an e.i.r.p. exceeding the value shown in Table II of Appendix 28 and transmitting on the frequency bands allocated to the Fixed Service or the Mobile Service which are shared with equal rights with the Space Radiocommunication Service for reception by earth stations :

- name of the transmitting terrestrial station;
- geographical co-ordinates;
- e.i.r.p. in the direction of maximum radiation;
- the azimuthal limits between which the e.i.r.p. exceeds the value shown in Table II of Appendix 28;

2) that by not later than . . . . /date of entry into force of the Final Acts of the present Conference/ each administration shall send the I.F.R.B., in addition to the information notified pursuant to No. 490, the following supplementary information concerning each terrestrial station with a sensitivity to interference exceeding the value shown in Table I of Appendix 28 and operating as receiving stations in the frequency bands allocated to the Fixed Service or the Mobile Service which are shared with equal rights with the Space Radiocommunication Service for transmissions by earth stations :

Ref.

F/188/321
(cont.)

- name of the terrestrial station;

- geographical coordinates;

- sensitivity to interference in the direction of maximum radiation;

- the azimuthal limits between which the sensitivity exceeds the value shown in Table I of Appendix 28;

3) that after the date indicated above, each administration shall send the I.F.R.B. the same supplementary information as specified above when it notifies new stations falling within the categories referred to in 1 and 2 above;

resolves further

1) that the I.F.R.B. shall keep up to date and regularly publish a list of the stations covered by 1 and 2 above, which shall include all the supplementary information referred to in 1 and 2 above;

2) that the I.F.R.B. shall enter the supplementary information referred to in 1 and 2 above in the Master Register in the manner deemed most appropriate.

SPACE
CONFERENCE

Document No. 188-E
23 June 1971
Original : French

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS - GENEVA - 1971

COMMITTEE 4

FRANCE

Ref.

F/188/321

DRAFT RESOLUTION No. J

The WARC-ST (Geneva 1971)

considering

a) that the co-ordination zone of a receiving earth station is determined by taking a high value, arbitrarily fixed, of the e.i.r.p. of the terrestrial stations transmitting in the frequency bands allocated to the Fixed Service or the Mobile Service which are shared with equal rights with the Space Radio Services for reception by earth stations;

b) that the e.i.r.p. of some of those terrestrial stations exceeds the value mentioned in a);

c) that the imposition of the e.i.r.p. limit mentioned in a) would unjustifiably hamper the operation of certain links between terrestrial stations;

d) that the adoption of a higher e.i.r.p. value for terrestrial stations for the calculation of that zone would lead to an excessive increase in the co-ordination zone of earth stations;

e) that the directivity of the antennae of the terrestrial stations is such that when the e.i.r.p. exceeds the value mentioned in a), it does so in only a very small angle seen from the terrestrial station;

f) that as a result, the hindrance to the operation of an earth station caused by terrestrial stations with an e.i.r.p. exceeding the value mentioned in a) is confined to very small areas;

Ref.

F/188/321 (cont.)

considering further

g) that a similar situation exists with regard to the sensitivity of terrestrial stations receiving in the frequency bands allocated to the Fixed Service or the Mobile Service, which are shared with equal rights with the Space Radic Services for transmission by earth stations;

resolves

1) that by not later than [date of entry into force of the Final Acts of the present Conference] each administration shall send the I.F.R.B. the following information concerning terrestrial stations with an e.i.r.p. exceeding the value shown in Table II of Appendix 28 and transmitting on the frequency bands allocated to the Fixed Service or the Mobile Service which are shared with equal rights with the Space Radiocommunication Service for reception by the earth stations :

- name of the terrestrial station;
- geographical coordinates;
- e.i.r.p. in the direction of maximum radiation;
- the range of azimuthal angles between which the e.i.r.p. exceeds the value shown in Table II of Appendix 28;

2) that by not later than [date of entry into force of the Final Acts of the present Conference] each administration shall send the I.F.R.B. the following information concerning terrestrial stations with a sensitivity exceeding the value shown in Table I of Appendix 28 and operating as receiving stations in the frequency bands allocated to the Fixed Service or the Mobile Service which are shared with equal rights with the Space Radiocommunication Service for transmissions by earth stations :

Ref.

F/188/321
(cont.)

- name of the terrestrial station;
- geographical coordinates;
- sensitivity in the direction of maximum radiation;
- the range of azimuthal angles between which the sensitivity exceeds the value shown in Table I of Appendix 28;

3) that after the date indicated above, each administration shall send the I.F.R.B. the same information as specified above when it notifies or puts into service new stations falling within the categories referred to in 1 and 2 above;

invites

the I.F.R.B. to publish and keep up-to-date a list of the stations covered by 1 and 2 above, which shall include all the information referred to in 1 and 2 above.

SPACE
CONFERENCE

Document No. 189-E
23 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

PLENARY MEETING

INTERNATIONAL ASTRONAUTICAL FEDERATION (I.A.F.)

POSITION PAPER FOR THE WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS

The International Astronautical Federation (I.A.F.), considering the prospect of a World Conference on Space Telecommunications to be held in June-July 1971, hereby declares that its position is :

1. General

1.1 The I.A.F. believes that both the exploration of space and its utilization for practical purposes of mankind are in the initial stage, and that the forthcoming years will see continued and expanded uses of space vehicles for these purposes.

1.2 The I.A.F. is further of the opinion that maximum practicable use of radio communication techniques is vital to this continued growth and expansion, and that this should be reflected in the regulations, allocations and standards governing use of the radio spectrum.

2. Specific Application : Communication Satellites

2.1 The I.A.F. encourages further expansion of the use of communication satellites and in particular, use of such service in areas of the world not now served or poorly served by terrestrial communication systems. The I.A.F. will support proposals made for such expansion, including proposals for the exclusive allocation of frequencies for "thin route, multiple-access" systems of the type important to the new and developing areas of the world.

2.2 Where more than one communication satellite system exists, the I.A.F. will press for free interchange of traffic between originator and destination, and for regulations relating to such free exchange.

3. Specific Application : Broadcasting Satellites

Believing that the requirements of several classes of multiple address traffic are markedly different from the requirements for single destination messages, the I.A.F. supports the concept of "broadcasting satellites" as a distinct service, including the need for allocations and standards for this service.

4. Domestic and Regional Systems

The I.A.F. believes that satellites have manifold uses for domestic and regional services, as distinct from international services, and urges clarification of terminology and regulations relating to such systems.

5. High Data Rate Satellite Systems

5.1 Considering that a number of satellite systems (e.g. meteorological satellites) obtain large amounts of data requiring communication in a short time, and that these systems are important future applications of space, the I.A.F. encourages specific recognition of such systems in regulations and applications.

5.2 In general, the I.A.F. believes that operational services of such type (as distinguished from experiments) should not be conducted in bands assigned to space research, and should preferably be accommodated in bands assigned to the corresponding terrestrial service.

SPACE
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Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

WORKING GROUP 5E

AUSTRALIA

PROPOSED AMENDMENTS TO ARTICLE 5 OF THE RADIO REGULATIONS

Following discussions in Working Groups 5E and 5E-1 on proposals to introduce the Broadcasting-Satellite Service in the 2 500 MHz region, the proposal hereunder is submitted for consideration :

Ref.

Mc/s

	Region 1	Region 2	Region 3
AUS/190/81	2 300-2 450 FIXED Amateur Mobile Radiolocation 357 358 359 360A	2 300-2 450 RADIOLOCATION Amateur Fixed Mobile 357 360 360A	

AUS/190/82 ADD 360A

The band 2 300-2 450 Mc/s is also allocated to the Distribution Satellite Service and is limited to domestic systems for community type reception including educational and instructional television.

Such use is subject to agreement among administrations concerned and having services operating in accordance with the Table, which may be affected.

Ref.

AUS/190/82 (cont.)

Reason : The use of the band 2 300-2 450 Mc/s for a Distribution Satellite Service is proposed as an alternative to the Proposal / CAN/USA/164/4 / for the band 2 450-2 690 Mc/s. The latter band has been planned by the C.C.I.R. for the development of multi-bearer radio-relay systems. Such systems are expected to be much less compatible with satellite services than the fixed services operating in the band 2 300-2 450 Mc/s. These systems are likely to be of short length and of low capacity and thus more readily co-ordinated.

In addition, tropospheric scatter systems are operating in Australia in the band 2 450-2 690 Mc/s, and also as permitted by No. 364 in Region 1.

As concluded by the S.J.M. these systems are in general sensitive to satellite emissions and are very difficult to co-ordinate.

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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 4

NOTE BY THE CHAIRMAN OF WORKING GROUP 4B

PARTIAL REVISION OF RECOMMENDATION No. Spa 3

As a result of the discussions in Working Group 4B on the proposal USA/28Corr./342 and Document No. DT/37, the Working Group 4B has asked me to forward to Committee 4 a text of the partial revision of Recommendation No. Spa 3 (see Annex). In forwarding this text it is intended that this text would be further supplemented by inputs from other Working Groups of Committee 4 as well as by additional items which the Committee 4 itself may like to include therein with a view to formulating a comprehensive recommendation to the C.C.I.R. and to administrations on all technical aspects of sharing of frequency bands between Space and Terrestrial Services.

G. C. BROOKS
Chairman
Working Group 4B

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ANNEX

RECOMMENDATION No. Spa 3*)

TO THE C.C.I.R. AND TO ADMINISTRATIONS

relating to frequency bands shared between
space and terrestrial services

The World Administrative Radio Conference for Space Telecommunications, Geneva, 1971,

recognizing

a) the value to the Conference of the material contained in Document No. 64 (Results of C.C.I.R. studies relating to space telecommunications concluded at its Special Joint Meeting);

b) that further studies on a wide range of problems dealing with space communications form the subject of C.C.I.R. Questions and Study Programmes approved by the XIIth Plenary Assembly;

considering however

a) that certain of the C.C.I.R. Recommendations, listed below, are provisional and call for further work and study before they can become definite :

Recommendation 355-1	"FREQUENCY SHARING BETWEEN ACTIVE COMMUNICATION-SATELLITE SYSTEMS AND TERRESTRIAL RADIO SERVICES IN THE SAME FREQUENCY BANDS"
Recommendation 465	"GENERALIZED EARTH-STATION ANTENNA RADIATION PATTERN FOR USE IN INTERFERENCE CALCULATIONS, INCLUDING COORDINATION PROCEDURES, IN THE FREQUENCY RANGE 2-10 GHz"

*) Partial replacement for Recommendation No. Spa 3.

b) that as a result of the deliberations of this Conference, particularly in relation to the provisions of Article 7 Sections / relevant sections /, and to / other relevant Articles /, further information is required in reply to the following Questions and Study Programmes already set for study by the C.C.I.R. :

Question 1-1/4	"ANTENNAE FOR SPACE SYSTEMS"
under Decides 2	the state of development in antenna design and fabrication;
under Decides 3	the state of development of antennae with improved side- and back-lobe characteristics;
under Decides 4	the polarization characteristics of antennae, particularly in the side-lobe regions and in planes other than the principal planes;
Question 2-1/4	"TECHNICAL CHARACTERISTICS OF COMMUNICATION-SATELLITE SYSTEMS FOR FIXED AND MOBILE, EXCLUDING AERONAUTICAL AND MARITIME MOBILE, SERVICES"
under Decides 4	under what conditions and to what extent would it be feasible for communication-satellite systems to share preferred frequency bands with terrestrial services;
Study Programme 2-1A-1/4	"FEASIBILITY OF FREQUENCY SHARING BETWEEN COMMUNICATION-SATELLITE SYSTEMS AND TERRESTRIAL SERVICES"
under Decides 2	the determination of preferred technical characteristics of transmitting and receiving antennae for earth stations at fixed locations, from the standpoint of spectrum sharing with other radio services;

recommends

1. that all administrations and recognized private operating agencies, through their participation in the work of the C.C.I.R., consider as a matter of priority, the submission of contributions on these subjects, so that definite Recommendations can be prepared at the Interim Meetings of the relevant Study Group for adoption by the XIIIth Plenary Assembly of the C.C.I.R.;

2. that the C.C.I.R. should study :

2.1 the reference antenna patterns for earth station antennae which may be appropriate for setting minimum standards of performance, and to recommend specific patterns for this purpose in order to increase utilization of the frequency bands shared between communication-satellite systems and terrestrial services, and taking into account the effect of such reference patterns on frequency sharing between communication-satellite systems;

2.2 the necessary limitation of spurious emissions and the frequency tolerances to be observed in both the Terrestrial and Space Services insofar as they may affect sharing of frequency bands.

2.3 the permissible interference criteria for the various Space and Terrestrial Services sharing the frequency bands allocated by the WARC-ST, Geneva, 1971, in order to permit the determination of :

2.3.1 the coordination distance and the probability of interference between stations within that distance;

2.3.2 the necessary limits of power flux-density set up at the earth's surface by space stations.

SPACE CONFERENCE

1971

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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 4

SUMMARY RECORD

OF THE

THIRD MEETING OF COMMITTEE 4

(TECHNICAL)

Tuesday, 22 June 1971, at 1500 hrs

Chairman : Mr. E. SANDBACH (Australia)

Subject discussed	Document No.
1. Approval of Summary Record of Second Meeting	169
2. Progress report by Working Group Chairmen 3. Consideration of any documents from Working Groups	174, DT/36, DT/35, 146, 155, 163, 165(Rev.), 160, 166
4. Constitution and terms of reference for Working Group 4E	
5. Designation of Chairman and Secretary of Working Group 4E	
6. Participation in Working Group 4E	
7. Distribution of new documents between Working Groups	
8. Distribution of documents to Working Group 4E	
9. Introduction and consideration of documents in Annex 3	

1. Approval of Summary Record of Second Meeting (Document No. 169)

Approved.

2. Progress Report by Working Group Chairmen

3. Consideration of any documents from Working Groups
(Documents Nos. 174, DT/36, DT/35, 146, 155, 163, 165(Rev.), 160, 166)

Working Group 4D

The Chairman of Working Group 4D said that the Working Group had agreed on the proposed additions to Article 7 on station keeping of space stations (Document No. 174) and on pointing accuracy of antennae on geostationary satellites (Document No. DT/36). It had also agreed on a draft recommendation related to carrier energy dispersal in communication-satellite systems (Document No. DT/35). Various drafting groups were considering further items, and it was hoped that the bulk of the Working Group's work would be well advanced by the end of the week.

The Delegate of France drew attention to the somewhat vague expression "synchronous satellites in inclined orbits" in Note*) to the proposed addition to Article 7 (Document No. 174, Annex), and it was agreed that that should be referred back to Working Group 4D for further consideration. The Delegate of the United Kingdom proposed that the words : "the provisions of / b / apply but" be deleted from the same Note*), and it was so agreed.

Working Group 4C

The Chairman of Working Group 4C said that the Working Group had held two meetings and had set up a Sub-Working Group 4C-1 to draft a text to calculate co-ordination distance. Some problems had arisen in connection with consideration of the revised curves for the determination of co-ordination distance in shared frequency bands between 1 and 40 GHz proposed by the United States in Corrigendum No. 1 to Corrigendum to Document No. 28, but it was hoped that a text on that subject would be ready for discussion by the next meeting of Committee 4. The Working Group had also studied Document No. 146 on definitions, which had given rise to no comment.

Working Group 4B

The Chairman of Working Group 4B drew attention to the Republic of Indonesia's reservations (Document No. 165(Rev.)) in connection with the proposed partial text for Section VII of Article 7 (Document No. 155), which he had introduced at Committee 4's previous meeting. The Working Group had approved the proposed partial text of Section VIII of Article 7 (Document No. 163), which followed the conclusions reached by the C.C.I.R. Special Joint Meeting, with some slight extensions, and it was hoped that the section on power flux-densities would be ready for the Committee's next meeting. After a lengthy discussion of the five proposals concerning Section I of Article 7, it had been agreed that those proposals were essentially administrative in nature, although with some technical content, and should be studied by Committee 6. It had been agreed that the substance of the United States proposal on earth station antenna characteristics should be added to Recommendation No. Spa 3 and a text would be submitted to a future meeting of Committee 4.

On the proposal of the Delegate of the United States, it was agreed that paragraph (3) on page 4 of Document No. 163 should read : "The limits of 470G, 470GA, 470HA and 470HB, as applicable, ..." and that the paragraphs in the proposal be renumbered in a more logical sequence before submission to Committee 7.

The Delegate of Canada, referring to the same paragraph of Document No. 163, said it should be pointed out to the Chairman of Working Group 4E, when established, that such agreements should be included with the information defined in Appendix 1, 1A or 1B for notification to the I.F.R.B. because such agreements should be communicated to the Board and to other administrations concerned.

The Delegate of Indonesia explained his delegation's reservation as set out in Document No. 165(Rev.).

The Delegate of Turkey made a similar reservation regarding the limitation of power in terrestrial microwave links, and hoped that such limitation would not be applicable to systems coming into operation before 1975. After further discussion of the question by the Delegates of Italy, France, the United Kingdom and the United States, and the Chairman of Working Group 4B, it was agreed that Document No. 155 should be referred back to Working Group 4B for further consideration with a view to reducing the number of reservations.

Working Group 4A

The Chairman of Working Group 4A introduced the second and third reports of the Working Group given in Documents Nos. 160 and 166.

It was agreed that Documents Nos. 160 and 166 would be circulated for comment to the Chairmen of the other Working Groups of Committee 4, and to the Chairmen of other Committees, with a covering note that the documents were for information only and should not be discussed at length. Paragraph 3 of Document No. 166 would be taken up at a later stage. The proposal of the Delegate of the United Kingdom to replace the last two words on page 4 by "geostationary satellite orbit" was agreed. The revision of Section IIB of Article I contained in the Annex to Document No. 166 was approved as amended.

4. Constitution and terms of reference for Working Group 4E

The terms of reference as set out in Annex 1 to Document C4-2 were approved.

5. Designation of Chairman and Secretary of Working Group 4E

Dr. N. Ohyama (Japan) was appointed Chairman and Mr. L. Sonesson Secretary of Working Group 4E.

6. Participation in Working Group 4E

About 15 delegations indicated their interest in participating in Working Group 4E.

In view of the need for Working Group 4E to work in close co-operation with Committee 6, was agreed that the Chairman of the Working Group should establish machinery for direct liaison with the appropriate Working Group of Committee 6.

7. Distribution of new documents between Working Groups

The distribution of new documents among Working Groups, as set out in Annex 2 to Document C4-3 was approved, with the additions noted by the Chairman, and the transfer of Document MEX/114/49 to Working Group 4B.

8. Distribution of documents of Working Group 4E

The distribution of documents set out in Annex 4 to Document C4-3 was approved.

9. Introduction and consideration of documents in Annex 3

1) Use of technical sharing criteria recommended by C.C.I.R. Plenary Assemblies by administrations and the I.F.R.B. for co-ordination purposes (D/5/37, USA/28 Corr./263(Rev.), G/96/321)

Since the three documents dealt with the same principle they were discussed together preparatory to being referred to Working Group 4E for processing. In introducing their respective documents the Delegates of the Federal Republic of Germany, the United States of America and the United Kingdom stressed the need for updating technical criteria in the long intervals between administrative conferences, the Delegate of the United States of America pointing out that this would be achieved at three year intervals by the application of criteria defined by the C.C.I.R. Plenary Assemblies and the Delegate of the United Kingdom emphasizing that the proposals were not intended to give the C.C.I.R. powers to amend the Radio Regulations in any way, such powers being reserved to administrations.

The proposals were supported by the Delegates of New Zealand and Australia, the latter pointing out that Recommendation No. Spa 1 (Radio Regulations, page 892) provided a certain precedent for the procedure.

A discussion took place among the Delegates of Canada, France, Japan, the United Kingdom and Brazil, the representative of the I.F.R.B. and the Chairman on the legal implications of the proposals. Points raised were : that it was doubtful whether the provisions of Article 15, No. 205 of the International Telecommunication Convention allowed the Radio Regulations to be altered between Administrative Conferences (although, if Radio Regulation No. 668 recommended the choice of equipment to be based, inter-alia, on C.C.I.R. recommendations it would be logical for C.C.I.R. recommendations on the operation of such equipment to be accepted as well), that if such changes were accepted there would be a need for setting up a consultation procedure between administrations and that there would be the problem of conflict between those administrations wishing to abide by the Radio Regulations as they stood and those wishing to follow the C.C.I.R. recommendations. In addition, the competence of Working Group 4E, and even Committee 4 itself, to discuss the matter was questioned in view of the legal and administrative implications. The final consensus of opinion was that in its deliberations Working Group 4E should not concern itself with the legal difficulties but concentrate on evolving the best mechanism to permit use of the latest technical criteria by those administrations who agree to apply them and enable the Radio Regulations to be brought up to date after every C.C.I.R. Plenary Assembly. It would be for the Plenary to discuss the other aspects.

The Delegate of France wished to record his country's reservations which he would bring forward again when the matter was discussed in a wider context. He interpreted the proposals as meaning that no C.C.I.R. recommendation could be used to replace the provisions of a Radio Regulation unless all administrations had pronounced in favour of it.

He further considered that from the technical point of view the three proposals were too vague to be useful and that a list of the specific technical problems that were not fully covered by the Radio Regulations should be given. An example was the calculation of the co-ordination distance below 1 Gc/s. Other subjects mentioned by other delegations were : inclusion of precipitation scatter in the calculation of propagation distance, power flux-density limits for services other than communication satellites, carrier dispersal in digital transmission.

The Delegate of the United Kingdom, supported by the Delegates of the United States of America and the Federal Republic of Germany, considered that a list of specific items would be unco-ordinated and unsatisfactory and that as not all future technical developments could be foreseen it would be unwise to limit the scope of the proposals in that way.

It was agreed that Working Group 4E should prepare a document incorporating the principles discussed at the meeting for agreement by Committee 4 and for subsequent submission to the Plenary.

The meeting rose at 1800 hours.

The Secretary :	The Chairman :
I. DOLEZEL	E. SANDBACH

SPACE CONFERENCE

Document No. 193-E
23 June 1971
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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 4

THIRD REPORT OF WORKING GROUP 4D TO COMMITTEE 4

Enclosed please find in the Annex the proposed Recommendation related to carrier energy dispersal in communication-satellite systems as approved by Working Group 4D after having considered Proposal F/89/318.

J.K.S. JOWETT
Chairman of Working Group 4D

Annex : 1

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A N N E X

DRAFT RECOMMENDATION

related to carrier energy dispersal in
/ communication-satellite systems_/ /_*_/

The World Administrative Radio Conference for Space Telecommunications, Geneva, 1971,

considering

a) that use of carrier energy dispersal techniques in / communication-satellite systems_/ can result in a substantial reduction of interference to stations of a terrestrial service operating in the same frequency bands;

b) that the use of such techniques can result in a substantial reduction in the level of interference between / communication-satellite systems_/ operating in the same frequency bands;

c) that such techniques are being regularly and successfully employed in / communication-satellite systems_/ without noticeable deterioration of the quality of operation;

recommends

1) that / communication-satellite systems_/ employing angle modulation by analogue signals should use carrier energy dispersal techniques as far as is practical with a view to spreading energy at all times and in a manner consistent with the satisfactory operation of the / systems_/;

2) that / communication-satellite systems_/ employing digital modulation should use carrier energy dispersal techniques when this becomes technically feasible and is practical.

/ Note : * See No. 84AG._/

C.W. SOWTON
for K. JOWETT
Chairman of Working Group 4D

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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Addendum No. 2 to
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2 July 1971
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COMMITTEE 4

NINTH REPORT OF WORKING GROUP 4D

TO COMMITTEE 4

PROPOSED ANNEX TO NEW APPENDIX 29

Pursuant to the request raised during the Fifth Meeting of Committee 4, Working Group 4D approved the annexed example of an interference calculation between two geostationary satellite systems sharing the same frequency band. This example is proposed as Annex to New Appendix 29.

C.W. SOWTON
for J.K.S. JOWETT
Chairman
Working Group 4D

Annex : 1

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A N N E X

ADD ANNEX /̄ TO PROPOSED NEW APPENDIX 29 7

EXAMPLE OF AN INTERFERENCE CALCULATION BETWEEN TWO GEOSTATIONARY SATELLITE /̄ SYSTEMS 7 SHARING THE SAME FREQUENCY BAND

A. GENERAL

In this example for simplicity two identical satellite systems are assumed with $\vartheta = 6°$ geocentric angular spacing between the satellites. For this angular separation the reference radiation pattern of the earth station antenna $32 - 25 \log \vartheta$ gives a gain of 12.5 dB in the direction of the other satellite.

The calculations have been performed in dB, which means that numerical multiplications thus become dB additions and numerical divisions become dB subtractions. In each step the contributing factors have been introduced in a sequence corresponding to the propagation direction. The first three steps define the system parameters for each system. Steps 4, 5 and 6 perform the actual interference calculations.

In the conclusions it will be shown that for this example chosen the interference, although relatively small, is not negligible. Since it exceeds 2% of the equivalent link noise temperature co-ordination is required in this case.

To determine the equivalent link noise temperature it is necessary to know the ratio between the total internal link noise and the thermal noise of the down-path. The noise budget for this example is assumed as follows :

Noise budget

Internal noise 8 000 pWOp	Thermal noise down-path	5 000 pWOp
	Thermal noise up-path	1 000 pWOp
	Intermodulation noise	2 000 pWOp
External noise 2000 pWOp	Interference noise from systems using other satellites	1 000 pWOp
	Interference noise from terrestrial systems	1 000 pWOp
	Total noise	10 000 pWOp

It may be noted that since both satellites use global beams essentially no antenna discrimination between wanted and unwanted signals is obtained at the satellite and that this constitutes a worst case.

B. SYSTEM PARAMETERS

Step 1) UP-path at 6 175 MHz	Symbol	Link A or A'	Unit
Maximum earth station transmitter power density per Hz in any 4 KHz band	p_e	-37	dBW/Hz
Antenna gain earth station	g_1	62.5	dB
Free space loss 38 500 km at 6 175 MHz	ℓ_u	200	dB
Satellite antenna gain (using global beam)	g_2	15.5	dB
Receiver input at satellite $p_e+g_1-\ell_u+g_2$		-159	dBW/Hz

		Symbol	Link A or A'	Unit
Step 2)	DOWN-path at 3 950 MHz			
	Maximum power density per Hz delivered to the satellite antenna	p_s	-57	dBW/Hz
	Satellite transmit antenna gain	g_3	15.5	dB
	Free space loss for 38 500 km at 3 950 MHz	ℓ_d	196	dB
	Earth station antenna gain	g_4	58.5	dB
	Receiver input at earth station $p_s+g_3-\ell_d+g_4$		-179	dBW/Hz
Step 3)	Link calculations			
	Transmission gain from satellite receiver input to earth station receiver input 159-179	γ	-20	dB
	Earth station noise temperature (giving G/T=40.7 dB)		60	°K
	Thermal noise down-path (see noise budget)		5 000	pWOp
	Total internal link noise (see noise budget)		8 000	pWOp
	Equivalent link noise temperature $\frac{8\ 000}{5\ 000} \times 60°$	T	96	°K

C. INTERFERENCE CALCULATION

	Symbol	Link A or A'	Unit
Step 4) UP-path interference			
Interfering earth station power density (as in Step 1)	p_e'	-37	dBW/Hz
Interfering earth station antenna gain towards interfered satellite (6° off beam)	$g_1'(\theta)$	+12.5	dB
Free space loss for 38 500 km at 6 175 MHz (see Step 1)	ℓ_u	200	dB
Satellite antenna gain in the direction from the interfering earth station	$g_2(\delta' e)$	15.5	dB
Boltzmann's constant 1.38×10^{-23} Joule/°K	k	-228.6	dBW/°K
Increase in receiver noise temperature at the satellite $p_e + g_1(\theta) - \ell_u + g_2(\delta'_e) - k$		19.6	dB°K
Absolute value of increase in satellite noise temperature	ΔT_s	91	°K
Step 5) DOWN-path interference			
Interfering satellite transmitter power density (Step 1)	p_s'	-57	dBW/Hz
Interfering satellite antenna gain towards interfered earth station	$g_3'(\delta_e)$	15.5	dB
Free space loss for 38 500 km at 3 950 MHz	ℓ_d	196	dB
Earth station antenna gain in the direction from the interfering satellite (6° off beam)	$g_4(\theta)$	12.5	dB
Boltzmann's constant 1.38×10^{-23} Joule/°K	k	-228.6	dBW/°K
Increase in receiver noise temperature at the earth station $p_s' + g'_3(\delta_e) - \ell_d + g_4(\theta) - k$		+3.5	dB°K
Absolute value of increase in earth station noise temperature	ΔT_e	2.24	°K

		Symbol	Link A or A'	Unit
Step 6)	Total link interference			
	Increase in satellite noise temperature (Step 4)	ΔT_s	91	°K
	Numerical value for γ (from Step 3)	γ	.01	numerical
	Increase in earth station noise temperature (Step 5)	ΔT_e	2.24	°K
	Increase in equivalent link noise temperature $\gamma \Delta T + \Delta T_e$ = (.01 x 91) + 2.24	ΔT	3.15	°K
	Percentage increase $\frac{3.15}{96}$ x 100%	$\Delta T/T$x100%	3.29	%
	Increase in link noise due to interference 3.29/100 x 8 000pWOp		263	pWOp

D. CONCLUSIONS

In the example shown the increase in equivalent link noise temperature is 3.29%. Since it exceeds the maximum value of 2%, the amount of noise introduced can no longer be considered negligible and therefore co-ordination between the two systems is required. More precise calculations should now be made using the actual antenna patterns of the earth stations, the topocentric angular separation of the satellites, and the precise basic transmission losses. There may be additional factors such as polarization isolation, frequency interleaving, spectral distribution of the interfering noise which all reduce the actual interference experienced.

As seen in the last item of Step 6, the introduced interference noise will not exceed 263 pWOp and, if there are no substantial interference contributions from other satellite systems, the precise value may in this example in all probability well be found acceptable to the two co-ordinating administrations, providing the aggregate of <u>all</u> interference contributions does not exceed tolerable limits.

It can be shown that for this example a larger satellite spacing of 7.5° would have caused only 2% increase in equivalent link noise temperature and thus obviated the need for any co-ordination.

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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

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29 June 1971
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COMMITTEE 4

FOURTH REPORT OF WORKING GROUP 4D TO COMMITTEE 4

PROPOSED NEW APPENDIX 29

Pursuant to the request raised during the Fourth Meeting of Committee 4, Working Group 4D approved the annexed text which is proposed for addition as a new penultimate paragraph on page 6 of Document No. 194 (prior to the paragraph starting with "Table I lists ....").

C.W. SOWTON
for J.K.S. JOWETT
Chairman
Working Group 4D

Annex : 1

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A N N E X

DRAFT

/ On page 6 of Document No. 194 (Appendix 29) prior to the paragraph starting with : "Table I lists ..." add the following text :/

"As an example of this method, it can be seen that in the case of a satellite / system / operating in accordance with current C.C.I.R. Recommendations using FM telephony and having a total noise in a telephone channel of 10 000 pW0p including 1 000 pW0p interference noise from terrestrial radio-relay systems and 1 000 pW0p interference noise from other satellite / systems /, 2% increase in equivalent noise temperature would correspond to 160 pW0p of interference noise."

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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

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COMMITTEE 4

FOURTH REPORT OF WORKING GROUP 4D TO COMMITTEE 4

PROPOSED NEW APPENDIX 29

Pursuant the request raised during the Fourth Meeting of Committee 4, Working Group 4D approved the annexed text which is proposed for addition as a new penultimate paragraph on page 6 of Document No. 194 (prior to the paragraph starting with "Table I lists.....").

C.W. SOWTON
for J.K.S. JOWETT
Chairman
Working Group 4D

Annex: 1

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ANNEX

DRAFT

/ On page 6 of Document No. 194 (Appendix 29) prior to the paragraph starting with: "Table I lists ....." add the following text: /

"As an example of this method, it can be seen that in the case of a satellite / system / using FM telephony and having a total noise in telephony channel 10 000 pWp0 including 1000 pWp0 interference noise from terrestrial radio-relay systems operating in accordance with current C.C.I.R. Recommendations and 1000 pWp0 interference noise from other satellite / systems /, 2% increase in equivalent noise temperature would correspond to 160 pWp0 of interference noise."

Corrigendum No. 1 to
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24 June 1971
Original : English

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 4

FOURTH REPORT OF WORKING GROUP 4D TO COMMITTEE 4

Proposed New Appendix 29

Second and third paragraphs after equation (4) in item 2 of the Annex shall be replaced by the following text :

"Unless more precise actual data are available, an appropriate reference radiation pattern may be used to express the gain $g'_1(\theta)$ and $g_4(\theta)$ in a direction forming angle θ with the direction of maximum radiation. In this event, the reference radiation pattern $32 - 25 \log_{10}\theta$ shall be used for earth station antennae for which the ratio of effective diameter to wavelength exceeds 100."

J.K.S. JOWETT
Chairman of Working Group 4D

SPACE
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WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 4

FOURTH REPORT OF WORKING GROUP 4D TO COMMITTEE 4

Proposed New Appendix 29

Enclosed please find in the Annex the proposed new Appendix 29 concerning method of calculation to determine the degree of interference between geostationary satellite systems sharing the same frequency band as approved by Working Group 4D after having considered proposals USA/28 Corr./262, G/95/320 and CCIR/64/Para. 9.3.2.

J.K.S. JOWETT
Chairman of Working Group 4D

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ANNEX

DRAFT NEW APPENDIX 29

A method of calculation to determine the degree of interference between geostationary satellite / systems / sharing the same frequency bands*)

1. Introduction

The method of calculating interference is based on the concept that the noise temperature of the system suffering interference increases as the level of the interference increases. It can, therefore, be applied irrespective of the modulation characteristics of the two /systems/, and of the precise frequencies used.

In this method, the apparent increase in the equivalent /link/ noise temperature**) of an earth station receiver resulting from interference caused by a given system is calculated and this value is compared with the predetermined increase in the noise temperature.

2. Calculation of the increase in noise temperature of the link suffering interference

As used in this section, the term / link / denotes the entire connection consisting of a transmitting earth station, a satellite and a receiving earth station (constituting a communication satellite / link /).

Let A and A' be the / links / of the two / systems / considered. Primes indicate the parameters of / link / A'; the notation without primes is used for the parameters of / link / A.

---

*) Exact title will depend on the outcome of Committee 6 deliberations.

**) The equivalent / link / noise temperature is taken to mean the noise temperature at the input of the earth station receiver corresponding to the RF noise power which produces the total observed noise at the output of the / link / excluding interference coming from / links / using other satellites and terrestrial systems.

The parameters are defined as follows (for [link] A) :

ΔT_S : increase in the receiving noise temperature of the satellite S caused by interference in the receiver of this satellite; [°K]

ΔT_e : increase in the receiving noise temperature of the earth station e_R caused by interference in the receiver of this station; [°K]

p_s : maximum power density per Hz delivered to the antenna of satellite S (averaged over the worst 4 kHz band); [W/Hz]

$g_3(\delta_e')$: transmit antenna gain of satellite S in the direction of the receiving earth station e_R' of [link] A'; [numerical power ratio]

Note - the product $p_s \, g_3(\delta_e')$ is the maximum equivalent isotropic radiated power per Hz of satellite S in the direction of the receiving earth station e_R' of [link] A'.

p_e : maximum power density per Hz delivered to the antenna of the transmitting earth station e_T (averaged over the worst 4 kHz band); [W/Hz]

$g_2(\delta_e')$: receive antenna gain of satellite S in the direction of the transmitting earth station e_T' of [link] A'; [numerical power ratio]

$g_1(\theta)$: transmit antenna gain of the earth station e_T in the direction of satellite S'; [numerical power ratio]

$g_4(\theta)$: receive antenna gain of the earth station e_R in the direction of satellite S'; [numerical power ratio]

k : Boltzmann's constant; [Joules/K]

ℓd*) : free-space transmission loss on the down-path; [numerical power ratio]

ℓu*) : free-space transmission loss on the up-path; [numerical power ratio]

---

*) See Note on page 5

transmission gain of the / system / from the satellite receiver input to the earth station receiver input; / numerical power ratio /

θ*) : geocentric angular separation between two satellites / degrees /.

The parameters ΔT_s and ΔT_e are given by the following equations :

$$\Delta T_s = \frac{p'_e \; g'_1 \; (\theta) \; g_2 \; (\delta'_e)}{k \ell_u} \quad (1)$$

$$\Delta T_e = \frac{p'_s \; g'_3 \; (\delta_e) \; g_4 \; (\theta)}{k \ell_d} \quad (2)$$

The symbol ΔT will be used to denote the apparent increase in the equivalent noise temperature for the entire / link / at the receiver input of the receiving station e_R due to interference from / system / A'.

This increase is the result of interference entering at both the satellite and earth station receivers of / system / A and can accordingly be expressed as :

$$\Delta T = \gamma \Delta T_s + \Delta T_e \quad (3)$$

Hence,

$$\Delta T = \gamma \frac{p'_e \; g'_1 \; (\theta) \; g_2 \; (\delta'_e)}{k \ell_u} + \frac{p'_s \; g'_3 \; (\delta_c) \; g_4 \; (\theta)}{k \ell_d} \quad (4)$$

Equation (4) combines both the up-path and the down-path interference. If there is a change of modulation in the satellite or if the translation frequencies of the wanted and interfering satellites are different then it may be necessary to treat up and down paths separately using equations (1) and (2).

Note : *) In the interest of simplification it was assumed that :

- basic transmission loss on the down-path is the same regardless of the satellite and earth station considered;
- basic transmission loss on the up-path is the same regardless of the earth station and satellite considered;
- the topocentric angular separation between the two satellites as seen from any earth station is identical to the geocentric angular separation between the two satellites.

In the foregoing equations the gains $g_1'(\theta)$ and $g_4(\theta)$ are those of the earth stations concerned. In the absence of more precise data for communication-satellite earth stations the reference radiation pattern $32-25 \log_{10} \theta$ shall be used to express the gains $g_1'(\theta)$ and $g_4(\theta)$ in a direction forming angle θ with the direction of maximum radiation.

In the same way, the increase $\Delta T'$ in the equivalent noise temperature for the entire [link] at receiver input of the receiving earth station e_R' under the effect of the interference caused by [link] A is given by the following equations :

$$\Delta T_{s'}' = \frac{p_e \, g_1(\theta) \, g_2'(\delta_e)}{k \ell_u} \quad (5)$$

$$\Delta T_{e'}' = \frac{p_s \, g_3(\delta_{e'}) \, g_4'(\theta)}{k \ell_d} \quad (6)$$

$$\Delta T' = \gamma \frac{p_e \, g_1(\theta) \, g_2'(\delta_e)}{k \ell_u} + \frac{p_s \, g_3(\delta_e') \, g_4'(\theta)}{k \ell_d} \quad (7)$$

For two multiple-access satellites, this calculation must be made for each of the [links] established via one satellite in relation to each of the [links] established via the other satellite.

3. Comparison between calculated and predetermined percentage increase in equivalent system noise temperature

The calculated values of ΔT and $\Delta T'$ shall be compared with the corresponding predetermined values. These predetermined values are taken as 2% of the appropriate equivalent link noise temperatures.

– if the calculated value of ΔT is less than the predetermined one, the interference level from [link] A' ~~to~~ [link] A is acceptably small irrespective of the modulation characteristics of the two [links] and of the precise frequencies used;

(– if the calculated value of ΔT is more than the predetermined one, a detailed calculation shall be carried out following the methods and techniques set out in C.C.I.R. Reports 455 and 388-1);

– the calculation of $\Delta T'$ with the predetermined value shall be carried out in a similar manner.

Table I lists the essential information which must be made available for each of the [links] being considered.

TABLE I

Parameter	Symbol
Maximum power density per Hz delivered to the antenna of the transmitting earth station, (averaged over the worst 4 kHz band)	p_e
Satellite receiver antenna gain towards the earth (see Note)	g_2 (δ)
Maximum power density per Hz delivered to the satellite transmitting antenna, (averaged over the worst 4 kHz band)	p_s
Satellite transmit antenna gain towards the earth (see Note)	g_3 (δ)
Transmission gain from satellite receiver input to earth station receiver input	γ
Equivalent [link] noise temperature for the entire [link] at the earth station receiver input	T

Note - The information on g_2 (δ) and g_3 (δ) should be provided in terms of contours on a map of the area of the earth which is visible from the satellite.

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 195-E
24 June 1971
Original : English

COMMITTEE 6

FIRST REPORT FROM WORKING GROUP 6B

REVISION OF ARTICLES 8, 14, 15 AND ARTICLE I (Section III)

1. Article 8

After consideration of proposals B/73/130 and J/32/44, Working Group 6B proposed the following modification to Article 8 :

"MOD RR477 (e) the study, on a long-term basis, of the usage of the radio spectrum, with a view to making recommendations for its more effective use;"

2. Article 14

After consideration of proposals ARG/24/53A, B/76/146, CAN/18/166 and USA/28/245, Working Group 6B proposed the following modification to Article 14 :

"MOD RR695 Spa Replace the text of the last sub-paragraph by the following :

/ - the conditions specified under No. 470V shall be fulfilled./"

Note : The brackets indicate that this text will be reviewed when the new text of No. 470V is drafted by Committee 4.

3. Article 15

After consideration of proposal CAN/19/167, Working Group 6B proposed the following modification to Article 15 :

"MOD RR717 (2) In such a case, the administration concerned may also request the Board to act in accordance with the provisions of Section VII of Article 9 and Section VII of Article 9A; but it shall then supply the Board with the full facts of the case, including all the technical and operational details and copies of the correspondence."

4. Article 1 (Section III)

Following the Note of 21 June 1971 from the Acting Chairman of Committee 6 and the Note of 17 June 1971 from the Chairman of Committee 4, Working Group 6B examined the definitions submitted in Document No. 146.

4.1

ADD 98A "Equivalent isotropically radiated power."

After consideration of the proposal, the text of that provision was adopted.

4.2

MOD 93 "Harmful interference."

After consideration of that proposal, some delegations were in favour of accepting the text as proposed by Committee 4, whereas some other delegations suggested deleting the words "the effect of" and keeping the original text of the Radio Regulations as it stands.

4.3 The Working Group accepted the proposed modification to the title of Article 5, which consisted of the addition of the foot-note : "See Resolution No. 6".

4.4 Definitions appearing in Annex to Document No. 146.

4.4.1

ADD 88A "Frequency band"

ADD 88B "Allocated frequency band"

ADD 88C "Shared (allocated) (frequency) band"

ADD 88D "Geographically allocated frequency band"

ADD 89A "Shared assigned (frequency) band"

ADD 89B "Frequency allotment plan"

After consideration, it was agreed that none of those proposed definitions was required by Working Group 6B for its work and that this matter should be reported to Committee 6. However, attention was drawn to the fact that the terms of reference of Working Group 6B covered the definitions of Article 1 (Section III).

4.4.2

MOD 89 "Assigned frequency band"

After discussion, the majority of the delegates came to the conclusion that the present text of No. 89 should not be amended and that it should be retained as it is in the Radio Regulations.

Moreover, the note added under the proposed text for this number was considered unnecessary.

4.5 Definitions listed in paragraph 4 of Document No. 146 :

"Pre-assigned frequency"

"Demand-assigned frequency"

"Figure of merit of a system"

"Noise temperature"

"Energy-dispersal frequency"

After consideration of those proposed definitions, it was agreed that only the definition of the "Noise temperature" was needed since this term is used in Appendix 1A, and that such a definition should be developed and completed by Committee 4.

S. ARITAKE
Chairman
Working Group 6B

1971

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24 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 4

NOTE

FROM : THE CHAIRMAN OF WORKING GROUP 4B

TO : THE CHAIRMEN OF WORKING GROUP 4A AND COMMITTEE 4

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1. During its sixth meeting on Wednesday, 23 June 1971, Working Group 4B examined the following documents :

   - Document No. 146 (paragraph 3 along with the Annex and paragraph 4);
   - Document No. 160;
   - Document No. 166 (paragraph 2 along with the Annex and paragraph 4).

2. The Working Group 4B was unanimous in its opinion that the definitions of terms proposed in Annex to Document No. 166 were useful from the point of view of the Radio Regulations and should be included therein.

3. The Working Group 4B was unanimous in its opinion that none of the other terms mentioned in the relevant parts of the documents listed above need definitions, to be included in the Radio Regulations, in so far as the work of the Working Group 4B is concerned.

G. C. BROOKS
Chairman
Working Group 4B

SPACE CONFERENCE

Document No. 197-E
24 June 1971
Original : French

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 5

FRANCE

Amendment to French proposals

F/41/86
F/41/87
F/41/87A

Ref.

Mc/s

	Region 1	Region 2	Region 3
F/197/322	1 525-1 535 ~~FIXED 350B~~ SPACE (Telemetering) 350A ~~Mobile except aeronautical mobile~~ 350C ADD EARTH RESOURCES SURVEY BY SATELLITE MOD 350A	1 525-1 535 SPACE (Telemetering) 350A ~~Fixed~~ ~~Mobile~~ 350D ADD EARTH RESOURCES SURVEY BY SATELLITE MOD 350A	1 525-1 535 ~~FIXED 350B~~ SPACE (Telemetering) MOD 350A ~~Mobile 350E~~ ADD EARTH RESOURCES SURVEY BY SATELLITE

MOD 350A Space stations employing frequencies in the band 1 525-1 535 Mc/s for telemetering purposes may also transmit tracking signals in this band, and transmit and receive signals for the survey of earth resources by satellite.

Reason : This allocation is requested to compensate for the band allocated to radionavigation at the expense of space telemetering and in accordance with Resolution Spa.3 and to permit the use of wide-band signals for geodesy and data collection satellites.

SPACE CONFERENCE

1971

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Addendum No. 1(Rev.) to
Document No. 198-E
5 July 1971
Original : English

COMMITTEE 4

NOTE BY THE CHAIRMAN OF WORKING GROUP 4B

ARTICLE 7

PROPOSED PARTIAL TEXT OF SECTION VIII

Limits on power flux-density
from space stations

1. During the eleventh meeting of Working Group 4B, the Working Group considered the proposals B/72/107, 108, 128 and 129 relating to the protection to be afforded to fixed service systems using tropospheric scatter. The consideration was limited to the bands below 2.3 Gc/s because for bands between 2.3 and 3 Gc/s the proposed text in Document No. 275 was considered to be adequate for the purpose.

2. As a result of the discussions, modifications, as indicated in the Annex, are suggested to Document No. 198. The Annex is submitted to Committee 4 for its approval. Committee 4 is requested to draw the attention of Committee 6 to the Annex to this Document to ensure that suitable provisions are made in Articles 9 and 9A to cover the requirements of co-ordination between the administrations concerned which would arise due to the texts proposed in the Annex.

G.C. BROOKS
Chairman
Working Group 4B

Annex : 1

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A N N E X

MODIFICATIONS TO BE MADE TO THE ANNEX TO DOCUMENT No. 198

1. Insert the following paragraph after the title and before "MOD 470N ..." on page 3 of Document No. 198.

"ADD 470MA 22 bis (0) Power flux-density limits [below 1 Gc/s]

ADD 470MB (a) In the band [614-960 Mc/s] where the broadcasting-satellite service shares the frequency band with equal rights with fixed service using tropospheric scatter, and where there is insufficient frequency separation there must be sufficient angular separation between the direction to the broadcasting-satellite space station and the direction of maximum radiation of the antenna of the receiving station of the fixed service using tropospheric scatter to ensure that the interference power at the receiver input of the station of the fixed service does not exceed -168 dbW in any 4 kc/s band."

2. Insert the following paragraph after "ADD 470NG ..." and before "ADD 470NH ..." on page 4 of Document No. 198.

"ADD 470NGA (c) The power flux-density values of 470NE are derived on the basis of protecting fixed service using line-of-sight techniques. Where fixed service using tropospheric scatter operates in the bands listed in 470NG and where there is insufficient frequency separation, there must be sufficient angular separation between the direction to the space station and the direction of maximum radiation of the antenna of the receiving station of the fixed service using tropospheric scatter to ensure that the interference power at the receiver input of the station of the fixed service does not exceed -168 dbW in any 4 kc/s band."

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

1971

Addendum No. 1 to
Document No. 198-E
30 June 1971
Original : English

COMMITTEE 4

REPORT FROM THE CHAIRMAN, WORKING GROUP 4B
RELATING TO PROPOSED PARTIAL TEXT OF SECTION VIII,
ARTICLE 7 RELATING TO LIMITS OF POWER FLUX-DENSITY
FROM SPACE STATIONS IN THE BANDS BETWEEN 2.3 TO 3 Gc/s

1. Enclosed please find in the Annex the proposed partial text of Section VIII, Article 7 relating to limits of power flux-density from space stations in the space services sharing frequency bands between 2.3 to 3 Gc/s with Terrestrial Services. The text would need to be completed by indication of the space services and the frequency bands in the appropriate paragraphs of the proposed text, for which the power flux-density limits would be applicable. This will be done as soon as the decisions of Committee 5 are known. Consequential drafting amendments will also be made to the proposed text as necessary.

2. The Working Group 4B approved these power flux-density limits during its 9th meeting on 30 June 1971 while considering Document No. DT/71.

G.C. BROOKS
Chairman
Working Group 4B

Annex : 1

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A N N E X

ADD 470NH (3) Power flux-density limits [between 2.3 Gc/s to 3 Gc/s].

ADD 470NI (a) The power flux-density at the earth's surface produced by emissions from a space station or reflected from a passive satellite for all conditions and for all methods of modulation shall not exceed the following values :

> -152 dbW/m^2 in any 4 kc/s band for angles of arrival between 0 and 5 degrees above the horizontal plane;
>
> $-152 + \frac{3(\delta - 5)}{4}$ dbW/m^2 in any 4 kc/s band for angles of arrival between 5 and 25 degrees above the horizontal plane;
>
> -137 dbW/m^2 in any 4 kc/s band for angles of arrival between 25 and 90 degrees above the horizontal plane.

These limits relate to the power flux-density which would be obtained under assumed free-space propagation conditions.

ADD 470NJ (b) The limits given in 470NI apply in the frequency bands listed in 470NK which are allocated to transmission by space stations in the following space services :

- [ ]
- [ ]
- [ ] etc.

where these bands are shared with equal rights with the [fixed or mobile] services :

ADD 470NK

- [ ]
- [ ]
- [ ] etc.

SPACE
CONFERENCE

Document No. 198-E
24 June 1971
Original : English

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

COMMITTEE 4

NOTE BY THE CHAIRMAN OF WORKING GROUP 4B

ARTICLE 7

PROPOSED PARTIAL TEXT OF SECTION VIII

LIMITS ON POWER FLUX-DENSITY

FROM SPACE STATIONS

1. Please find in the Annex the proposed partial text of Section VIII of Article 7 concerning limits on power flux-density from space stations in the space services sharing frequency bands with terrestrial services. The text was approved by Working Group 4B during its sixth meeting on 23 June 1971. The text would need to be completed by indication of the space services and the frequency bands in the appropriate paragraphs of the proposed text, for which the power flux-density limits would be applicable. This will be done as soon as the decisions of Committee 5 are known. Consequential drafting amendments will also be made to the proposed text as necessary.

2. The Working Group 4B has not yet come to a conclusion on the power flux-density limits applicable to space stations in frequency bands between 2.3 to 3 Gc/s. Insertion of these limits in the proposed text would also entail some drafting amendments to this text.

G.C. BROOKS
Chairman,
Working Group 4B

Annex : 1

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A N N E X

LIMITS ON POWER FLUX-DENSITY FROM SPACE STATIONS

MOD 470N   23. (1) Power flux-density limits [between 1.67 to 1.7 Gc/s].

ADD 470NA   (a) The power flux-density at the earth's surface produced by emissions from a space station or reflected from a passive satellite for all conditions and for all methods of modulation shall not exceed -133 dbW/m^2 in any 1.5 Mc/s band. This limit relates to the power flux-density which would be obtained under assumed free-space propagation conditions.

ADD 470NB   (b) The limit given in 470NA applies in frequency band(s) listed in 470NC which is(are) allocated to transmission by space stations in the meteorological-satellite service and [earth sciences-satellite service] where this(these) band(s) is(are) shared with equal rights with the meteorological aids service :

ADD 470NC   (c) - [ ]

- [ ]

- [ ] etc.

ADD 470ND   23. (2) Power flux-density limits [between 1.7 Gc/s and 2.3 Gc/s].

ADD 470NE   (a) The power flux-density at the earth's surface produced by emissions from a space station or reflected from a passive satellite for all conditions and for all methods of modulation shall not exceed the following values :

-154 dbW/m^2 in any 4 kc/s band for angles of arrival between 0 and 5 degrees above the horizontal plane;

$-154 + \frac{\delta - 5}{2}$ dbW/m^2 in any 4 kc/s band for angles of arrival (δ) between 5 and 25 degrees above the horizontal plane;

-144 dbW/m^2 in any 4 kc/s band for angles of arrival between 25 and 90 degrees above the horizontal plane.

These limits relate to the power flux-density which would be obtained under assumed free-space propagation conditions.

ADD 470NF (b) The limits given in 470NE apply in the frequency bands listed in 470NG which are allocated to transmission by space stations in the following space services :

- [ ]
- [ ]
- [ ]
- [ ]
- [ ] etc.

where these bands are shared with equal rights with the [fixed or mobile] services :

ADD 470NG

- [ ]
- [ ]
- [ ]
- [ ]
- [ ] etc.

ADD 470NH to ADD 470NK (to be proposed later)
(").

ADD 470NL (4) Power flux-density limits [between 3 Gc/s and 8 Gc/s]

ADD 470NM (a) The power flux-density at the earth's surface produced by emissions from a space station or reflected from a passive satellite for all conditions and for all methods of modulation shall not exceed the following values :

-152 dbW/m^2 in any 4 kc/s band for angles of arrival between 0 and 5 degrees above the horizontal plane;

$-152 + \frac{(\delta - 5)}{2}$ dbW/m^2 in any 4 kc/s band for angles of arrival (δ) between 5 and 25 degrees above the horizontal plane;

-142 dbW/m^2 in any 4 kc/s band for angles of arrival between 25 and 90 degrees above the horizontal plane.

These limits relate to the power flux-density which would be obtained under assumed free-space propagation conditions.

ADD 470NN (b) The limits given in 470NM apply in the frequency bands listed in 470NO which are allocated to transmission by space stations in the following space services :

- [ ]
- [ ]
- [ ] etc.

where these bands are shared with equal rights with the [fixed or mobile] services :

ADD 470NO
- [ ]
- [ ]
- [ ] etc.

ADD 470NP (5) Power flux-density limits [between 8 and 11.7 Gc/s]

ADD 470NQ (a) The power flux-density at the earth's surface, produced by emissions from a space station, or reflected from a passive satellite for all conditions and for all methods of modulation shall not exceed the following values :

-150 dbW/m^2 in any 4 kc/s band for angles of arrival between 0 and 5 degrees above the horizontal plane;

$-150 + \frac{(\delta - 5)}{2}$ dbW/m^2 in any 4 kc/s band for angles of arrival (δ) between 5 and 25 degrees above the horizontal plane;

-140 dbW/m^2 in any 4 kc/s band for angles of arrival between 25 and 90 degrees above the horizontal plane.

These limits relate to the power flux-density which would be obtained under assumed free-space propagation conditions.

ADD 470NR (b) The limits given in 470NQ apply in the frequency bands listed in 470NS which are allocated to transmission by space stations in the following space services :

- [ ]
- [ ]
- [ ] etc.

where these bands are shared with equal rights with the [fixed or mobile] services :

ADD 470NS

- [ ]
- [ ]
- [ ] etc.

ADD 470NT (6) Power flux-density limits [between 11.7 and 15.4 Gc/s]

ADD 470NU (a) The power flux-density at the earth's surface, produced by emissions from a space station or reflected from a passive satellite for all conditions and for all methods of modulation shall not exceed the following values :

-148 dbW/m^2 in any 4 kc/s band for angles of arrival between 0 and 5 degrees above the horizontal plane;

$-148 + \frac{(\delta - 5)}{2}$ dbW/m^2 in any 4 kc/s band for angles of arrival (δ) between 5 and 25 degrees above the horizontal plane;

-138 dbW/m^2 in any 4 kc/s band for angles of arrival between 25 and 90 degrees above the horizontal plane.

These limits relate to the power flux-density which would be obtained under assumed free-space propagation conditions.

ADD 470NV (b) The limits given in 470NU apply in the frequency bands listed in 470NW which are allocated to transmission by space stations in the following space services :

- [ ]
- [ ]
- [ ] etc.

where these bands are shared with equal rights with the [fixed or mobile] services :

ADD 470NW

- [ ]
- [ ]
- [ ] etc.

ADD 470NX (7) Power flux-density limits [above 15.4 Gc/s]

ADD 470NY (a) The power flux-density at the earth's surface produced by emissions from a space station in the communication-satellite service for all conditions and for all methods of modulation shall not exceed the following values :

-115 dbW/m^2 in any 1 Mc/s band for angles of arrival between 0 and 5 degrees above the horizontal plane;

$-115 + \frac{\delta - 5}{2}$ dbW/m^2 in any 1 Mc/s band for angles of arrival (δ) between 5 and 25 degrees above the horizontal plane;

-105 dbW/m^2 in any 1 Mc/s band for angles of arrival between 25 and 90 degrees above the horizontal plane.

These limits relate to the power flux-density which would be obtained under assumed free-space propagation conditions.

ADD 470NZ (b) The limits given in 470NX apply in the frequency bands listed in 470NAA which are allocated to transmission by space stations in the following space services :

- [ ]
- [ ]
- [ ] etc.

where these bands are shared with equal rights with the [fixed or mobile] services :

ADD 470NAA

- [ ]
- [ ]
- [ ] etc.

ADD 470NAB (8) The limits given in [470NA, 470NE, 470NI, 470NM, 470NQ and 470NU] may be exceeded subject to the agreement of any administration in whose territory the power flux-density may be higher than the limits indicated above.

SUP 4700 to 470U

SPACE CONFERENCE

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

Document No. 199-E
24 June 1971
Original: French

SUB-WORKING GROUP 5D-1

SUB-WORKING GROUP 5D-1

TERMS OF REFERENCE

- To study the various Proposals relating to the use of space techniques to meet the needs of the Aeronautical and Maritime Mobile Services in the bands between 1 535 and 1 660 Mc/s.
- to seek the possibilities of agreement and to propose appropriate acceptable solutions.

(Documentation contained in Document No. DT/16, pages 16-32 to 16-57 inclusive and, possibly, relevant documents submitted by the Administrations)

Maurice CHEF
Chairman

SPACE CONFERENCE

Document No. 200-E
28 June 1971

WORLD ADMINISTRATIVE RADIO CONFERENCE FOR SPACE TELECOMMUNICATIONS – GENEVA – 1971

LIST OF DOCUMENTS

No.	Origin	Title	Destination
1	S.G.	Agenda for the Conference	PL
2	S.G.	Prop., Symbols etc.	PL
3	Denmark	Prop., RR Art. 5	PL
4	F.R. of Germany	Prop., RR Art. 1	PL
5 + Corr.1, 2	F.R. of Germany	Prop., RR Art. 5	PL
6	S.G.	Opinion expressed by the Plan Committee for Europe and the Mediterranean Basin	PL
7 + Corr.1,2	Sweden	Prop., RR Art. 5	PL
8	Norway	Prop., RR Art. 5	PL
9	Australia	Prop., RR Art. 1	PL
10 + Corr.1, 2	Australia	Prop., RR Art. 5	PL
11	Australia	Prop., RR Art. 7	PL
12(Rev.)	Canada	Proposals	PL
13(Rev.)	Canada	Prop., RR Art. 1	PL
14(Rev.) + Corr.	Canada	Prop., RR Art. 5	PL
15(Rev.)+Add	Canada	Prop., RR Art. 7	PL
16(Rev.)	Canada	Prop., RR Art. 9	PL
17(Rev.)	Canada	Prop., RR Art. 9A	PL
18(Rev.)	Canada	Prop., RR Art. 14	PL
19(Rev.)	Canada	Prop., RR Art. 15	PL
20(Rev.)	Canada	Prop., RR New App. 1B	PL
21	Argentina	Prop., RR Art. 1	PL
22+Corr.1,2	Argentina	Prop., RR Art. 5	PL
23 + Corr.	Argentina	Prop., RR Art. 7	PL
24 + Corr.	Argentina	Prop., RR Art. 14	PL

No.	Origin	Title	Destination
25 + Corr.	Argentina	Prop., RR Art. 41	PL
26	Argentina	Prop., RR Res. Spa. 1	PL
27	Argentina	Prop., RR Rec. 16	PL
28 + Corr. 1, 2, 3	U.S.A.	Proposals	PL
Corr.1 to Corr.1 to 28	U.S.A.	Revised curves for the determination of coordination distance in shared frequency bands between 1 and 40 GHz	PL
29	Japan	Prop., RR Art. 1	PL
30 + Corr. 1, 2, 3	Japan	Prop., RR Art. 5	PL
31 + Corr.	Japan	Prop., RR Art. 7	PL
32	Japan	Prop., RR Art. 8	PL
33	Japan	Prop., RR Arts. 9 & 9A	PL
34	Japan	Prop., RR Rec. Spa. 7	PL
35 + Corr.1, 2	India	Prop., RR Art. 5	PL
36	India	Prop., RR Art. 9A	PL
37	India	Prop., Frequency sharing	PL
38	India	Prop., RR Art. 1	PL
39 + Corr.	India	Prop., RR Art. 5	PL
40	France	Prop., RR Art. 1	PL
41	France	Prop., RR Art. 5	PL
42	France	Prop., RR Art. 6	PL
43 + Corr.	France	Prop., RR Art. 7	PL
44	France	Prop., RR Art. 9A	PL
45	France	Prop., RR App. 1A	PL
46 + Corr.	France	Prop., RR App. 1B	PL
47	France	Draft Recommendation	PL
48	France	Draft Recommendation	PL
49	Netherlands	Prop., RR Art. 5	PL
50	S.G.	List of documents	

No.	Origin	Title	Destination
51	United Kingdom	Explanatory memorandum covering the Frequency, administrative and technical aspects of the U.K. Proposals for the World Administrative Radio Conference for Space Telecommunications	PL
52	United Kingdom	Control of interference between geostationary satellite systems and non-synchronous inclined-orbit satellite systems using the same frequencies in the communication-satellite bands	PL
53	United Kingdom	Prop., RR Art. 1	PL
54 + Corr.	United Kingdom	Prop., RR Art. 5	PL
55	United Kingdom	Prop., RR Art. 7	PL
56	United Kingdom	Prop., RR Arts. 9 & 9A	PL
57	United Kingdom	Draft Resolution C	PL
58	S.G.	International cooperation in the peaceful uses of outer space	PL
59	U.S.S.R.	Prop., RR Art. 5	PL
60	Australia	Prop., RR Art. 5	PL
61 + Corr.	S.G.	Report of the I.F.R.B.	PL
62	New Zealand	Prop., RR Art. 5	PL
63	Sweden	Prop., RR Art. 5	PL
64 + Corr.	S.G.	Special Joint Meeting of C.C.I.R. Study Groups	PL
65	S.G.	Suggestions for the organization of the work of the Conference	PL
66	New Zealand	Additional Prop., RR Art. 5	PL
67	Australia	Prop., RR Art. 1	PL
68	Sweden	Additional Prop., RR Art. 5	PL

No.	Origin	Title	Destination
69	Brazil	Prop., RR Arts. 1, 5, 7, 8, 9, 9A & 14	PL
70	Brazil	Prop., RR Art. 1	PL
71 + Corr.	Brazil	Prop., RR Art. 5	PL
72 + Corr.1,2	Brazil	Prop., RR Art. 7	PL
73	Brazil	Prop., RR Art. 8	PL
74	Brazil	Prop., RR Art. 9	PL
75	Brazil	Prop., RR Art. 9A	PL
76	Brazil	Prop., RR Art. 14	PL
77	Mexico	Proposals	PL
78	Mexico	Prop., RR Art. 2	PL
79	United Kingdom	Coordination between geostationary communication satellite system sharing the same frequency bands	PL
80	United Kingdom	Prop., RR App. 1A	PL
81	United Kingdom	Rev. Prop., RR Art. 7	PL
82	China	Prop., RR Art. 1	PL
83	France	Add. Prop., RR Art. 1	PL
84	France	Rev. Prop., RR Art. 5	PL
85	France	Add. Prop., RR Art. 6	PL
86	France	Rev. Prop., RR Art. 7	PL
87	France	Add. Prop., RR Art. 9A	PL
88	France	Proposals concerning the determination of the coordination area for earth stations	PL
89	France	Draft Recommendation	PL
90	France	Proposals on the establishment of plans for satellite broadcasting	PL
91	S.G.	Convening of the Conference	PL

No.	Origin	Title	Destination
92	S.G.	Invitations to the World Administrative Radio Conference for Space Telecommunications	PL
93 + Corr. + Add.	S.G.	Notification to international organizations	PL
94+Add.1,2,3	S.G.	Situation of certain countries with respect to the International Telecommunication Convention, Montreux (Montreux, 1965)	PL
95	United Kingdom	Rev. Prop., Art. 9A	PL
96	United Kingdom	Draft Recommendation	PL
97	Japan	Prop., Art. 1	PL
98 + Corr.1,2	Japan	Prop., Art. 5	PL
99	Japan	Prop., Art. 7	PL
100	Secretariat	List of documents	PL
101	U.S.A.	A study of international aeronautical communications/navigation satellite system-channel/spectrum requirements (1 535-1 660 MHz)	PL
102	U.S.A.	Artificial site shielding	PL
103	U.S.A.	Signal levels in the rear section of an operational earth station antenna	PL
104	Mexico	Amateur service	PL
105	Mexico	Survey of earth resources	
106	Mexico	Satellite broadcasting	PL
107(Rev.)	Secretariat	Programme of work for the Conference as recommended by the meeting of Heads of delegations	PL
108	United Kingdom	Proposals for frequency allocations to the maritime mobile service using space communication techniques at frequencies of the order of 450-600 MHz	PL

No.	Origin	Title	Destination
109(Rev.)	Secretariat	Assignment of proposals	PL
110	Chile	Proposed amendment concerning the aeronautical mobile service	PL
111 + Corr.	India	Likelihood of interference to the receivers of tropospheric scatter links operating over the frequency band 845-935 MHz in Regions 1 and 3 from the emissions of an Indian broadcasting satellite proposed to be located at longitude 79 degrees East in the geostationary orbit	PL
112	India	Prop., RR Art. 5 and 7	PL
113	UNESCO	Frequency allocations for space communications	PL
114	Mexico	Proposed amendments to Chapter II (frequencies)	PL
115	I.P.T.C.	The transmission of news by satellite	PL
116	Secretariat	Committee structure	PL
117 (Rev.)	U.S.S.R.	Draft Resolution No. Spa. F	PL
118	Secretariat	Structure of the Working Groups of Com. 4	Com. 4
119	Argentina	Prop., RR Art. 5	PL
120	Com. 5	Structure of the Working Groups of Com. 5	Com. 5
121	Brazil	Draft Recommendation H	PL
122(Rev.)	Com. 6	Structure of the Working Groups of Com. 6	Com. 6
123	Rep. of India	Satellite instructional television experiment (site)	PL

No.	Origin	Title	Destination
124	Marconi International Marine Co.Ltd.	Preliminary comments on the proposals for the maritime mobile service	PL
125	Greece	Prop., RR Art. 5	Com. 5
126	Com. 5	Note by the Chairman - Categories of services and allocations	Com. 5
127	Com. 4	Summary Record of the first meeting of Com. 4	Com. 4
128	Com. 2	Summary Record of the first meeting of Com. 2	Com. 2
129	PL	Minutes of the first Plenary Meeting	PL
130 + Corr.	Malaysia	General comments concerning RR Art. 5 - broadcasting satellite service	Com. 5
131	Japan	Allowable power flux-density produced at the surface of the Earth by a satellite if radio-relay systems were to share the frequency with space services in the band 2.3-3 GHz	Com. 4
132	Japan	Information document relating to allocation of frequencies above 40 Gc/s	PL
133 + Corr.	United Kingdom	Proposals for frequency allocations to the maritime mobile service using space communication techniques at frequencies of the order of 450-600 Mc/s	PL
134	I.A.T.A.	I.A.T.A. views on Article 5 of the RR	PL
135	I.M.C.O.	Recommendations concerning maritime requirements for the use of space techniques	WG 5D

No.	Origin	Title	Destination
136	Norway	Supplementary information to Document No.8 on spectrum/channel requirements for the international maritime communications satellite system	PL
137	Norway	Modification to No. 322 of Article 5 to the RR	Com. 5
138	Mexico	Draft Resolution No. G	PL
139	Japan	Frequency sharing between communication-satellite systems and radio-relay systems at frequencies above 15.4 GHz	Com. 5
140	Japan	Project of 20 GHz large-capacity digital radio-relay system in Japan	Com. 5
141	Japan	Draft Resolution H	PL
142 + Add.	Com. 6	Summary Record of the first meeting of Com. 6	Com. 6
143	India	Techno-economic considerations in the use of the 12 GHz band for satellite broadcasting in the tropical countries	Com. 4 & 5
144	Cuba	Amateur service	PL
145	Com. 5	Provisional Summary Record of the first meeting of Com. 5	Com. 5
146	WG 4A	First report from WG 4A, revision of Article 1, Section III	Com. 4
147	Secretariat	Note by the Secretariat - Communication from the Czechoslovak Delegation	PL
148	Rep. of India	Prop., RR Art. 5	Com. 5
149 + Corr.	Kenya Tanzania Uganda	General observations concerning proposals - Article 5 of the RR	Com. 5
150	Secretariat	List of documents	PL

No.	Origin	Title	Destination
151	WG 5D	Note from Working Group 5D to Working Groups 5B and 5C	WG 5B and WG 5C
152	WG 5D	Note from Working Group 5D to Working Group 5B	WG 5B
153	WG 5D	Note from Working Group 5D to Working Group 5E	WG 5E
154	Com. 2	First report by the Working Party of Committee 2 (Credentials)	Com. 2
155	WG 4B	Note by the Chairman of Working Group 4B	WG 4B
156	S.G.	Budget of the Conference	Budget control Committee
157	S.G.	Contributions of recognized private operating agencies and international organizations not enjoying exemption	Budget control Committee
158	S.G.	Cost of printing the Final Acts	Com. 3
159	S.G.	Situation concerning expenditure for the Space Conference at 1 June 1971	Budget control Committee
160	WG 4A	Second report - Revision of Section I of Article 1	Com. 4
161	Com. 5	Summary Record of the Second Meeting of Committee 5	Com. 5
162	Rep. of Indonesia	Proposal for amendment of foot-note 311A of the Radio Regulations	Com. 5
163	WG 4B	Article 7 Proposed partial text of Section VIII	WG 4B
164	U.S.A. & Canada	Prop., RR Art. 5	Com. 5

No.	Origin	Title	Destination
165(Rev.)	Rep. of Indonesia	Reservation regarding 470BA	Com. 4
166	WG 4A	Third Report - Revision of Article 1, Section IIB	Com. 4
167	Com. 2	Summary Record of the Second Meeting of Committee 2 (Credentials)	Com. 2
168	U.S.A.	Recommendation No. I	Com. 4
169	Com. 4	Summary Record of the Second Meeting of Committee 4 (Technical)	Com. 4
170(Rev.)	United Kingdom	Draft Resolution No. I	WG 6A
171	United Kingdom	Protection ratio measurements and interference calculations for FM television signals affecting V.S.B. AM television reception in the same channel (625 lines PAL colour system)	Com. 4
172+Corr.	United Kingdom	Aeronautical and Maritime Satellite Services in the band 1 535-1 660 MHz	Com. 5
173	Chairman of the Conference	Memorandum relating to proposals presented by Poland	PL
174(Rev.)	WG 4D	First report of Working Group 4D to Committee 4	Com. 4
175	PL	Minutes of the second Plenary Meeting	PL
176	WG 5D	Note from Working Group 5D to Chairman of Committee 5	Com. 5
177	WG 5B	First report of Working Group 5B to Committee 5 (Allocations)	Com. 5
178	U.S.A.	Proposals in the band 2 500-2 690 MHz	Com. 5
179	Argentina	Survey of earth resources	PL

No.	Origin	Title	Destination
180(Rev.)	Com. 4	Proposals concerning Broadcasting Satellite Service	Com. 6
181	WG 5C	First Report of Working Group 5C to Committee 5	Com. 5
182	I.A.R.U.	Space techniques in the Amateur Service	PL
183	Argentina	Prop. RR App. 10	Com. 6
184	Com. 2	Second report by the Working Party of Committee 2 (Credentials)	Com. 2
185	WG 5C	Note from Working Group 5C to Working Group 5D	WG 5D
186	Sub-WG 5 ad hoc-1	Terms and Definitions, section IIa, RR Art. 1	WG 5 ad hoc
187	WG 5B	Second Report to Com. 5	Com. 5
188 (Rev.)	France	Draft Resolution No. J	Com. 4
189	I.A.F.	Position paper for the World Administrative Radio Conference for Space Telecommunications	PL
190	Australia	Prop. RR Art. 5	WG 5E
191	WG 4B	Partial Revision of Recommendation No. Spa 3	Com. 4
192	Com. 4	Summary Record of the third Meeting of Com. 4	Com. 4
193	WG 4D	Third Report of WG 4D to Committee 4	Com. 4
194 + Corr. + Add.	WG 4D	Fourth Report of Working Group 4D to Committee 4. Proposed new Appendix 29	Com. 4

No.	Origin	Title	Destination
195	WG 6B	First Report -Revision of Articles 8, 14, 15 and Article 1 (Section III)	Com. 6
196	WG 4B	Note from the Chairman to WG 4A and Com. 4	Com. 4
197	France	Amendment to French proposals F/41/86, F/41/87 and F/41/87A	Com. 5
198	WG 4B	Art. 7 - Proposed partial text of Section VIII	Com. 4
199	Sub-WG 5D-1	Terms of reference	Sub-WG 5D-1
200	Secretariat	List of documents	PL