INTERNATIONAL TELECOMMUNICATION UNION

FINAL ACTS

of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (ORB-88)

Geneva, 1988

Geneva 1989

INTERNATIONAL TELECOMMUNICATION UNION

FINAL ACTS

of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (ORB-88)

Geneva, 1988

Geneva 1989

ISBN 92-61-03931-6

NOTE

The following symbols have been used to indicate the nature of the revision in each case:

ADD	=	addition of a new provision
MOD	=	modification of an existing provision
(MOD)	=	editorial modification of an existing provision
NOC	=	provision unchanged
SUP	=	deletion of an existing provision

TABLE OF CONTENTS

FINAL ACTS

of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Orb-88)

Geneva, 1988

Page

RESOLUTIONS

Page

Page

RECOMMENDATIONS

FINAL ACTS

adopted by the Second Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It

Geneva, 1988 (WARC Orb-88)

PREAMBLE

The World Administrative Radio Conference, Geneva, 1979, resolved in its Resolution 3 that a World Administrative Radio Conference be convened, in two sessions, to guarantee in practice for all countries equitable access to the geostationary-satellite orbit and the frequency bands allocated to space services.

The Plenipotentiary Conference (Nairobi, 1982), in its Resolution 1, included such a conference in the Union's calendar of conferences. In its Resolution 8, it also instructed the Administrative Council to consider the inclusion, in the agenda of the First Session, of the question of the planning of the bands allocated to the fixed-satellite service and reserved exclusively for feeder links for the broadcasting-satellite service.

The Administrative Council, at its 38th Session (1983), following consultations with the Members of the Union, adopted Resolution 895, by which it took the necessary steps to convene the First Session of this World Administrative Radio Conference, to be held in Geneva for a duration of five and a half weeks.

Accordingly, the First Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of the Space Services Utilizing It, (WARC Orb-85), was held in Geneva from 8 August to 15 September 1985 and adopted a Report to the Second Session. This Report included the principles and methods to guarantee in practice for all countries equitable access to the geostationary orbit and frequency bands allocated to space services as well as the technical parameters to be used for planning. It also contained guidelines for the work to be carried out by the permanent organs of the Union in preparation for the Second Session of the Conference.

At its 41st session (1986), the Administrative Council, by its Resolution 953, established the agenda for the Second Session of the Conference. At its 42nd session (1987), the Administrative Council, considering the results of consultations with the Members concerning the establishment of this agenda, resolved that the Second Session be convened in Geneva for five weeks and three days commencing on Monday, 29 August 1988.

Accordingly, the Second Session of the Conference (WARC Orb-88) met in Geneva for the stipulated period; it considered and, in conformity with its agenda, adopted a partial revision of the Radio Regulations and Appendices thereto, as contained in the present Final Acts and concerning the following:

ARTICLE 1	Terms and definitions
ARTICLE 8	Frequency Allocations
ARTICLE 11	Coordination of Frequency Assignments to Stations in a Space Radiocommunication Service Except Stations in the Broadcasting-Satellite Service and to Appropriate Terrestrial Stations
ARTICLE 12	Notification and Recording in the Master International Frequency Register of Frequency Assignments to Terrestrial Radiocommunication Stations
ARTICLE 13	Notification and Recording in the Master International Frequency Register of Frequency Assignments to Radio Astronomy and Space Radiocommunication Stations Except Stations in the Broadcasting-Satellite Service
ARTICLE 14	Supplementary Procedure to Be Applied in Cases Where a Footnote in the Table of Frequency Allocations Requires an Agreement with an Administration
ARTICLE 15A	Coordination, Notification and Recording of Frequency Assignments to Stations in the Fixed-Satellite Service (Earth-to-space) in the Frequency Bands 14.5 - 14.8 GHz (in Regions 1 and 3), 17.3 - 18.1 GHz (in Regions 1 and 3) and 17.3 - 17.8 GHz (in Region 2) Providing Feeder Links for the Broadcasting-Satellite Service and also to Stations of Other Services to Which these Bands are Allocated, so far as their Relationship to the Fixed-Satellite Service (Earth-to-space) in these Bands Is Concerned
ARTICLE 27	Terrestrial Radiocommunication Services Sharing Frequency Bands with Space Radiocommunication Services above 1 GHz

ARTICLE 28	Space Radiocommunication Services Sharing Frequency Bands with Terrestrial Radiocommunication Services above 1 GHz
ARTICLE 29	Special Rules Relating to Space Radiocommunication Services
ARTICLE 69	Entry into Force of the Radio Regulations
APPENDIX 3	Notices Relating to Space Radiocommunication and Radio Astronomy Stations
APPENDIX 4	Advance Publication Information to Be Furnished for a Satellite Network
APPENDIX 28	Method for the Determination of the Coordination Area Around an Earth Station in Frequency Bands Between 1 GHz and 40 GHz Shared Between Space and Terrestrial Radiocommunication Services
APPENDIX 29	Method of Calculation for Determining if Coordination is Required Between Geostationary-Satellite Networks Sharing the Same Frequency Bands
APPENDIX 30A (Orb-88)	Provisions and Associated Plans for Feeder Links for the Broadcasting-Satellite Service (11.7 - 12.5 GHz in Region 1, 12.2 - 12.7 GHz in Region 2 and 11.7 - 12.2 GHz in Region 3) in the Frequency Bands 14.5 - 14.8 GHz and 17.3 - 18.1 GHz in Regions 1 and 3, and 17.3 - 17.8 GHz in Region 2 (Articles, Plans and Annexes)
APPENDIX 30B	Provisions and Associated Plan for the Fixed- Satellite Service in the Frequency Bands 4 500 - 4 800 MHz, 6 725 - 7 025 MHz, 10.70 - 10.95 GHz, 11.20 - 11.45 GHz and 12.75 - 13.25 GHz (Articles, Plan and Annexes)

In accordance with its agenda, the Conference took other decisions considered necessary or appropriate, including the review and revision of existing Resolutions and Recommendations and the adoption of various new Resolutions and Recommendations as contained in the present Final Acts.

The partial revision of the Radio Regulations, as referred to in this Preamble, shall form an integral part of the Radio Regulations and shall enter into force on **16 March 1990 at 0001 hours UTC**, except for such elements of the partial revision for which a different date of entry into force is specifically stipulated therein.

The delegates signing the partial revision of the Radio Regulations, contained in the present Final Acts, which is subject to approval by their competent authorities, declare that, should an administration make reservations concerning the application of one or more of the provisions of the revised Radio Regulations, no other administration shall be obliged to observe that provision or those provisions in its relations with that particular administration.

Members of the Union shall inform the Secretary-General of their approval of this partial revision of the Radio Regulations. The Secretary-General shall inform Members promptly of the receipt of such notifications of approval.

IN WITNESS WHEREOF, the delegates of the Members of the International Telecommunication Union named below have, on behalf of their respective competent authorities, signed one copy of the present Final Acts in the Arabic, Chinese, English, French, Russian and Spanish languages. In case of dispute, the French text shall prevail. This copy shall remain deposited in the archives of the Union. The Secretary-General shall forward one certified true copy to each Member of the International Telecommunication Union.

Done at Geneva, 6 October 1988

For the Republic of Afghanistan:

MOHAMMAD ZARIN KARIMI

For the People's Democratic Republic of Algeria:

SLIMANE BOUHADEB
ABDELMADJID MAALEM
ABDEL AZIZ ALLAN

In the name of the Federal Republic of Germany:

H. VENHAUS
H.W. BARTELS
F. MASSON

For the People's Republic of Angola:

JOAO-PEDRO LUBANZA
JOSE ALVES SARAIVA
ALVARO MONI NOEL

For Antigua and Barbuda:

CAMPBELL MICKEY MATTHEW

For the Kingdom of Saudi Arabia:

MOHAMED JAMIL A. MULLA
FOUAD ADEEB TAHER
SA' AD MOSLEH K. AL-HARBI
MOHAMED K. AL-NAHEDH
IBRAHIM S. AL-ZAKRI
HABEEB K. AL-SHANKITI
SAMI S. AL-BASHEER
SULAIMAN ALI AL-SAMNAN
SAUD A. AL-RASHEED
ABDULMOHSIN M. AL-GESAIR
FADHL N.M. AHMED
WALID M. AL-BAWARDI
ALI A. AL-SHEHRI
ABDULRAHMAN M. AL-SOBAY

For the Argentine Republic:

ARMANDO FRANCISCO GARCÍA
GRACIELA BRÍGIDA MEALLA MEALLA
DANIEL GUSTAVO AZZI BALBI

For Australia:

J.N. McKENDRY
W.R. ELLIS

For Austria:

GERD LETTNER

For the Commonwealth of the Bahamas:

LEANDER A. BETHEL

For the State of Bahrain:

A.S. AL-THAWADI

For Belgium:

ROBERT TASTENOY

For the People's Republic of Benin:

AGNAN BARTHELEMY

For the Byelorussian Soviet Socialist Republic:

I.M. GRITSUK

For the Federative Republic of Brazil:

SAVIO PINHEIRO

For Brunei Darussalam:

S. JEEVARATNAM

For the People's Republic of Bulgaria:

TZANTCHO TZANEV

For Burkina Faso:

ZOULI BONKOUNGOU
YOUSSOUF KABA

For the Republic of Burundi:

LAURENT NDIKUMWAMI
FIACRE NIYOKINDI

For the Republic of Cameroon:

EMMANUEL KAMDEM-KAMGA
HENRI DJOUAKA
HILAIRE MBEGA
JACOB NKEMBE
RICHARD MAGA
EMMANUEL NGUIAMBA NLOUTSIRI

For Canada:

GABRIEL WARREN
EDWARD D. DUCHARME
ROBERT R. BOWEN
BRUCE A. GRACIE
VISHNU SAHAY
RONALD G. AMERO

For the Central African Republic:

FRANCIS DIMA

For Chile:

LUIS ESCOBAR CERDA

For the People's Republic of China:

SONG ZHIYUAN

For the Republic of Cyprus:

CHRISTOPHOROS YIANGOU
ANDREAS MICHAELIDES

For the Vatican City State:

EUGENIO MATIS S.I.
PIER VINCENZO GIUDICI

For the Republic of Colombia:

HECTOR CHARRY SAMPER

For the Republic of Korea:

KO WON SANG
LEE KEUN HYEOB
CHUNG TAE CHUL
KIM JONG SI
HWANG HO-TARK
JANG KI-SOONG
CHOI JAE-ICK

For the Republic of Côte d'Ivoire:

JEAN-BAPTISTE YAO KOUAKOU
LESAN BASILE GNON
KOUADIO JULES KOFFI
GEORGES ELEFTERIOU
ALEXIS KOFFI KOUMA

For Cuba:

HUGO FERNÁNDEZ MACBEATH

For Denmark:

J. RISUM

For the Arab Republic of Egypt:

MAHMOUD M.S. EL-NEMR
REDA MESSIHA ATTALA
HAMDY ABDEL HALIM MOHAMAD

For the United Arab Emirates:

MUSTAFA HAMOUDA ISHAG
HASSAN OMAR ALI MUBARAK
AHMED A. AL-MOHAIDEB

For Ecuador:

GALO LEORO F.
VIVANCO ARIAS JOSÉ
RIVADENEIRA SUÁREZ RUBÉN
SALVADOR-CRESPO ÍÑIGO

For Spain:

PASCUAL MENÉNDEZ
FRANCISCO MOLINA NEGRO
MANUEL PÉREZ DEL ARCO

For the United States of America:

THEODORE F. BROPHY
ROBERT A. HEDINGER
HAROLD G. KIMBALL
THOMAS S. TYCZ
WARREN G. RICHARDS

For the People's Democratic Republic of Ethiopia:

BEKELE YADETTA
WOUDNEH TADDESE

For Finland:

CHRISTER NYKOPP
K. TERÄSVUO

For France:

YVES RODRIGUE
MICHEL POPOT
FRANÇOIS SILLARD

For the Gabonese Republic:

JULES LEGNONGO
FABIEN MBENG-EKOGHA

For Ghana:

I.A.K. QUARTEY
K.A. JACKSON

For Greece:

NICOLAOS KOUNINIOTIS
VASSILI G. CASSAPOGLOU
N. BENMAYOR

For the Republic of Guinea:

MAMADOU DIOULDE SOW

For the Hungarian People's Republic:

Dr FERENC VALTER

For the Republic of India:

SATYA PAL
M.K. RAO
A.M. JOSHI
K.S. MOHANAVELU
S. SADHU
S.A. SUBBAIAH

For the Republic of Indonesia:

ARNOLD PH. DJIWATAMPU
M. SUGIHARTO
TUPUK SUTRISNO
EDDY SETIABUDHI

For the Islamic Republic of Iran:

A.R. BAHRAINIAN
H. MAHYAR
M.H. FARZIN
K. MAJDMANESH

For the Republic of Iraq:

ALI MUSA A. SHABAN
ABDULSATTAR M. HINDI

For Ireland:

T.A. DEMPSEY
J.A.C. BREEN
M.J.C. CURLEY
P. VERCOE-ROGERS

For Iceland:

G. ARNAR

For the State of Israel:

S. KLEPNER
I. BEIVAR
M. FAIRMONT
A. BAR-SELA
A. AVITZOUR
H. ISRAEL

For Italy:

A. PETTI

For Japan:

MAKOTO MIURA

For the Hashemite Kingdom of Jordan:

SAMIR DAJANI

For the Republic of Kenya:

T.S. HUNGIN
S.K. KIBE
D.K. GITHUA
R.J. LUBANGA
J.R.M. OWALA
J.P. KIMANI

For the State of Kuwait:

ADEL AL-IBRAHIM
HAMEED AL-KATTAN
ABDULWAHAB AL-SUNEEN
ABDULAZEEZ AL-BAGHLI

For Lebanon:

MAURICE GHAZAL

For the Republic of Liberia:

JULIUS F. HOFF
SAYYUO J.M. GARGARD

For the Socialist People's Libyan Arab Jamahiriya:

KREDELY ABDALLA
ALI MOHAMED GHERWI
ZAKARIA AHMED EL HAMMALI
EMHEMED SALEH SEBIE
AMMAR EL-MAHJOUB
MOHAMED MOHAMED BANNUSH

For the Principality of Liechtenstein:

M. VON LEDEBUR

For Luxembourg:

JEAN DONDELINGER
MARCEL HEINEN

For the Democratic Republic of Madagascar:

RANDRIANJAFISOLO ALEXANDRE

For Malaysia:

MOHD ARIS BIN BERNAWI
AB. RAHIM BIN H.J. SALEH

For the Republic of Mali:

SIKON SISSOKO
IDRISSA SAMAKE

For the Republic of Malta:

JOSEPH BARTOLO
A.J. LATEO
G.J. SPITTERI

For the Kingdom of Morocco:

EL GHALI BENHIMA
TOUMI AHMED
BENDAOUD ABDERRAHIM

For the Islamic Republic of Mauritania:

MANGASSOUBA ALIOU

For Mexico:

CARLOS A. MERCHAN ESCALANTE
LUIS MANUEL BROWN HERNÁNDEZ
ROSA MA. RAMÍREZ DE ARELLANO H.

For Monaco:

LOUIS JEAN-MARIE BIANCHERI

For the Mongolian People's Republic:

L. BAYART
L. BANZRAGCH

For the Federal Republic of Nigeria:

E.B. FASHEYIKU
O. AKINHANMI
O.O. OLANIYAN
A.S. TIJANI
O.B. AKAH

For Norway:

THORMOD BØE
GEIR SUNDE
ODD H. HESTAD
ERIK OTTO EVENSTAD
TORE ØVENSEN

For New Zealand:

K.J. McGUIRE
I.R. HUTCHINGS
B.R. EMIRALI
M.E. POOLE
G.H. RAILTON

For the Sultanate of Oman:

SALIM BIN ALI AL-ABDISSALAM
HAMED BIN YAHYA AL-KINDY

For the Islamic Republic of Pakistan:

EHSANUL HAQ
BASHARAT AHMED
WASIQ MAHMOOD

For the Republic of Panama:

MARCOS ANDRÉS VILLARREAL
MIRTA SAAVEDRA POLO

For Papua New Guinea:

DAVID S. KARIKO
DANNY COYLE

For the Republic of Paraguay:

ANGEL BARBOZA GUTIÉRREZ
MIRIAN TERESITA PALACIOS
SABINO ERNESTO MONTANARO

For the Kingdom of the Netherlands:

HERMAN STANLEY H.L.

For Peru:

JAIME STIGLICH

For the People's Republic of Poland:

ZBYSZKO KUPCZYK

For Portugal:

ROGERIO MANUEL FERREIRA SIMÕES CARNEIRO
DOMINGOS PIRES FRANCO
EMILIO AQUILES DE OLIVEIRA
ISABEL MARIA SILVA PARENTE
MARÍA TERESA RODRÍGUEZ BANDEIRA
ALBANO INACIO DOS SANTOS
LUIZ DUARTE LOPES
JOÃO FERNANDO DA CONCEICAO GUERREIRO BARRETO
DAMIÃO MARTINS DE CASTRO

For the State of Qatar:

HASHIM AHMED MUSTAFAWI
HASSAN MOHAMMAD AL-MASS

For the Syrian Arab Republic:

M. NAZIH BATTIKHI

For the German Democratic Republic:

Dr HAMMER

For the Democratic People's Republic of Korea:

LI GYONG JUN

For the Ukrainian Soviet Socialist Republic:

I. SOLOVJEV

For the Socialist Republic of Romania:

CONSTANTIN CEAUSESCU
LUCIAN CONSTANTINESCU
VIOREL POPLACEAN

For the United Kingdom of Great Britain and Northern Ireland:

KEITH CRAWFORD SHOTTON
MICHAEL PETER DAVIES
RONALD ALFRED BEDFORD

For the Republic of San Marino:

P. GIACOMINI
I. GRANDONI

For the Republic of Senegal:

CHEIKH TIDIANE NDIONGUE
MAKHTAR FALL
ASSANE DIALLO
RASSOUL M'BAYE
MAMADOU SEYDOU DIALLO

For the Republic of Singapore:

NG SENG SUM
SAI LIM CHOON
CHANG LONG KIAT
TAY CHEK KHOON

For Sweden:

PERCY EKEDAHL PETTERSSON
LARS SONESSON
BERNDT STENBERG

For the Confederation of Switzerland:

C. STEFFEN
H.A. KEIFFER

For the United Republic of Tanzania:

JOHN S. NGATENA
ELIAH A.H. MKONGWE

For the Czechoslovak Socialist Republic:

JIRA

For Thailand:

RIANCHAI REOWILAISUK

For the Togolese Republic:

AMEGANVI-LYS AYI

For the Kingdom of Tonga:

SIONE KITE

For Trinidad and Tobago:

JEAN EVELYNE GEORGE

For Tunisia:

CHAFFAI MONGI
BETTAIEB BECHIR
KHATTELI NOURI

For Turkey:

GÖKSEL IBRAHIM
KURU YÜCEL
CENKCILER DILEK
SAYRAC TIMUR

For the Union of Soviet Socialist Republics:

A.L. BADALOV

For the Eastern Republic of Uruguay:

MIGUEL VIEYTES
LUIS PELUFFO
JUAN ZAVATTIERO
ROSENDO F. HERNÁNDEZ
JUAN J. CERVERA

For the Republic of Venezuela:

PEDRO J. BARRIOS B.
ALEJANDRA ORNÉS MACIÁ
RAFAEL PÉREZ CASTILLO
LUIS EMILIO PÉREZ ROMERO

For the Socialist Republic of Viet Nam:

LE DUC NIEM

For the Socialist Federal Republic of Yugoslavia:

KOSIN MARKO

For the Republic of Zambia:

RONEY KASIWA SIAME
CLEMENT GILBERT MUMBA

For the Republic of Zimbabwe:

DZIMBANHETE FREDSON MATAVIRE
ISHMAEL ESIMAIRE CHIKWENHERE

ANNEX

Partial Revision of the Radio Regulations and the Appendices thereto

ARTICLE 1

Terms and Definitions

Section III. Radio Services

MOD **22** **Orb-88** 3.3 *Fixed-Satellite Service:* A radiocommunication service between earth stations at given positions, when one or more satellites are used; the given position may be a specified fixed point or any fixed point within specified areas; in some cases this service includes satellite-to-satellite links, which may also be operated in the inter-satellite service; the fixed-satellite service may also include feeder links for other space radiocommunication services.

Section IV. Radio Stations and Systems

MOD **109** **Orb-88** 4.52 *Feeder Link:* A radio link from an earth station at a given location to a space station, or vice versa, conveying information for a space radiocommunication service other than for the fixed-satellite service. The given location may be at a specified fixed point, or at any fixed point within specified areas.

Section VII. Frequency Sharing

ADD **168A** **Orb-88** 7.10 *Effective Boresight Area* (of a steerable satellite beam): An area on the surface of the Earth within which the boresight of a *steerable satellite beam* is intended to be pointed.

There may be more than one unconnected effective boresight area to which a single steerable satellite beam is intended to be pointed.

ADD **168B** **Orb-88** 7.11 *Effective Antenna Gain Contour* (of a steerable satellite beam): An envelope of antenna gain contours resulting from moving the boresight of a *steerable satellite beam* along the limits of the *effective boresight area.*

Section VIII. Technical Terms Relating to Space

MOD **169** **Orb-88** 8.1 *Deep Space:* Space at distances from the Earth equal to, or greater than, 2×10^6 kilometres.

ADD **183** **Orb-88** 8.15 *Steerable Satellite Beam:* A *satellite* antenna beam that can be re-pointed.

ARTICLE 8

Frequency Allocations

MOD **480** Orb-88 In Region 2, the use of the band 1 605 - 1 705 kHz by stations of the broadcasting service is subject to the Plan established by the Regional Administrative Radio Conference (Rio de Janeiro, 1988).

In Region 2, in the band 1 625 - 1 705 kHz, the relationship between the broadcasting, fixed and mobile services is shown in No. **419**. However, the examination of frequency assignments to stations of the fixed and mobile services in the band 1 625 - 1 705 kHz under No. **1241** shall take account of the allotments appearing in the Plan established by the Regional Administrative Radio Conference (Rio de Janeiro, 1988).

SUP **792** Orb-88

ADD **792A** Orb-88 The use of the bands 4 500 - 4 800 MHz, 6 725 - 7 025 MHz, 10.7 - 10.95 GHz, 11.2 - 11.45 GHz and 12.75 - 13.25 GHz by the fixed-satellite service shall be in accordance with the provisions of Appendix **30B**.

MOD **839** Orb-88 The use of the bands 11.7 - 12.2 GHz by the fixed-satellite service in Region 2 and 12.2 - 12.7 GHz by the broadcasting-satellite service in Region 2 is limited to national and subregional systems. The use of the band 11.7 - 12.2 GHz by the fixed-satellite service in Region 2 is subject to previous agreement between the administrations concerned and those having services, operating or planned to operate in accordance with the table, which may be affected (see Articles **11**, **13** and **14**). For the use of the band 12.2 - 12.7 GHz by the broadcasting-satellite service in Region 2, see Article **15**.

MOD **858** Orb-88 The band 14 - 14.5 GHz may be used, within the fixed-satellite service (Earth-to-space), for feeder links for the broadcasting-satellite service, subject to coordination with other networks in the fixed-satellite service. Such use of feeder links is reserved for countries outside Europe.

MOD **863** Orb-88 The use of the band 14.5 - 14.8 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service. This use is reserved for countries outside Europe.

MOD **868** *Additional allocation:* in Afghanistan, Algeria, the Federal Republic of
Orb-88 Germany, Angola, Saudi Arabia, Austria, Bahrain, Bangladesh, Cameroon, Costa Rica, El Salvador, the United Arab Emirates, Finland, Guatemala, Honduras, India, Indonesia, the Islamic Republic of Iran, Iraq, Israel, Japan, Kuwait, Libya, Nepal, Nicaragua, Oman, Pakistan, Qatar, Sudan, Sri Lanka, Sweden, Thailand and Yugoslavia, the band 17.3 - 17.7 GHz is also allocated to the fixed and mobile services on a secondary basis. The power limits given in Nos. **2505** and **2508** shall apply.

MOD **884** In the band 31 - 31.3 GHz the power flux-density limits specified in
Orb-88 No. **2582** shall apply to the space research service.

ARTICLE 11

MOD Orb-88

Coordination of Frequency Assignments to Stations in a Space Radiocommunication Service Except Stations in the Broadcasting Satellite Service and to Appropriate Terrestrial Stations [1, 2, 3]

NOC

Section I. Procedures for the Advance Publication of Information on Planned Satellite Networks [4]

MOD A.11.1 Orb-88 [1] For the coordination of frequency assignments to stations in the broadcasting-satellite service and other services in the frequency bands 11.7 - 12.2 GHz (in Region 3), 11.7 - 12.5 GHz (in Region 1) and 12.2 - 12.7 GHz (in Region 2) as well as the coordination of frequency assignments to feeder-link stations utilizing the fixed-satellite service (Earth-to-space) in the frequency bands 17.3 - 17.8 GHz (in Region 2) and in the frequency bands 14.5 - 14.8 GHz and 17.3 - 18.1 GHz in Regions 1 and 3 and the other services in these bands, see also Article **15** and Article **15A** respectively.

ADD A.11.2 Orb-88 [2] These procedures may be applicable for earth stations of the earth exploration-satellite service, space research service, space operation service and radiodetermination-satellite service intended to be used while in motion or during halts at unspecified points.

ADD A.11.3 Orb-88 [3] For the application of the provisions of this Article with respect to stations in a space radiocommunication service using frequency bands covered by the fixed-satellite service Allotment Plan, see also Appendix **30B** and Resolution **107 (Orb-88)**.

(MOD) A.11.4 Orb-88 [4] These procedures may be applicable to stations on board satellite launching vehicles.

NOC **1041** *Publication of information*

MOD **1042** **Orb-88** § 1. (1) An administration (or one acting on behalf of a group of named administrations) which intends to bring into use a satellite network within a satellite system [1] shall, prior to the coordination procedure described in No. **1060** where applicable, send to the International Frequency Registration Board, not earlier than six years [2] and preferably not later than two years before the date of bringing into service of each satellite network, the information listed in Appendix **4**.

MOD **1043** **Orb-88** (2) Amendments to the information sent in accordance with the provisions of No. **1042** shall also be sent to the Board as soon as they become available. Modifications which are of such a nature as to significantly change the character of the network may require recommencing the advance publication procedure.

MOD **1044** **Orb-88** (3) If the information is found to be incomplete, the Board shall immediately seek from the administration concerned any clarification and information not provided.

On receipt of the complete information sent under Nos. **1042** and **1043**, the Board shall publish it in a special section of its weekly circular within three months and shall also, when the weekly circular contains such information, so advise all administrations by circular telegram. The circular telegram shall indicate the frequency bands to be used and, in the case of a geostationary satellite, the orbital location of the space station. When the Board is not in a position to comply with the time limit referred to above, it shall periodically so inform the administrations, giving the reasons therefor.

ADD **1042.1** **Orb-88** [1] For the use of frequency bands which are not covered by the fixed-satellite service Allotment Plan. See also Resolution **108 (Orb-88)**.

ADD **1042.2** **Orb-88** [2] See also No. **1550**.

SUP **1045**
Orb-88

NOC **1046** *Comments on published information*

MOD **1047**
Orb-88 § 2. If, after studying the information published under No. **1044**, any administration is of the opinion that interference which may be unacceptable may be caused to assignments of its existing or planned satellite networks, it shall, within four months after the date of the weekly circular containing the complete information listed in Appendix **4**, send the administration concerned its comments on the particulars of the interference to its existing or planned satellite systems. A copy of these comments shall also be sent to the Board. If no such comments are received from an administration within the period mentioned above, it may be assumed that the administration has no basic objections to the planned satellite network(s) of that system on which details have been published.

ADD **1047A**
Orb-88 An administration sending information under No. **1042** and No. **1043** may request the assistance of the Board in determining, with the aid of Appendix **29**, if its planned network could affect or be affected by other satellite networks for which complete Appendix **4** information has been received by the Board.

ADD **1047B**
Orb-88 An administration receiving information published under No. **1044** may request the assistance of the Board in identifying with the aid of Appendix **29**, whether its existing or planned networks for which complete Appendix **4** information has been sent to the Board could affect or be affected by the planned network.

NOC **1048** *Resolution of difficulties*

MOD **1049**
Orb-88 § 3. (1) An administration receiving comments sent in accordance with No. **1047** and administrations sending such comments shall endeavour to resolve any difficulties that may arise and shall provide any additional information that may be available.

MOD **1051** *a)* the administration responsible for the planned network shall first explore all possible means of meeting its requirements, taking into account the characteristics of the geostationary-satellite networks of other systems, and without considering the possibility of adjustment to networks of other administrations. If no such means can be found, the administration concerned may then request other administrations, either bilaterally or multilaterally, or in exceptional circumstances through the convening of multilateral meetings similar to that provided for in No. **1085C**, to mutually help resolve these difficulties.
Orb-88

MOD **1053** *c)* if, after following the procedure described in Nos. **1051** and **1052**, there are unresolved difficulties, the administrations concerned shall together make every possible effort to resolve these difficulties by means of mutually acceptable adjustments, for example, to geostationary space station locations and to other characteristics of the networks involved in order to provide for the normal operation of both the planned and existing networks.
Orb-88

MOD **1054** (3) In their attempts to resolve the difficulties mentioned above, administrations may seek the Board's assistance which may consist of:
Orb-88

ADD **1054A** *a)* evaluating the levels of interference;
Orb-88

ADD **1054B** *b)* defining, with the agreement of the administrations concerned, the method and criteria to be used;
Orb-88

ADD **1054C** *c)* making arrangements to facilitate discussions as mutually agreed by the administrations concerned.
Orb-88

ADD **1054D** **Orb-88** In seeking the assistance of the Board, the administration(s) concerned shall send the details of the comments which have given rise to the difficulties and make any suggestions that it (they) may consider useful.

NOC **1055** *Results of advance publication*

MOD **1056** **Orb-88** § 4. An administration on behalf of which details of planned satellite networks have been published in accordance with the provisions of Nos. **1042** to **1044** shall, after the period of four months specified in No. **1047**, inform the Board whether or not comments provided for in No. **1047** have been received and of the progress made in resolving any difficulties. Additional information on the progress made in resolving any remaining difficulties shall be sent to the Board at intervals not exceeding six months prior to the commencement of coordination or the sending of the notices to the Board. The Board shall publish this information in the special section of its weekly circular referred to in No. **1044** and shall also, when the weekly circular contains such information, so inform all administrations by circular telegram.

ADD **1056A** **Orb-88** When, upon expiry of a period of six years plus the extension provided for in No. **1550** after the date of the publication of the special section referred to in No. **1044**, the administration responsible for the network has not submitted the Appendix **3** information for coordination under No. **1060** or for notification under No. **1488**, as appropriate, the information published under No. **1044** shall be cancelled after the administration concerned had been informed.

NOC **1057** *Commencement of Coordination or Notification Procedures*

SUP **1058** **Orb-88**

ADD **1058A** **Orb-88** § 5 (1) When communicating to the Board the information referred to in No. **1042**, an administration may, at the same time or at a later time, communicate:

ADD **1058B** **Orb-88** *a)* the information required for the network coordination of a frequency assignment to a station pertaining to a geostationary-satellite network in accordance with the provisions of No. **1074**, including the copy of the request for coordination sent to any other administration; this information will be treated in accordance with the provisions of Section II of this Article; *or*

ADD **1058C** **Orb-88** *b)* the information required for notification of a frequency assignment to a station of a geostationary-satellite network when coordination for that assignment is not required; *or*

ADD **1058D** **Orb-88** *c)* the information required for notification of a frequency assignment to a station of a non-geostationary-satellite network.

ADD **1058E** **Orb-88** The coordination or notification information, as the case may be, shall be considered as having been received by the Board not earlier than six months after the date of receipt of the information referred to in No. **1042**.

MOD **Orb-88**

Section II. Coordination of Frequency Assignments to a Space Station on a Geostationary Satellite or an Earth Station Communicating with Such a Space Station using Frequency Bands other than Those Covered by the Fixed-Satellite Service Allotment Plan in Relation to Stations of Other Geostationary-Satellite Networks *

NOC **1059** *Requirement for Coordination*

MOD **1060** **Orb-88** § 6. (1) Before an administration (or one acting on behalf of one or more named administrations) notifies to the Board or brings into use any frequency assignment to a space station on a

---

ADD * See also Section IB of Article 6 of Appendix **30B**.

geostationary satellite or to an earth station that is to communicate with a space station on a geostationary satellite, it shall, except in the cases described in Nos. **1066** to **1071**, effect coordination of the assignment with any other administration whose assignment, for a space station on a geostationary satellite or for an earth station that communicates with a space station on a geostationary satellite, might be affected.[1]

ADD **1060A** **Orb-88** Coordination under No. **1060** may be effected for a satellite network using the information relating to the space station, including its service area, and the parameters of one or more typical earth stations which may be located in all or part of the space station service area.

ADD **1060B** **Orb-88** If a frequency assignment is brought into use before the commencement of the coordination procedure of No. **1060**, when this coordination is required, the operation in advance of the receipt by the Board of the Appendix **3** information shall in no way afford any priority of the date.

MOD **1061** **Orb-88** (2) Frequency assignments to be taken into account in the application of No. **1060** are those in the same frequency band as the planned assignment, pertaining to the same service or to another service to which the band is allocated with equal rights or a higher category of allocation (see Nos. **420-425** and **435**), and which are:

MOD **1062** **Orb-88** *a)* in conformity with No. **1503**; *and*

ADD **1060.1** **Orb-88** [1] In cases where the application of Article **14** is required with respect to one or more assignments of a network, the agreement obtained in application of Article **14** in relation to an assignment of another satellite network to which Nos. **1061** to **1065** apply shall be deemed to constitute successful application of the procedure of Section II of this Article.

MOD **1064** Orb-88

c) included in the coordination procedure with effect from the date of receipt [1] by the Board, in accordance with No. **1074**, of the relevant information as specified in Appendix **3**; *or*

MOD **1065** Orb-88

d) already notified to the Board without any coordination in those cases where Nos. **1066** to **1071** apply.

NOC **1066**

(3) No coordination under No. **1060** is required:

ADD **1066A** Orb-88

a) when an administration proposes to notify or bring into use, within the service area of a satellite network, a typical earth station or an earth station which would not cause or suffer interference of a level greater than the typical earth station;

(MOD) **1067** Orb-88

b) when the use of a new frequency assignment will cause, to any service of another administration, an increase in the noise temperature of any space station receiver or earth station receiver, or an increase in the equivalent satellite link noise temperature, as appropriate, calculated in accordance with the method given in Appendix **29**, which does not exceed the threshold value defined therein;

(MOD) **1068** Orb-88

c) when the interference resulting from a modification to a frequency assignment which has previously been coordinated will not exceed that value agreed during coordination;

ADD **1064.1** Orb-88

[1] See No. **1058E** concerning the date to be considered as the date of receipt by the Board of the information relating to the coordination of a satellite network or a notification of a frequency assignment.

MOD **1069** **Orb-88**

d) when an administration proposes to notify or bring into use a new earth station which would not cause or suffer interference of a level greater than that which would be caused by an earth station belonging to the same satellite network and whose characteristics have been published in accordance with No. **1078**, or notified to the Board without coordination in those cases where coordination was not required;

(MOD) **1070** **Orb-88**

e) when, for a new frequency assignment to a receiving station, the notifying administration states that it accepts the interference resulting from the frequency assignments referred to in Nos. **1061** to **1065.**

(MOD) **1071** **Orb-88**

f) between earth stations using frequency assignments in the same direction (either Earth-to-space or space-to-Earth).

NOC **1072** *Coordination Data*

MOD **1073** **Orb-88**

§ 7. (1) For the purpose of effecting coordination, the administration requesting coordination shall send to any other administration concerned under No. **1060** all the information listed in Appendix **3** required for coordination including the characteristics of one or more typical earth stations and the respective areas in which they may be located. The request concerning coordination of a network may specify all or some of the frequency assignments expected to be used by the stations of the satellite network.

MOD **1074** **Orb-88**

(2) The administration requesting coordination shall at the same time send to the Board a copy of the request for coordination, with all the information listed in Appendix **3** required for coordination and the name(s) of the administration(s) with which coordination is sought. The Board shall immediately acknowledge the receipt of this information.

ADD **1074A** **Orb-88** (3) An administration believing that the provisions of Nos. **1066** to **1071** apply to its planned assignments may send to the Board the relevant information listed in Appendix **3**, either under No. **1074** for publication or in accordance with Nos. **1488** to **1491**.

MOD **1075** **Orb-88** § 8. (1) On the receipt of the complete information referred to in No. **1074**, the Board shall:

MOD **1076** **Orb-88** *a)* immediately examine this information with respect to its conformity with No. **1503** and, as soon as possible, send a telegram to all administrations indicating the identity of the satellite network, its findings with respect to No. **1503** and the date of receipt[1] of the information; this date shall be considered as the date from which the assignment will be taken into account for coordination;

MOD **1078** **Orb-88** *c)* publish in the special section of its weekly circular referred to in No. **1044**, within three months, the information received under No. **1074** and the result of the examination under Nos. **1076** and **1077**. When the weekly circular contains such information, the Board shall so inform all administrations by circular telegram. When the Board is not in a position to comply with the time limit referred to above, it shall periodically so inform the administrations giving the reasons therefor.

ADD **1078A** **Orb-88** (2) If the information is found to be incomplete, the Board shall immediately seek from the administration concerned any clarification and information not provided.

ADD **1076.1** **Orb-88** [1] See No. **1058E** concerning the date to be considered as the date of receipt by the Board of the information relating to the coordination of a satellite network or a notification of a frequency assignment.

NOC **1083** *Examination of Coordination Data and Agreement Between Administrations*

MOD **1084** **Orb-88** § 11. (1) On receipt of the coordination data, an administration shall promptly examine the matter with regard to interference [1] which would be caused to the frequency assignments of its network in respect of which coordination is sought under No. **1060** or caused by these assignments. In so doing, it shall have regard to the proposed date of bringing into use of the assignment for which coordination was requested. It shall then, within four months from the date of the relevant weekly circular, notify the administration requesting coordination of its agreement. If, however, the administration with which coordination is sought does not agree, it shall, within the same period, send to the administration seeking coordination the technical details upon which its disagreement is based, including those relevant characteristics contained in Appendix **3** which have not previously been notified to the Board, and make such suggestions as it is able to offer with a view to a satisfactory solution of the problem. A copy of these comments shall also be sent to the Board.

MOD **1085** **Orb-88** (2) Either the administration seeking coordination or an administration with which coordination is sought may request additional information which it may require to assess the interference to assignments of the network concerned.

MOD **1084.1** **Orb-88** [1] In the absence of specific provisions relating to the evaluation of the interference, the calculation methods and the criteria should be based on relevant CCIR Recommendations agreed by the administrations concerned either as a result of Resolution **703** or otherwise. In the event of disagreement on a CCIR Recommendation or in the absence of such Recommendations, the methods and criteria shall be agreed between the administrations concerned. Such agreements shall be concluded without prejudice to other administrations.

ADD **1085A** **Orb-88** (3) Affected administrations as well as the administration seeking coordination shall make all possible mutual efforts to overcome the difficulties, in a manner acceptable to the parties concerned.

ADD **1085B** **Orb-88** All administrations may use correspondence, any appropriate means of telecommunication, or bilateral or multilateral meetings, as necessary, to effect coordination with any other administration. The results thereof shall be communicated to the Board in accordance with No. **1087**.

ADD **1085C** **Orb-88** (5) In exceptional cases the multilateral coordination among the administrations concerned, of networks in the fixed-satellite service, may take the form of a Multilateral Planning Meeting (MPM) in accordance with *resolves* 1 to 7 of Resolution **110 (Orb-88)** and shall apply to the following frequency bands:

3 700 - 4 200 MHz
5 850 - 6 425 MHz
10.95 - 11.20 GHz
11.45 - 11.70 GHz
11.70 - 12.20 GHz in Region 2 [1]
12.50 - 12.75 GHz in Region 1 and Region 3 [1, 2]
14.00 - 14.50 GHz

ADD **1085D** **Orb-88** (6) Towards this end, the administration seeking coordination may initiate action to convene a Multilateral Planning Meeting (MPM) to resolve mutually the difficulties and effect the coordination of the satellite network.

ADD **1085C.1** **Orb-88** [1] In these bands this provision shall apply between networks of the fixed-satellite service only.

ADD **1085C.2** **Orb-88** [2] When a fixed-satellite service network is to be operated in the frequency band 12.5 - 12.75 GHz as well as under No. **845** in the frequency band 12.2 - 12.5 GHz, this provision may apply for coordination of the network.

NOC **1086** *Results of Coordination*

MOD **1087** **Orb-88** § 12. (1) An administration which has initiated a coordination procedure under the provisions of Nos. **1060** to **1074** shall communicate to the Board, on expiry of the period of four months following the date of the relevant weekly circular mentioned in No. **1078**, the names of the administrations with which an agreement has been reached. It shall also inform the Board of the progress made in effecting coordination with the other administrations or of any difficulties. Such a communication shall be made to the Board every six months after the above-mentioned period. The Board shall publish this information in the special section of its weekly circular referred to in No. **1044**.

ADD **1087A** **Orb-88** (2) An administration which initiated the coordination, as well as any administration with which coordination is sought, shall communicate to the Board any modifications to the published characteristics of their respective networks that were required to reach agreement on the coordination. The Board shall publish this information in accordance with No. **1078**, indicating that these modifications resulted from the joint effort of the administrations concerned to reach agreement on coordination and for this reason they should be given special consideration.

ADD **1087B** **Orb-88** (3) When the coordination process takes the form of a Multilateral Planning Meeting (MPM), in accordance with *resolves* 1 to 7 of Resolution **110 (Orb-88)**, the administration which sought the coordination of its satellite network shall communicate to the Board the names of administrations with which coordination has been completed and an agreement reached, as well as the names of administrations with which coordination has not been completed.

ADD **1087C** **Orb-88** (4) Each administration participating in a Multilateral Planning Meeting (MPM) shall communicate to the Board any changes agreed upon in the published characteristics of frequency assignments of its satellite networks considered by the Multilateral Planning Meeting (MPM).

ADD **1087D** **Orb-88** (5) The Board shall publish the information specified in Nos. **1087B** and **1087C** above in the special section of its weekly circular referred to in No. **1044** and shall also, when the weekly circular contains such information, so inform all administrations by circular telegram.

NOC **1088** *Requests to the IFRB for Assistance in Effecting Coordination*

ADD **1091A** **Orb-88** *c)* a bilateral or multilateral meeting, or a Multilateral Planning Meeting (MPM) is required to achieve coordination and the administration concerned experiences difficulties in making arrangements for it;

(MOD) **1092** **Orb-88** *d)* there is disagreement between the administration seeking coordination and an administration with which coordination is sought as to the acceptable interference; *or*

(MOD) **1093** **Orb-88** *e)* coordination is not possible for any other reason.

MOD **1094** **Orb-88** (2) In so doing, the administration shall provide the necessary information to enable the Board to endeavour to effect such coordination.

NOC **1095** *Action to be taken by the IFRB*

ADD **1098A** **Orb-88** (4) Where the Board receives a request under No. **1091A**, it shall take appropriate steps to facilitate the holding of such meetings when all administrations concerned agree and shall also provide requested assistance that may help in achieving coordination.

(MOD) **1099** **Orb-88** (5) Where necessary, as part of the procedure under Nos. **1089** to **1094**, the Board shall assess the interference. In any case, the Board shall inform the administrations concerned of the results obtained.

MOD **1100** **Orb-88** (6) The Board may request additional information which it may require to assess the interference to assignments of the network concerned.

MOD **1101** **Orb-88** (7) Where an administration fails to reply within thirty days of dispatch of the Board's telegram requesting acknowledgement sent under No. **1096**, or fails to give a decision in the matter within thirty days of dispatch of the Board's telegram of request under No. **1097**, or fails to reply to the Board's requests made in application of No. **1098A**, it shall be deemed that the administration with which coordination was sought has undertaken:

MOD **1102** **Orb-88** *a)* that no complaint will be made in respect of any harmful interference affecting the services rendered by its space radiocommunication stations which may be caused by the use of the assignment to a station of the satellite network for which coordination was requested;

MOD **1103** **Orb-88** *b)* that its space radiocommunication stations will not cause harmful interference to the satellite network assignment for which coordination was requested.

SUP **1104** **Orb-88**

SUP **1105** **Orb-88**

MOD **Orb-88**

Section III. Coordination of Frequency Assignments to an Earth Station Operating in a Geostationary or Non-Geostationary Satellite Network in Relation to Terrestrial Stations

ADD **1111A** **Orb-88** *d)* to bring into use a new frequency assignment to a receiving earth station and the notifying administration states that it accepts the interference resulting from existing and future terrestrial station assignments. In such case, administrations responsible for the terrestrial stations are not required to apply the provisions of Section IV of this Article.

MOD **1118** Orb-88

a) interference [1] which would affect the service rendered by its terrestrial radiocommunication stations operating in accordance with the Convention and these Regulations, or to be so operated prior to the planned date of bringing the earth station assignment into service, or within the next three years, whichever is the longer; *and*

MOD **1143** Orb-88

a) that no complaint will be made in respect of any harmful interference affecting the services rendered by its terrestrial stations which may be caused by the use of the assignment for which coordination was requested;

MOD **1144** Orb-88

b) that its terrestrial stations will not cause harmful interference to the frequency assignment for which coordination was requested.

SUP **1145** Orb-88

SUP **1146** Orb-88

MOD **1118.1** **1119.1** Orb-88

[1] In the absence of specific provisions relating to the evaluation of the interference, the calculation methods and the criteria should be based on relevant CCIR Recommendations agreed by the administrations concerned either as result of Resolution **703** or otherwise. In the event of disagreement on a CCIR Recommendation or in the absence of such Recommendations, the methods and criteria shall be agreed between the administrations concerned. Such agreements shall be concluded without prejudice to other administrations.

NOC

Section IV. Coordination of Frequency Assignments to a Terrestrial Station for Transmission in Relation to an Earth Station

MOD **1164** **Orb-88** § 26. (1) On receipt of the coordination data, the administration with which coordination is sought shall promptly examine the matter with regard to interference [1] which would affect the services rendered by its earth stations covered by Nos. **1148** to **1154**, which are operating, or are to be operated, within the next three years.

MOD **1166** **Orb-88** (3) The administration with which coordination is sought shall, within an overall period of four months [2] from dispatch of the coordination data, either notify the administration requesting coordination of its agreement to the proposed assignment or, if this is not possible, indicate the reasons for its objection and make such suggestions as it may be able to offer with a view to a satisfactory solution of the problem.

MOD **1167** **Orb-88** § 27. Either the administration seeking coordination or the administration with which coordination is sought may request additional information which it may require to assess the interference to assignments of the network concerned.

ADD **1189** **Orb-88** § 32. If requested by an administration participating in a Multilateral Planning Meeting (MPM), the Board, using such means at its disposal as are appropriate in the circumstances, shall render technical assistance for the completion of the procedures of Section II of this Article. In making such a request this administration shall furnish the Board with all necessary information.

ARTICLE 12

MOD Orb-88 **Notification and Recording in the Master International Frequency Register of Frequency Assignments [1] to Terrestrial Radiocommunication Stations [2, 3, 4]**

MOD A.12.4 Orb-88 [4] For the notification and recording of frequency assignments to terrestrial stations in the frequency bands 14.5 - 14.8 GHz (in Regions 1 and 3), 17.7 - 17.8 GHz (in Region 2), and 17.7 - 18.1 GHz (in Regions 1 and 3), so far as their relationship to the fixed-satellite service (Earth-to-space) in this band is concerned, see also Article **15A**.

ARTICLE 13

MOD Orb-88

Notification and Recording in the Master International Frequency Register of Frequency Assignments [1] to Radio Astronomy and Space Radiocommunication Stations Except Stations in the Broadcasting-Satellite Service [2, 3, 4]

ADD 1493A Orb-88

(4) A notice submitted in accordance with Nos. **1488** to **1491** and relating to a frequency assignment to a space station for transmission or reception may indicate the characteristics of one or more associated typical earth stations with the area in which they are intended to be operated.

MOD A.13.2 Orb-88

[2] For the notification and recording of frequency assignments to stations in the broadcasting-satellite service and other services in the frequency bands 11.7 - 12.2 GHz (in Region 3), 11.7 - 12.5 GHz (in Region 1) and 12.2 - 12.7 GHz (in Region 2), as well as the notification and recording of frequency assignments to feeder-link stations in the fixed-satellite service (Earth-to-space) in the frequency bands 14.5 - 14.8 GHz in Region 1 (see No. **863**) and in Region 3, 17.3 - 18.1 GHz in Regions 1 and 3, and 17.3 - 17.8 GHz in Region 2 and other services in these bands, see also Article **15** and Article **15A** respectively.

ADD A.13.3 Orb-88

[3] These procedures may be applicable for earth stations of the earth exploration satellite service, space research service, space operation service and radiodetermination satellite service intended to be used while in motion or during halts at unspecified points.

ADD A.13.4 Orb-88

[4] For the application of the provisions of this Article with respect to stations in a space radiocommunication service using frequency bands covered by the fixed-satellite service Allotment Plan, see also Appendix **30B**.

MOD **1494** **Orb-88**

(5) A notice submitted in accordance with Nos. **1488** to **1491** and relating to a frequency assignment to earth stations in a satellite system shall include the technical characteristics either of each earth station, with its location, or of a typical earth station, with an indication of the area within which such typical earth stations are to be operated.

ADD **1494A** **Orb-88**

Except for mobile earth stations, individual notification of an earth station is required when:

ADD **1494B** **Orb-88**

a) the coordination area calculated in accordance with the method given in Appendix **28** overlaps the territory of another administration in which the frequency band is allocated with equal rights to the terrestrial services;

ADD **1494C** **Orb-88**

b) the characteristics of the earth station are such that the interference caused or suffered is greater than for any typical earth station coordinated under No. **1060** for the relevant location.

MOD **1503** **Orb-88**

a) with respect to its conformity with the Convention, the Table of Frequency Allocations [1] and the other provisions of the Radio Regulations, with the exception of those relating to the coordination procedures and the probability of harmful interference which are the subject of the following subparagraphs:

MOD **1517** **Orb-88**

§ 12. (1) Finding unfavourable with Respect to No. **1503.**

MOD **1518** **Orb-88**

(2) Where the notice includes a specific reference to the fact that the station will be operated in accordance with the provisions of No. **342**, the assignment shall be recorded in the Master Register on the understanding that the provisions of No. **1560** shall be applied, as appropriate. The date of receipt by the Board of the notice shall be entered in Column 2d.

ADD **1503.1** **Orb-88**

[1] Conformity with the Table of Frequency Allocations implies the successful application of Article **14**, when necessary.

SUP **1520**
Orb-88

SUP **1521**
Orb-88

SUP **1522**
Orb-88

SUP **1523**
Orb-88

SUP **1524**
Orb-88

MOD **1529**
Orb-88

b) if the Board's efforts toward securing agreement in application of No. **1528** or Nos. **1089** to **1094** or Nos. **1130** to **1135** are unsuccessful, the Board shall examine the notice with respect to the provisions of Nos. **1506** to **1508** and Nos. **1509** to **1512**, as appropriate. At the same time, the Board shall so inform the administrations concerned;

ADD **1530A**
Orb-88

(4) Where the notifying administration states that it has been unsuccessful in the application of the coordination procedures mentioned in Nos. **1504** and **1505**, the Board shall examine the notice with respect to the provisions of Nos. **1506** to **1508** and Nos. **1509** to **1512**, as appropriate. At the same time, the Board shall so inform the administrations concerned.

(MOD) **1531**
Orb-88

(5) Where the notifying administration resubmits the notice and the Board finds that the coordination procedures mentioned in Nos. **1504** and **1505** have been successfully completed with all administrations whose space or terrestrial radiocommunication stations may be affected, the assignment shall be recorded in the Master Register. The date of receipt by the Board of the original notice shall be entered in Column 2d. The date of receipt by the Board of the resubmitted notice shall be entered in the Remarks Column.

(MOD) **1532** **Orb-88** (6) Where the notifying administration resubmits the notice with a request that the Board effect the required coordination under No. **1060** or **1107**, it shall be treated in accordance with the provisions of Nos. **1527** and either **1528** or **1529**. However, in any subsequent recording of the assignment, the date of receipt by the Board of the resubmitted notice shall be entered in the Remarks Column.

MOD **1550** **Orb-88** (4) The notified date of bringing into use of the first assignment of a satellite network shall not be later than six years following the date of publication of the special section of the weekly circular referred to in No. **1044**. This notified date of bringing into use will be extended at the request of the notifying administration by no more than three years.

MOD **1556** **Orb-88** (5) In the circumstances described in No. **1544**, and as long as an assignment which received an unfavourable finding cannot be resubmitted with a statement relating to operation without interference, the notifying administration may ask the Board to enter the assignment provisionally in the Master Register, in which event a special symbol to denote the provisional nature of the entry shall be entered in the Remarks Column. The Board shall delete this symbol when it receives from the notifying administration, at the end of the period in No. **1544**, the information relating to the absence of complaint of harmful interference.

ARTICLE 14

NOC

Supplementary Procedure to Be Applied in Cases Where a Footnote in the Table of Frequency Allocations Requires an Agreement with an Administration

ADD **1619A** **Orb-88** When an administration intends to bring into use a frequency assignment to a space radiocommunication station, the agreement of an administration having an existing or planned space radiocommunication station may be required with respect to the assignments of this administration:

ADD **1619B** **Orb-88** *a)* which are recorded in the Master Register, in conformity with No. **1503**; *or*

ADD **1619C** **Orb-88** *b)* which are notified to the Board;

ADD **1619D** **Orb-88** *c)* for which information under No. **1042** [2] has been received by the Board; *or*

ADD **1619E** **Orb-88** *d)* for which the procedure of this Article has been initiated.

MOD **1613.1** **Orb-88** [1] The information in Appendix **3** or **4** submitted to the Board under Article **11** may also be used for the purpose of this procedure. When the Appendix **4** information is submitted for an assignment to a geostationary-satellite network, the administration seeking agreement under this Article shall also submit the information required for the application of Appendix **29**.

ADD **1619D.1** **Orb-88** [2] The administration having such an assignment is requested to communicate as soon as possible the Appendix **3** information or, in the case of a geostationary-satellite network, any information in addition to that communicated in accordance with Appendix **4** which is necessary for the application of Appendix **29**.

ARTICLE 15A

MOD **Orb-88** **Coordination, Notification and Recording of Frequency Assignments to Stations in the Fixed-Satellite Service (Earth-to-Space) in the Frequency Bands 14.5 - 14.8 GHz (in Regions 1 and 3), 17.3 - 18.1 GHz (in Regions 1 and 3) and 17.3 - 17.8 GHz (in Region 2) Providing Feeder Links for the Broadcasting-Satellite Service and also to Stations of Other Services to Which these Bands are Allocated, so far as their Relationship to the Fixed-Satellite Service (Earth-to-Space) in these Bands Is Concerned**

MOD **1668** **Orb-88** The provisions and associated Plans for feeder links associated with the broadcasting-satellite service, utilizing the fixed-satellite service (Earth-to-space) in the frequency bands 14.5 - 14.8 GHz (in Regions 1 and 3), 17.3 - 18.1 GHz (in Regions 1 and 3) and 17.3 - 17.8 GHz (in Region 2), as contained in Appendix **30A (Orb-88)**, shall apply to the assignment and use by feeder links of frequencies in this band and to stations of other services to which these bands are allocated so far as the relationship of these other services to the fixed-satellite service (Earth-to-space) in these bands is concerned. For feeder links in the fixed-satellite service for the broadcasting-satellite service in Region 2, Resolution **42 (Rev. Orb-88)** is also applicable.

NOC **1969** to **1681** NOT allocated.

CHAPTER VIII

NOC

Provisions Relating to Groups of Services and to Specific Services and Stations *

ARTICLE 27

Terrestrial Radiocommunication Services Sharing Frequency Bands with Space Radiocommunication Services above 1 GHz

MOD **2510** **Orb-88** (6) The limits given in Nos. **2503**, **2505** and **2508** apply in the following frequency bands allocated to the fixed-satellite service for reception by space stations, where these bands are shared with equal rights with the fixed or mobile service:

10.7 - 11.7 GHz [1] (for Region 1)

12.5 - 12.75 GHz [1] (for countries mentioned in Nos. **848** and **850**)

MOD **Orb-88** * For provisions governing the mobile services and the special services related to safety, see:

Special services related to safety:	Chapter **IX**
Aeronautical mobile service and aeronautical mobile-satellite service:	Chapter **X**
Maritime mobile service:	Chapter **XI**
Maritime mobile-satellite service:	Chapter **XI**
Land mobile service and land mobile satellite service:	Chapter **XII**

12.7 - 12.75 GHz [1] (for Region 2)
12.75 - 13.25 GHz

14.0 - 14.25 GHz (for countries mentioned in No. **857**)

14.25 - 14.3 GHz (for countries mentioned in Nos. **857**, **860** and **861**)

14.3 - 14.4 GHz [1] (for Regions 1 and 3)
14.4 - 14.5 GHz
14.5 - 14.8 GHz

MOD **2511** **Orb-88** (7) The limits given in Nos. **2505** and **2508** apply in the following frequency bands allocated to the fixed-satellite service for reception by space stations, where these bands are shared with equal rights with the fixed or mobile service:

17.7 - 18.1 GHz
27.0 - 27.5 GHz [3] (for Regions 2 and 3)
27.5 - 29.5 GHz

SUP **2510.2** **Orb-88**

SUP **2511.1** **Orb-88**

ARTICLE 28

NOC

Space Radiocommunication Services Sharing Frequency Bands with Terrestrial Radiocommunication Services above 1 GHz

MOD **2576.2** Orb-88

[2] See No. **2576.1** and Resolution **34**.

ARTICLE 29

NOC

Special Rules Relating to Space Radiocommunication Services

NOC

Section III. Station Keeping of Space Stations [1]

MOD **A.29** **S.III.1** Orb-88

[1] In the case of space stations on board geosynchronous satellites with circular orbits having an angle of inclination greater than 5 degrees, the positional tolerance shall relate to the nodal point.

CHAPTER XIII

ARTICLE 69

Entry into Force of the Radio Regulations

MOD **5187** **Orb-88** These Regulations, which are annexed to the International Telecommunication Convention, shall enter into force on 1 January 1982, except as specified in Nos. **5188, 5189, 5193, 5194** and **5195**.

MOD **5193** **Orb-88** § 7. The partial revision of the Radio Regulations contained in the Final Acts of WARC ORB-85 shall enter into force on 30 October 1986 at 0001 hours UTC.

ADD **5195** **Orb-88** § 10. The partial revision of the Radio Regulations contained in the Final Acts of WARC ORB-88 shall enter into force on 16 March 1990 at 0001 hours UTC.[1]

SUP **5193.1** ~~Orb-88~~

ADD **5195.1** ~~Orb-88~~ [1] For the provisional application of certain parts of this revision, see Resolutions **104 (Orb-88)** and **106 (Orb-88)**.

MOD

APPENDIX 3

Orb-88

NOC

Notices Relating to Space Radiocommunications and Radio Astronomy Stations

MOD

(See Articles **11**, **13** and **14**)

MOD

Section I. General Instructions

MOD 1. A separate notice shall be sent to the International Frequency Registration Board for the purpose of:

a) coordinating under No. **1060** frequency assignments of a geostationary-satellite network, taking into account the characteristics of its associated stations (see Section II of this Appendix);

b) coordinating under No. **1060** frequency assignments to a specific earth station (see Section II of this Appendix);

c) coordinating under No. **1060** frequency assignments to a typical earth station not previously so coordinated (see Section II of this Appendix);

d) coordinating under No. **1107** frequency assignments to an earth station (see Section III of this Appendix);

e) notifying each frequency assignment to a space station of a geostationary, non-geostationary or deep-space satellite network, taking into account the characteristics of its associated stations (see Section II of this Appendix);

f) notifying each frequency assignment to an earth station (see Section III of this Appendix);

g) notifying each frequency assignment to be received by a radio astronomy station (see Section IV of this Appendix);

h) notifying any change in the characteristics of a frequency assignment recorded in the Master International Frequency Register (hereinafter called the *Master Register*);

i) notifying any total deletion of a frequency assignment recorded in the Master Register.

MOD 2. When notices are submitted under Nos. **1488** to **1491** for frequency assignments to a space station and associated earth stations that together are to form a satellite network, for transmission and reception by the space station or any associated earth station, a single notice may be submitted that covers all basic characteristics of the network and listing the assigned frequencies as prescribed in this Appendix. However, when individual notices are submitted under Nos. **1488** to **1491** for frequency assignments to an earth or space station for transmitting or for frequency assignments to be used for reception by an earth or space station, separate notices shall be submitted to the Board for each station. In each of these cases, when the basic characteristics are identical with the exception of the frequency, a single notice may be submitted covering all basic characteristics and listing the assigned frequencies.

A transmitting or receiving earth station, the basic characteristics of which may cause more interference or require more protection than those of a typical earth station associated with a previously notified network, may be associated with that network, as a new type of associated earth station, when it has been successfully coordinated under the provisions of No. **1060** as part of the network.

NOC 3. In the case of a satellite system employing multiple space stations with the same general characteristics, a separate notice shall be submitted to the Board for each space station for transmitting or receiving assignments:

– when it is aboard a geostationary satellite;

– when it is aboard a non-geostationary satellite, except when a number of satellites have the same radio frequency characteristics and orbital characteristics (excluding the ascending node position); in the latter case, one notice covering all such space stations may be submitted to the Board.

ADD 4. The notices and basic characteristics shall also be used for seeking agreement in accordance with Article **14** of the Radio Regulations.

MOD 5. The following information, when appropriate, shall be shown on the notice:

a) the national serial number of the notice and the date on which the notice is sent to the Board;

b) the name of the notifying administration;

c) whether the notice reflects:

1) first notification and, if so, whether it is an addition (ADD), modification (MOD) or deletion (SUP);

2) resubmission of the notice;

3) a request for coordination in accordance with No. **1060**;

4) a request for coordination in accordance with No. **1107**;

5) notification in accordance with No. **1488**;

6) a request for agreement in accordance with Article **14** of the Radio Regulations;

7) a request for the assistance of the IFRB;

d) reference to the IFRB weekly circular special section providing the advance publication information required in accordance with No. **1042**;

e) reference to the IFRB weekly circular special section providing the coordination information required in accordance with No. **1060**;

f) reference to the IFRB weekly circular special section providing the information required in accordance with Article **14** of the Radio Regulations;

g) characteristics as outlined in Sections II, III, or IV of this Appendix as appropriate;

h) any other information which the administration considers to be relevant, for instance: an indication that the assignment concerned would operate in accordance with No. **342**; any factors taken into account when applying Appendix **28** to the Radio Regulations for determination of the coordination area; or whether the transmissions of the station are to be permanently switched off after a certain period.

MOD

Section II. Notices Relating to Coordination under No. 1060 of Satellite Networks, and Notification of Space Stations

ADD 2.A General characteristics to be provided for the satellite network

MOD 2.A.1 Identity of the satellite network

Indicate the identity of the space station(s).

(MOD) 2.A.2 Date of bringing into use [3]

a) In the case of a new assignment, indicate the date (actual or foreseen, as appropriate) of bringing the frequency assignment into use.

b) Whenever the assignment is changed in any of its basic characteristics (except in the case of a change in Item 2.A.1), the date to be given shall be that of the latest change (actual or foreseen, as appropriate).

(MOD) 2.A.3 Operating administration or company

MOD Give the name of the operating administration or company and the postal and telegraphic addresses of the administration to which communications should be sent on urgent matters regarding interference, quality of emissions and questions referring to the technical operation of the space station (see Article **22** of the Radio Regulations).

(MOD) 2.A.4 Orbital information

a) In the case of a space station aboard a geostationary satellite indicate the nominal geographical longitude on the geostationary-satellite orbit and the planned longitudinal tolerance and inclination excursion. Indicate also in the case where a geostationary satellite is intended to communicate with an earth station:

1) the arc of the geostationary-satellite orbit over which the space station is visible, at a minimum angle of elevation of 10° at the Earth's surface, from its associated earth stations or service areas;

2) the arc of the geostationary-satellite orbit within which the space station could provide the required service to its associated earth stations or service areas;

3) in the event that the arc defined in paragraph 2) above is less than the arc defined in paragraph 1) above, the reasons therefore.

Note – The arcs specified in 1) and 2) will be indicated by the geographical longitude of the extremes of these arcs on the geostationary-satellite orbit.

b) In the case of any space station(s) aboard non-geostationary satellite(s), indicate the angle of inclination of the orbit, the period, the altitudes in kilometres of the apogee and perigee of the space station(s) and the number of satellites used.

(MOD) 2.A.5 Coordination

MOD Give the name of any administration with which coordination has been successfully effected in accordance with No. **1060** and, if appropriate, the name of any administration with which coordination has been sought but not completed.

(MOD) 2.A.6 Agreements

MOD *a)* Give, if appropriate, the name of any administration with which agreement has been reached to exceed the limits prescribed in these Regulations.

b) Give, if appropriate, the name of any administration with which agreement has been reached in accordance with Article **14** of the Radio Regulations.

ADD 2.B Characteristics of the satellite network for reception at the space station

All the information required in sub-section 2.B is to be provided for each satellite receiving beam if a network is to be coordinated or notified.

ADD Information related to satellite receiving beam

ADD 2.B.1 Name of satellite receiving beam

Indicate, for a geostationary satellite, the name of the satellite receiving antenna beam and whether it is a steerable or reconfigurable antenna beam.

ADD 2.B.2 Service area or associated transmitting station(s)

a) When the associated transmitting stations are earth stations, indicate the service area or areas of the satellite beam on the Earth.

b) When the associated transmitting stations are space stations, identify each station by reference to the notification thereof or in any other appropriate manner.

ADD 2.B.3 Assigned frequency (frequencies)

Indicate the assigned frequency (frequencies), as defined in No. **142**, in kHz up to 28 000 kHz inclusive, in MHz above 28 000 kHz to 10 500 MHz inclusive and in GHz above 10 500 MHz.

If the basic characteristics are identical, with the exception of the frequency, a single notice may be submitted covering all basic characteristics and listing the assigned frequencies.

(MOD) 2.B.4 Assigned frequency band

NOC Indicate the bandwidth of the assigned frequency band in kHz (see No. **141**).

(MOD) 2.B.5 Class of station(s) and nature of service

Indicate the class of station and nature of service performed, using the symbols shown in Appendix **10**.

ADD 2.B.6 Space station receiving antenna characteristics

a) In the case of a space station aboard a geostationary satellite that is intended to communicate with an earth station, indicate whether the receiving antenna beam will point in a fixed direction or will have a steerable beam (see No. **183**) capability.

b) In the case of a space station aboard a geostationary satellite, indicate the name of the satellite antenna beam by a three character code. For steerable beams, the last character shall be an "R".

c) In the case of a space station aboard a geostationary satellite that is intended to communicate with an earth station via a receiving antenna pointing in a fixed direction, indicate the maximum isotropic gain (dBi) and the gain contours plotted on a map of the Earth's surface, preferably in a radial projection from the satellite onto a plane perpendicular to the axis from the centre of the Earth to the satellite. The space station antenna gain contours shall be drawn as isolines of the isotropic gain, at least for −2, −4, −6, −10 and −20 dB and at 10 dB intervals thereafter, as necessary, relative to the maximum antenna gain, when any of these contours is located either totally or partially anywhere within the limit of visibility of the Earth from the given geostationary satellite. Whenever possible the gain contours of the space station receiving antenna should also be provided in the form of a numerical equation.

d) In the case of a space station aboard a geostationary satellite where a steerable beam is used, data on the radiation characteristics shall be provided as follows:

1) if the effective boresight area (see No. **168A**) is identical with the global or nearly global service area, provide only the maximum isotropic antenna gain (dBi). The maximum antenna gain is applicable to all points on the Earth's visible surface;

2) if the effective boresight area (see No. **168A**) is less than the global or nearly global service area, provide the maximum antenna gain and the effective antenna gain contours (see No. **168B**). These contours shall be provided as defined in *c*) above.

e)[1] In the case of a space station aboard a geostationary satellite, include, in the antenna gain contours of *c)* and *d)* 2) above, the effect of the planned longitudinal tolerance, inclination excursion and pointing accuracy of the antenna.

f) In the case of a space station aboard a geostationary satellite in which the antenna radiation beam is directed towards another satellite, also indicate the antenna radiation pattern, taking the gain in the direction of maximum radiation as a reference.

g) In the case of a space station aboard a non-geostationary satellite, indicate the isotropic gain of the space station receiving antenna in the direction of maximum radiation (dBi) and indicate the antenna radiation pattern, taking the gain in the direction of maximum radiation as a reference.

h)[1] Indicate the type of polarization of the antenna. In the case of circular polarization, indicate the direction of polarization (see Nos. **148** and **149**). In the case of linear polarization, indicate the angle (in degrees) measured anticlockwise in a plane normal to the beam axis from the equatorial plane to the electric vector of the wave as seen from the satellite. Indicate also whether consent is given to the general use of this information in determining the need for coordination with other satellite networks according to Appendix **29** of the Radio Regulations.

i) Indicate, for a geostationary satellite, the pointing accuracy of the antenna.

j) In the case of a space station aboard a geostationary satellite operating in a band allocated in the Earth-to-space direction and in the space-to-Earth direction, also indicate the gain of the space station receiving antenna in the direction of those parts of the geostationary-satellite orbit which are not obstructed by the Earth, by means of a diagram showing estimated antenna gain versus orbital longitude.

MOD 2.B.7 Receiving system noise temperature

Indicate, in kelvins, the total receiving system noise temperature referred to the output of the receiving antenna of the space station.

ADD Information related to associated transmitting station(s)

This information is to be provided for each type of transmitting station associated with each space station receiving antenna beam.

ADD 2.B.8 Type and identity of the associated transmitting station(s)

Indicate whether the associated transmitting station is another space station, a typical earth station of the network, or a specific earth station.

When the associated transmitting station is:

a) another space station, indicate its characteristics by reference to the notification thereof or in any other appropriate manner;

b) a typical earth station of the network, the characteristics provided under the following items of sub-section 2.B shall represent the limiting characteristics for any earth station conforming to that type for the purpose of coordination under No. **1060**;

c) a specific earth station, the characteristics provided under the following items of sub-section 2.B only apply to that earth station and shall include the identity of the earth station and the geographical coordinates of the antenna site for the purpose of coordination under No. **1060**.

The remaining information required in sub-section 2.B is to be provided for each associated earth station or typical earth station.

MOD 2.B.9 Class of station(s) and nature of service

Indicate the class of station and nature of service performed, using the symbols shown in Appendix **10** to the Radio Regulations.

MOD 2.B.10 Earth station transmitting antenna characteristics

a) Indicate the isotropic gain (dBi) of the antenna in the direction of maximum radiation (see No. **154**).

b) Indicate the beamwidth in degrees between the half power points (describe in detail if not symmetrical).

c) Either attach the measured radiation diagram of the antenna (taking as a reference the direction of maximum radiation) or indicate the reference radiation diagram to be used for coordination.

d)[1] Indicate the type of polarization of the transmitted wave in the direction of maximum radiation; also indicate the direction in the case of circular polarization and the plane in the case of linear polarization (see Nos. **148** and **149**).

MOD 2.B.11 Class of emission, necessary bandwidth and description of the transmission

In accordance with Article **4** and Appendix **6** of the Radio Regulations:

a) indicate the class of emission and the necessary bandwidth;

b)[1] indicate the carrier frequency or frequencies of the emission(s);

c)[1] indicate, for each carrier, the class of emission, necessary bandwidth and description of transmission;

d)[1] indicate, for the carrier having the smallest bandwidth of the assignments in the system, the class of emission, necessary bandwidth and a description of the transmission.

MOD 2.B.12 Power characteristics of the earth station transmission

a)[1] Indicate for each carrier the peak envelope power (dBW) supplied to the input of the antenna.

b) Indicate the total peak envelope power (dBW) and the maximum power density (dB(W/Hz))[4] supplied to the input of the antenna averaged over the worst 4 kHz band for carriers below 15 GHz, or averaged over the worst 1 MHz band for carriers above 15 GHz.

c)[1] Indicate for each carrier the minimum value of the peak envelope power supplied to the input of the antenna.

d)[1] Indicate for each carrier type[8] (see 2.B.13), the maximum power density (dB(W/Hz))[4] supplied to the input of the antenna, averaged over the worst 4 kHz band for carriers below 15 GHz, or averaged over the worst 1 MHz band for carriers above 15 GHz.

e)[1] Indicate the maximum aggregate power (dBW) of all carriers (per transponder, if applicable) supplied to the input of the antenna and their aggregate bandwidth. If this corresponds to the bandwidth of a transponder, so indicate.

MOD 2.B.13[1] Modulation characteristics

For each carrier, according to the nature of the signal modulating the carrier and the type of modulation, indicate the following characteristics:

a) carrier frequency modulated by a frequency-division multichannel telephony baseband (FDM/FM) or by a signal that can be represented by a multi-channel telephony baseband: indicate the lowest and highest frequencies of the baseband and the r.m.s. frequency deviation of the test tone as a function of baseband frequency;

b) carrier frequency modulated by a television signal: indicate the standard of the television signal (including, where appropriate, the standard used for colour), the frequency deviation for the reference frequency of the pre-emphasis characteristic and the pre-emphasis characteristic itself; also indicate, where applicable, the characteristics of the multiplexing of the video signal with the sound signal(s) or other signals;

c) carrier phase-shift modulated by a digital signal: indicate the bit rate and the number of phases;

d) amplitude modulated carrier (including single side-band): indicate as precisely as possible the nature of the modulating signal and the kind of amplitude modulation used;

e) for all other types of modulation, provide such particulars as may be useful for an interference study;

f) for any type of modulation, as applicable, indicate the characteristics of energy dispersal, such as the peak-to-peak frequency deviation (MHz) and the sweep frequency (kHz) of the energy dispersal waveform.

ADD 2.C Characteristics of the satellite network for transmission from the space station

ADD All the information required in sub-section 2.C is to be provided for each satellite transmitting beam if a network is to be coordinated or notified.

ADD Information related to satellite transmitting beam

ADD 2.C.1 Name of the satellite transmitting beam

Indicate, for a geostationary satellite, the name of the satellite transmitting antenna beam and whether it is a steerable or reconfigurable antenna beam.

ADD 2.C.2 Service area or associated receiving station(s)

a) If the associated receiving stations are earth stations, indicate the service area or areas of the satellite beam on the Earth.

b) If the associated receiving stations are space stations, identify each station by reference to the notification thereof or in any other appropriate manner.

ADD 2.C.3 Space station transmitting antenna characteristics

a) In the case of a space station aboard a geostationary satellite that is intended to communicate with an earth station, indicate whether the transmitting antenna beam will point in a fixed direction or will have a steerable beam (see No. **183**) capability.

b) In the case of a space station aboard a geostationary satellite, indicate the name of the satellite antenna beam by a three character code. For steerable beams, the last character shall be an "R".

c) In the case of a space station aboard a geostationary satellite that is intended to communicate with an earth station via a transmitting antenna pointing in a fixed direction, indicate the maximum isotropic gain (dBi) and the gain contours plotted on a map of the Earth's surface, preferably in a radial projection from the satellite onto a plane perpendicular to the axis from the centre of the Earth to the satellite. The space station antenna gain contours shall be drawn as isolines of the isotropic gain at least for -2, -4, -6, -10 and -20 dB and at 10 dB intervals thereafter, as necessary, relative to the maximum antenna gain, when any of these contours is located either totally or partially anywhere within the limit of visibility of the Earth from the given geostationary satellite. Whenever possible the gain contours of the space station transmitting antenna should also be provided in the form of a numerical equation.

d) In the case of a space station aboard a geostationary satellite where a steerable beam is used, data on the radiation characteristics shall be provided as follows:

1) if the effective boresight area (see No. **168A**) is identical with the global or nearly global service area, provide only the maximum isotropic antenna gain (dBi). The maximum antenna gain is applicable to all points on the Earth's visible surface;

2) if the effective boresight area (see No. **168A**) is less than the global or nearly global service area, provide the maximum antenna gain and the effective antenna gain contours (see No. **168B**). These contours shall be provided as defined in *c)* above.

e)[1] In the case of a space station aboard a geostationary satellite, include, in the antenna gain contours of *c)* and *d)* 2) above, the effect of the planned longitudinal tolerance, inclination excursion and pointing accuracy of the antenna.

f) In the case of a space station aboard a geostationary satellite in which the antenna radiation beam is directed towards another satellite, also indicate the antenna radiation pattern, taking the gain in the direction of maximum radiation as a reference.

g) In the case of a space station aboard a non-geostationary satellite, indicate the isotropic gain of the space station transmitting antenna in the direction of maximum radiation (dBi) and indicate the antenna radiation pattern, taking the gain in the direction of maximum radiation as a reference.

h)[1] Indicate the type of polarization of the radiation emitted by the antenna. In the case of circular polarization, indicate the direction of polarization (see Nos. **148** and **149**). In the case of linear polarization, indicate the angle (in degrees) measured anticlockwise in a plane normal to the beam axis from the equatorial plane to the electric vector of the wave as seen from the satellite.

i) For a geostationary satellite, indicate the pointing accuracy of the antenna.

j) In the case of a space station aboard a geostationary satellite operating in a band allocated in the Earth-to-space direction and in the space-to-Earth direction, also indicate the gain of the space station transmitting antenna in the direction of those parts of the geostationary satellite orbit which are not obstructed by the Earth, by means of a diagram showing estimated antenna gain versus orbital longitude.

MOD 2.C.4 Assigned frequency (frequencies)

Indicate the assigned frequency (frequencies), as defined in No. **142**, in kHz up to 28 000 kHz inclusive, in MHz above 28 000 kHz to 10 500 MHz inclusive and in GHz above 10 500 MHz.

If the basic characteristics are identical, with the exception of the frequency, a single notice may be submitted covering all basic characteristics and listing the assigned frequencies.

(MOD) 2.C.5 Assigned frequency band

Indicate the bandwidth of the assigned frequency band in kHz (see No. **141**).

MOD 2.C.6 Class of station(s) and nature of service

Indicate the class of station and nature of service performed, using the symbols shown in Appendix **10** to the Radio Regulations.

MOD 2.C.7 Class of emission, necessary bandwidth and description of the transmission [6]

In accordance with Article **4** and Appendix **6** of the Radio Regulations:

a) indicate the class of emission and the necessary bandwidth;

b)[1] indicate the carrier frequency or frequencies of the emission(s);

c)[1] indicate, for each carrier, the class of emission, necessary bandwidth and description of transmission;

d)[1] indicate, for the carrier having the smallest bandwidth of the assignments in the system, the class of emission, necessary bandwidth and a description of the transmission.

MOD 2.C.8 Power characteristics of the space station transmission [6]

a)[1] Indicate for each carrier the peak envelope power (dBW) supplied to the input of the antenna.

b) Indicate the maximum power density (dB(W/Hz))[4] supplied to the input of the antenna, averaged over the worst 4 kHz band for carriers below 15 GHz or averaged over the worst 1 MHz band for carriers above 15 GHz.

c)[1] Indicate for each carrier the minimum value of the peak envelope power supplied to the input of the antenna.

d) Indicate the maximum total peak envelope power (dBW) supplied to the input of the antenna for each contiguous satellite bandwidth and this bandwidth. For a satellite transponder, this corresponds to the maximum saturated peak envelope power and the bandwidth of each transponder.

e)[1] Indicate for each carrier type [8] (see item 2.C.9), the maximum power density (dB(W/Hz))[4] supplied to the input of the antenna, averaged over the worst 4 kHz band for carriers below 15 GHz, or averaged over the worst 1 MHz band for carriers above 15 GHz.

MOD 2.C.9[1] Modulation characteristics [6]

For each carrier, according to the nature of the signal modulating the carrier and the type of modulation, indicate the following characteristics:

a) carrier frequency modulated by a frequency-division multichannel telephony baseband (FDM/FM) or by a signal that can be represented by a multi-channel telephony baseband: indicate the lowest and highest frequencies of the baseband and the r.m.s. frequency deviation of the test tone as a function of baseband frequency;

b) carrier frequency modulated by a television signal: indicate the standard of the television signal (including, where appropriate, the standard used for colour), the frequency deviation for the reference frequency of the pre-emphasis characteristic and the pre-emphasis characteristic itself; also indicate, where applicable, the characteristics of the multiplexing of the video signal with the sound signal(s) or other signals;

c) carrier phase-shift modulated by a digital signal: indicate the bit rate and the number of phases;

d) amplitude-modulated carrier (including single side-band): indicate as precisely as possible the nature of the modulating signal and the kind of amplitude modulation used;

e) for all other types of modulation, provide such particulars as may be useful for an interference study;

f) for any type of modulation, as applicable, indicate the characteristics of energy dispersal, such as the peak-to-peak frequency deviation (MHz) and the sweep frequency (kHz) of the energy dispersal waveform.

ADD Information related to associated receiving station(s)

ADD This information is to be provided for each type of receiving station associated with each space station transmitting antenna beam.

ADD 2.C.10 Type and identity of the associated receiving station(s)

Indicate whether the associated receiving station is another space station, a typical earth station of the network, or a specific earth station.

When the associated receiving station is:

a) another space station, indicate its characteristics by reference to the notification thereof or in any other appropriate manner;

b) a typical earth station of the network, the characteristics provided under the following items of sub-section 2.C shall represent the limiting characteristics for any earth

station conforming to that type for the purpose of coordination under No. **1060**;

c) a specific earth station, the characteristics provided under the following items of sub-section 2.C only apply to that earth station and shall include the identity of the earth station and the geographical coordinates of the antenna site for the purpose of coordination under No. **1060**.

The remaining information required in sub-section 2.C is to be provided for each associated earth station or typical earth station.

MOD 2.C.11 Class of station(s) and nature of service

Indicate the class of station and nature of service performed, using the symbols shown in Appendix **10** of the Radio Regulations.

MOD 2.C.12 Earth station receiving antenna characteristics

a) Indicate the isotropic gain (dBi) of the antenna in the direction of maximum radiation (see No. **154**).

b) Indicate the beamwidth in degrees between the half-power points (describe in detail if not symmetrical).

c) Either attach the measured radiation diagram of the antenna (taking as a reference the direction of maximum radiation) or indicate the reference radiation diagram to be used for coordination.

d)[1] Indicate the type of polarization of the antenna. In the case of circular polarization, indicate the direction of polarization (see Nos. **148** and **149**). In the case of linear polarization, indicate the plane of polarization. Indicate also if consent is given to the general use of this information in determining the need for coordination with other satellite networks according to Appendix **29** of the Radio Regulations.

MOD 2.C.13 Noise temperature of the associated receiving station(s)

Indicate, in kelvins, the lowest total receiving system noise temperature referred to the output of the receiving antenna of the earth station under clear sky conditions. This value shall be indicated for the nominal value of the angle of elevation when the associated transmitting station is aboard a geostationary satellite and, in other cases, for the minimum value of angle of elevation.

ADD 2.D Overall link characteristics

For simple frequency-changing transponders on board a geostationary satellite, the following information is to be provided.

ADD 2.D.1 Connection between Earth-to-space and space-to-Earth frequencies in the network

Indicate, in tabular form the connection between up-link and down-link frequency assignments in each transponder for each intended combination of receiving and transmitting beams.

ADD 2.D.2 Transmission gains and associated equivalent satellite link noise temperatures

For each entry under 2.D.1 indicate in tabular form:

a) the lowest equivalent satellite link noise temperature and the associated transmission gain under the conditions defined in 2.C.13 (see No. **168**);

b) the values of transmission gain and associated equivalent satellite link noise temperature that correspond to the highest ratio of transmission gain to equivalent satellite link noise temperature. The transmission gain is evaluated from the output of the receiving antenna of the space station to the output of the receiving antenna of the earth station.

ADD

Section III. Notices Relating to Coordination under No. 1107 and Notification of Earth Stations

ADD 3.A General characteristics to be provided for an earth station

ADD 3.A.1 Identity and location of the earth station

a) Indicate the type of station.

b)[2] Indicate the name by which the station is known or the name of the locality in which it is situated.

c) Indicate the country or geographical area in which the station is located. Symbols from the Preface to the International Frequency List should be used.

d)[2] Indicate the geographical coordinates of each transmitting and receiving antenna site comprising the earth station (longitude and latitude in degrees and minutes). Indicate also the seconds [7] with an accuracy of one-tenth of a minute.

MOD 3.A.2 Date of bringing into use

a) In the case of a new assignment, indicate the date (actual or foreseen, as appropriate) of bringing into use of the frequency assignment.

b) Whenever any of the basic characteristics of the assignment are changed (except in the case of a change in 3.A.1 *b)*), the date to be given shall be that of the latest change (actual or foreseen, as appropriate).

(MOD) 3.A.3 Operating administration or company

Give the name of the operating administration or company and the postal and telegraphic addresses of the administration to which communications should be sent on urgent matters regarding interference, quality of emissions and questions referring to the technical operation of the station (see Article **22** of the Radio Regulations).

MOD 3.A.4 Class of station(s) and nature of service

Indicate the class of station and nature of service performed, using the symbols shown in Appendix **10** to the Radio Regulations.

ADD 3.A.5 Space station(s) with which communication is to be established

a) Identify the associated space station(s) by reference to the notification thereof or in any other appropriate manner.

b) In the case of a geostationary satellite, indicate also its orbital position.

MOD 3.A.6 Coordination

Give the name of any administration with which the use of this frequency has been successfully coordinated in accordance with Nos. **1060** and **1107** and, if appropriate, the name of any administration with which coordination has been sought but not completed.

MOD 3.A.7 Agreements

a) Give, if appropriate, the name of any administration with which agreement has been reached to exceed the limits prescribed in these Regulations.

b) Give, if appropriate, the name of any administration with which agreement has been reached in accordance with Article **14** of the Radio Regulations.

ADD 3.B Characteristics of the transmitting earth station

ADD 3.B.1 Name of the satellite receiving beam [5]

Indicate the name of the satellite receiving antenna beam.

MOD 3.B.2 Assigned frequency (frequencies)

Indicate the assigned frequency (frequencies), as defined in No. **142**, in kHz up to 28 000 kHz inclusive, in MHz above 28 000 kHz to 10 500 MHz inclusive and in GHz above 10 500 MHz.

(MOD) 3.B.3 Assigned frequency band

Indicate the bandwidth of the assigned frequency band in kHz (see No. **141**).

MOD 3.B.4 Class of emission, necessary bandwidth and description of the transmission

In accordance with Article **4** and Appendix **6** of the Radio Regulations:

a) indicate the class of emission and the necessary bandwidth;

b)[1] indicate the carrier frequency or frequencies of the emission(s);

c)[1] indicate, for each carrier, the class of emission, necessary bandwidth and description of transmission;

d)[1] indicate, for the carrier having the smallest bandwidth of the assignments in the system, the class of emission, necessary bandwidth and a description of the transmission.

MOD 3.B.5 Earth station transmitting antenna characteristics

a) Indicate the isotropic gain (dBi) of the antenna in the direction of maximum radiation (see No. **154**).

b) Indicate the beamwidth in degrees between the half-power points (describe in detail if not symmetrical).

c) Either attach the measured radiation diagram of the antenna (taking as a reference the direction of maximum radiation) or indicate the reference radiation diagram to be used for coordination.

d)[2] Indicate graphically the horizon elevation angle for each azimuth around the earth station.

e)[2] Indicate in degrees from the horizontal plane the planned minimum operating angle of elevation of the antenna in the direction of maximum radiation, having due regard to possible inclined-orbit operation of the associated space station.

f)[2] Indicate in degrees, clockwise from True North, the planned range of operating azimuthal angles for the direction of maximum radiation, having due regard to possible inclined-orbit operation of the associated space station.

g)[1] Indicate the type of polarization of the transmitted wave in the direction of maximum radiation; also indicate the direction in the case of circular polarization and the plane in the case of linear polarization (see Nos. **148** and **149**).

h)[2] Indicate the altitude (metres) of the antenna above mean sea level.

MOD 3.B.6 Power characteristics of the transmission

a)[1] Indicate for each carrier the peak envelope power (dBW) supplied to the input of the antenna.

b) Indicate the total peak envelope power (dBW) and the maximum power density (dB(W/Hz))[4] supplied to the input of the antenna averaged over the worst 4 kHz band for carriers below 15 GHz, or averaged over the worst 1 MHz band for carriers above 15 GHz.

c)[1] Indicate for each carrier the minimum value of the peak envelope power supplied to the input of the antenna.

d)[1,5] Indicate for each carrier type[8] (see 3.B.7), the maximum power density (dB(W/Hz))[4] supplied to the input of the antenna, averaged over the worst 4 kHz band for carriers below 15 GHz, or averaged over the worst 1 MHz band for carriers above 15 GHz.

e)[1,5] Indicate the maximum aggregate power (dBW) of all carriers (per transponder, if applicable) supplied to the input of the antenna and their aggregate bandwidth. If this corresponds to the bandwidth of a transponder, so indicate.

MOD 3.B.7[1] Modulation characteristics [5]

For each carrier, according to the nature of the signal modulating the carrier and the type of modulation, indicate the following characteristics:

a) carrier frequency modulated by a frequency-division multi-channel telephony baseband (FDM/FM) or by a signal that can be represented by a multi-channel telephony baseband: indicate the lowest and highest frequencies of the baseband and the r.m.s. frequency deviation of the test tone as a function of baseband frequency;

b) carrier frequency modulated by a television signal: indicate the standard of the television signal (including, where appropriate, the standard used for colour), the frequency deviation for the reference frequency of the pre-emphasis characteristic and the pre-emphasis characteristic itself; also indicate, where applicable, the characteristics of the multiplexing of the video signal with the sound signal(s) or other signals;

c) carrier phase-shift modulated by a digital signal: indicate the bit rate and the number of phases;

d) amplitude-modulated carrier (including single side-band): indicate as precisely as possible the nature of the modulating signal and the kind of amplitude modulation used;

e) for all other types of modulation, provide such particulars as may be useful for an interference study;

f) for any type of modulation, as applicable, indicate the characteristics of energy dispersal, such as the peak-to-peak frequency deviation (MHz) and the sweep frequency (kHz) of the energy dispersal waveform.

ADD 3.C Characteristics of the receiving earth station

ADD 3.C.1 Name of the satellite transmitting beam[5]

ADD Indicate the name of the satellite transmitting antenna beam.

MOD 3.C.2 Assigned frequency (frequencies)

Indicate the assigned frequency (frequencies), as defined in No. **142**, of the emission to be received, in kHz up to 28 000 kHz inclusive, in MHz above 28 000 kHz to 10 500 MHz inclusive and in GHz above 10 500 MHz.

(MOD) 3.C.3 Assigned frequency band

Indicate the bandwidth of the assigned frequency band in kHz (see No. **141**).

MOD 3.C.4 Class of emission, necessary bandwidth and description of the transmission

In accordance with Article **4** and Appendix **6** of the Radio Regulations:

a) indicate the class of emission and the necessary bandwidth of the transmission to be received;

b)[1] indicate the carrier frequency or frequencies of the emissions to be received;

c)[1] indicate, for each carrier to be received, the class of emission, necessary bandwidth and description of the transmission;

d)[1] indicate, for the carrier having the smallest bandwidth of the assignments in the system, the class of emission, necessary bandwidth and a description of the transmission.

The information required in the two items 3.C.5 and 3.C.6 is needed additionally for the notification of a typical earth station.

MOD 3.C.5 Power characteristics of the space station transmission [5]

a)[1] Indicate for each carrier the peak envelope power (dBW) supplied to the input of the antenna.

b) Indicate the maximum power density (dB(W/Hz))[4] supplied to the input of the antenna, averaged over the worst 4 kHz band for carriers below 15 GHz or averaged over the worst 1 MHz band for carriers above 15 GHz.

c)[1] Indicate for each carrier the minimum value of the peak envelope power supplied to the input of the antenna.

d) Indicate the maximum total peak envelope power (dBW) supplied to the input of the antenna for each contiguous satellite bandwidth and this bandwidth. For a satellite transponder, this corresponds to the maximum saturated peak envelope power and the bandwidth of each transponder.

e)[1] Indicate for each carrier type [8] (see item 3.C.6), the maximum power density (dB(W/Hz)) [4] supplied to the input of the antenna, averaged over the worst 4 kHz band for carriers below 15 GHz, or averaged over the worst 1 MHz band for carriers above 15 GHz.

MOD 3.C.6 [1] Modulation characteristics [5]

For each carrier, according to the nature of the signal modulating the carrier and the type of modulation, indicate the following characteristics:

a) carrier frequency modulated by a frequency-division multichannel telephony baseband (FDM/FM) or by a signal that can be represented by a multi-channel telephony baseband: indicate the lowest and highest frequencies of the baseband and the r.m.s. frequency deviation of the test tone as a function of baseband frequency;

b) carrier frequency modulated by a television signal: indicate the standard of the television signal (including, where appropriate, the standard used for colour), the frequency deviation for the reference frequency of the pre-emphasis characteristic and the pre-emphasis characteristic itself; also indicate, where applicable, the characteristics of the multiplexing of the video signal with the sound signal(s) or other signals;

c) carrier phase-shift modulated by a digital signal: indicate the bit rate and the number of phases;

d) amplitude-modulated carrier (including single side-band): indicate as precisely as possible the nature of the modulating signal and the kind of amplitude modulation used;

e) for all other types of modulation, provide such particulars as may be useful for an interference study;

f) for any type of modulation, as applicable, indicate the characteristics of energy dispersal, such as the peak-to-peak frequency deviation (MHz) and the sweep frequency (kHz) of the energy dispersal waveform.

MOD 3.C.7 Earth station receiving antenna characteristics

a) Indicate the isotropic gain (dBi) of the antenna in the direction of maximum radiation (see No. **154**).

b) Indicate the beamwidth in degrees between the half-power points (describe in detail if not symmetrical).

c) Either attach the measured radiation diagram of the antenna (taking as a reference the direction of maximum radiation) or indicate the reference radiation diagram to be used for coordination.

d)[2] Indicate graphically the horizon elevation angle for each azimuth around the earth station.

e)[2] Indicate in degrees from the horizontal plane the planned minimum operating angle of elevation of the antenna in the direction of maximum radiation, having due regard to possible inclined-orbit operation of the associated space station.

f)[2] Indicate in degrees, clockwise from True North, the planned range of operating azimuthal angles for the direction of maximum radiation, having due regard to possible inclined-orbit operation of the associated space station.

g)[1] Indicate the type of polarization of the transmitted wave in the direction of maximum radiation; also indicate the direction in the case of circular polarization and the plane in the case of linear polarization (see Nos. **148** and **149**).

h)[2] Indicate the altitude (metres) of the antenna above mean sea level.

MOD 3.C.8 Noise temperature, equivalent satellite link noise temperature and transmission gain

a) Indicate, in kelvins, the lowest total receiving system noise temperature referred to the output of the receiving antenna of the earth station under clear sky conditions. This value shall be indicated for the nominal value of the angle of elevation when the associated transmitting station is aboard a geostationary satellite and, in other cases, for the minimum value of angle of elevation.

b) For each associated condition of operation when simple frequency-changing transponders are used on the associated space station aboard a geostationary satellite:

1) indicate the lowest equivalent satellite link noise temperatures under the conditions of *a)* above for each assignment (see No. **168**).

2) indicate the value of transmission gain associated with each equivalent satellite link noise temperature given in *b)* 1) above. The transmission gain is evaluated from the output of the receiving antenna of the space station to the output of the receiving antenna of the earth station.

MOD

Section IV. Notices Relating to Frequencies to be Received by Radio Astronomy Stations

ADD 4.A General characteristics to be provided for radio astronomy stations

MOD 4.A.1 Date of bringing into use

a) Indicate the date (actual or foreseen, as appropriate) when reception of the frequency band begins.

b) Whenever there is a change in any of the basic characteristics, as shown in this Section (except in the case of a change in 4.A.2 *b)*), the date to be given shall be that of the latest change (actual or foreseen, as appropriate).

MOD 4.A.2 Name and location of the station

a) Insert the letters "RA".

b) Indicate the name by which the station is known or the name of the locality in which it is situated, or both.

c) Indicate the country or geographical area in which the station is located. Symbols from the Preface to the International Frequency List should be used.

d) Indicate the geographical coordinates of the station site (longitude and latitude in degrees and minutes).

MOD 4.A.3 Regular hours of reception

Indicate in UTC the regular hours of reception on the observed frequency.

MOD 4.A.4 Operating administration or company

Give the name of the operating administration or company and the postal and telegraphic addresses of the administration to which communications should be sent on urgent matters regarding interference and questions referring to the technical operation of stations (see Article **22** of the Radio Regulations).

ADD 4.B Technical characteristics of radio astronomy stations

MOD 4.B.1 Observed frequency

Indicate the centre of the frequency band observed, in kHz up to 28 000 kHz inclusive, in MHz above 28 000 kHz to 10 500 MHz inclusive and in GHz above 10 500 MHz.

MOD 4.B.2 Bandwidth

Indicate the bandwidth of the frequency band (kHz) observed by the station.

MOD 4.B.3 Antenna characteristics

Indicate the antenna type and dimensions, effective area and angular coverage in azimuth and elevation.

MOD 4.B.4 Noise temperature

Indicate, in kelvins, the overall receiving system noise temperature referred to the output of the receiving antenna.

MOD 4.B.5 Class of observations

Indicate the class of observations to be taken on the frequency band shown in item 4.B.2. Class A observations are those in which the sensitivity of the equipment is not a primary factor. Class B observations are those of such a nature that they can be made only with advanced low-noise receivers using the best techniques.

MOD

Section V. Forms of Notice

MOD The Board shall develop and keep up-to-date forms of notice to meet fully the statutory provisions of this Appendix and related decisions of future conferences.

SUP Annex to Appendix 3

ADD The following footnotes are applicable within Appendix 3:

[1] This information need only be furnished when such information has been used as a basis to effect coordination with another administration. This information may be optionally provided in a request for coordination under No. **1060** (see Resolution **69 (Orb-88)**).

[2] Not required for notification of a typical earth station.

[3] See also Resolution **4 (Rev.Orb-88).**

[4] The most recent version of CCIR Report 792 should be used to the extent applicable in calculating the maximum power density.

[5] Not required for coordination under No. **1107.**

[6] This item is also to be provided for each associated receiving earth station or typical receiving earth station.

[7] This information need only be furnished if the coordination area of the earth station overlaps the territory of another administration.

[8] For details of carrier types, see relevant CCIR texts.

MOD

APPENDIX 4

Orb-88

NOC

Advance Publication Information to Be Furnished for a Satellite Network

NOC

(see Article **11**)

NOC

Section A. General Instructions

(MOD) A.1 Information shall be provided separately for each satellite network.

MOD A.2 Information to be furnished for each satellite network shall include general characteristics (Section B) and, as applicable, characteristics in the Earth-to-space direction (Section C), characteristics in the space-to-Earth direction (Section D), overall link characteristics (Section E), and characteristics for space-to-space relay (Section F). In addition, the administration, or one acting on behalf of a group of named administrations submitting the advance information, may provide, as supplementary information, data for interference calculations for the purpose of inter-network coordination (Section G).

NOC

Section B. General Characteristics to Be Furnished for a Satellite Network

(MOD) B.1 Identity of the satellite network

Clearly identify the satellite network and, if applicable, identify the satellite system of which it will form a part.

(MOD) B.2 Date of bringing into use [1]

Indicate the date by which the satellite network is expected to be brought initially into use.

(MOD) B.3 Administration or group of administrations submitting the advance information

Give the name of the administration or the names of the administrations in the group submitting the advance information on the satellite network and the postal and telegraphic addresses of the administration(s) to which any communication should be sent.

(MOD) B.4 Orbital information relating to the space station(s)

a) In the case of a space station aboard a geostationary satellite, give the planned nominal geographical longitude on the geostationary-satellite orbit and the planned longitudinal tolerance and inclination excursion. Indicate also:

1) the arc of the geostationary-satellite orbit over which the space station is visible, at a minimum angle of elevation of 10° at the Earth's surface, from its associated earth stations or service areas;

(MOD) [1] See also Resolution **4 (Rev.Orb-88).**

2) the arc of the geostationary-satellite orbit within which the space station could provide the required service to its associated earth stations or service areas;

3) in the event that the arc defined in paragraph 2) above is less than the arc defined in paragraph 1) above, provide the reasons therefore.

Note: The arcs specified in 1) and 2) will be indicated by the geographical longitude of the extremes of these arcs on the geostationary-satellite orbit.

b) In the case of space station(s) aboard non-geostationary satellite(s), indicate the angle of inclination of the orbit, the period, the altitudes in kilometres of the apogee and perigee of the space station(s) and the number of satellites used having the same characteristics.

NOC

Section C. Characteristics of the Satellite Network in the Earth-to-Space Direction

(MOD) C.1 Earth-to-space service area(s)

Indicate the service area(s) on the Earth associated with each receiving antenna of the space station.

(MOD) C.2 Class of stations and nature of service

For each Earth-to-space service area, indicate the class of the stations in the satellite network and the nature of the service to be performed, using the symbols shown in Appendix **10** of the Radio Regulations.

(MOD) C.3 Frequency range

For each Earth-to-space service area, indicate the frequency range within which the carriers will be located.

(MOD) C.4 Power characteristics of the transmitted wave

a) For each Earth-to-space service area, indicate the maximum spectral power density (dB(W/Hz)) [1] to be delivered to the antenna of the transmitting earth stations (the bandwidth over which this is averaged depends on the nature of the service concerned) for each size of transmitting earth station antenna and, if available, the total peak envelope power (dBW) and the necessary bandwidth of this emission.

b) If available, indicate, for each Earth-to-space service area, the actual radiation pattern (relative to isotropic) of the transmitting earth station antenna having the highest off-beam equivalent isotropically radiated spectral power density for each size of transmitting earth station antenna.

c) If available, for television carriers and for each Earth-to-space service area, indicate the peak envelope power to be delivered to the input of the earth station transmitting antenna.

d) If available, indicate the minimum carrier power delivered to the antenna of the earth station for narrow-band carriers.

(MOD) C.5 Characteristics of space station receiving antennas

MOD Provide information for each receiving satellite antenna beam:

MOD *a)* in the case of a space station aboard a geostationary satellite that is intended to communicate with an earth station, indicate whether the receiving antenna beam will be pointing in a fixed direction or has a steerable beam (see No. **183**) capability;

NOC [1] The most recent version of CCIR Report 792 should be used to the extent applicable in calculating the maximum power density per Hz.

MOD

b) in the case of a space station aboard a geostationary satellite, indicate the name of the satellite antenna beam by a three character code. For steerable beams, the last character shall be an "R";

MOD

c) in the case of a space station aboard a geostationary satellite employing a receiving antenna pointing in a fixed direction, indicate the maximum isotropic gain (dBi) and the gain contours plotted on a map of the Earth's surface, preferably using a radial projection from the satellite in a plane perpendicular to the axis from the centre of the Earth to the satellite. The space station antenna gain contours shall be drawn as isolines of the isotropic gain at least for −2, −4, −6, −10 and −20 dB and at 10 dB intervals thereafter, as necessary, relative to the maximum antenna gain when any of these contours is located either totally or partially anywhere within the limit of visibility of the Earth from the given geostationary satellite. Whenever possible the gain contours of the space station receiving antenna should also be provided in the form of a numerical equation;

MOD

d) in the case of a space station aboard a geostationary satellite using a steerable beam, data on the radiation characteristics shall be provided as follows:

1) when the effective boresight area (see No. **168A**) is identical with the global or nearly global service area, provide only the maximum isotropic antenna gain (dBi). The maximum antenna gain is applicable to all points on the Earth's visible surface;

2) when the effective boresight area (see No. **168A**) is less than the global or nearly global service area, provide the maximum antenna gain and, to the extent practicable, the effective antenna gain contours (see No. **168B**). These contours shall be provided as defined in *c)* above. If the gain contours are not provided, then the maximum antenna gain is applicable to all points on the Earth's visible surface;

ADD *e)* in the case of a space station aboard a geostationary satellite in which the antenna radiation beam is directed towards another satellite, also indicate the antenna radiation pattern, taking the gain in the direction of maximum radiation as a reference;

ADD *f)* in the case of a space station aboard a non-geostationary satellite, indicate the isotropic gain of the space station receiving antenna in the direction of maximum radiation (dBi) and indicate the antenna radiation pattern, taking the gain in the direction of maximum radiation as a reference;

ADD *g)* if available, for each space station receiving antenna, indicate the type of polarization of the antenna. In the case of circular polarization, indicate the direction of polarization (see Nos. **148** and **149**);

ADD *h)* in the case of a space station aboard a geostationary satellite operating in a band allocated in the Earth-to-space direction and in the space-to-Earth direction, also indicate the estimated gain of the space station receiving antenna in the direction of those parts of the geostationary-satellite orbit which are not obstructed by the Earth by means of a diagram showing estimated antenna gain versus orbit longitude.

(MOD) C.6 Noise temperature of the receiving space station

For each Earth-to-space service area, when other than a simple frequency-changing transponder is used aboard the space station, indicate, in kelvins, the lowest total receiving system noise temperature referred to the output of the receiving antenna.

(MOD) C.7 Necessary bandwidth

If available, in the case of narrow-band carriers, indicate the necessary bandwidth.

(MOD) C.8 Modulation characteristics

If available, in the case of television carriers, indicate the characteristics of energy dispersal such as the peak-to-peak frequency deviation (MHz) and the sweep frequency (kHz) of the energy dispersal waveform.

NOC

Section D. Characteristics of the Satellite Network in the Space-to-Earth Direction

(MOD) D.1 Space-to-Earth service area(s)

NOC Indicate the service area(s) on the Earth associated with each transmitting antenna of the space station.

(MOD) D.2 Class of stations and nature of service

NOC For each space-to-Earth service area, indicate the class of the stations in the satellite network and the nature of the service to be performed, using the symbols shown in Appendix **10** of the Radio Regulations.

(MOD) D.3 Frequency range

NOC For each space-to-Earth service area, indicate the frequency range within which the carriers will be located.

(MOD) D.4 Power characteristics of the transmission

NOC *a)* For each space-to-Earth service area, indicate the maximum spectral power density (dB(W/Hz)) [1] to be delivered to the transmitting antenna of the space station (the bandwidth over which this is averaged depends on the nature of the service concerned) and, if available, the total peak envelope power (dBW) and the necessary bandwidth of this emission.

NOC [1] The most recent version of CCIR Report 792 should be used to the extend applicable in calculating the maximum power density per herz.

NOC *b)* If available, for narrow-band carriers and for television carriers, indicate the peak envelope power to be delivered to the input of the space station transmitting antenna.

NOC *c)* If available, indicate the minimum carrier power delivered to the antenna of the space station for narrow-band carriers.

MOD D.5 Characteristics of space station transmitting antennas

Provide information for each transmitting satellite antenna beam:

a) in the case of a space station aboard a geostationary satellite that is intended to communicate with an earth station, indicate whether the transmitting antenna beam will be pointing in a fixed direction or has a steerable beam (see No. **183**) capability;

b) in the case of a space station aboard a geostationary satellite, indicate the name of the satellite antenna beam by a three character code. For steerable beams, the last character shall be an "R";

c) in the case of a space station aboard a geostationary satellite employing a transmitting antenna pointing in a fixed direction, indicate the maximum isotropic gain (dBi) and the gain contours plotted on a map of the Earth's surface, preferably in a radial projection from the satellite in a plane perpendicular to the axis from the centre of the Earth to the satellite. The space station antenna gain contours shall be drawn as isolines of the isotropic gain at least for -2, -4, -6, -10 and -20 dB and at 10 dB intervals thereafter, as necessary, relative to the maximum antenna gain, when any of these contours is located either totally or partially anywhere within the limit of visibility of the Earth from the given geostationary satellite. Whenever possible, the gain contours of the space station transmitting antenna should also be provided in the form of a numerical equation;

d) when a steerable beam is used, data on the radiation characteristics shall be provided as follows:

1) when the effective boresight area (see No. **168A**) is identical with the global or nearly global service area, provide only the maximum isotropic antenna gain (dBi). The maximum antenna gain is applicable to all points on the Earth's visible surface;

2) when the effective boresight area (see No. **168B**) is less than the global or nearly global service area, provide the maximum antenna gain and, to the extent practicable, the effective antenna gain contours (see No. **168B**). These contours shall be provided as defined in *c)* above. If the gain contours are not provided, then the maximum antenna gain is applicable to all points on the Earth's visible surface;

e) in the case of a space station aboard a geostationary satellite in which the antenna radiation beam is directed towards another satellite also indicate the antenna radiation pattern, taking the gain in the direction of maximum radiation as a reference;

f) in the case of a space station aboard a non-geostationary satellite, indicate the isotropic gain of the space station transmitting antenna in the direction of maximum radiation (dBi) and indicate the antenna radiation pattern, taking the gain in the direction of maximum radiation as a reference;

g) if available, for each space station transmitting antenna, indicate the type of polarization of the antenna. In the case of circular polarization, indicate the direction of polarization (see Nos. **148** and **149**);

h) in the case of a space station aboard a geostationary satellite operating in a band allocated in the Earth-to-space direction and in the space-to-Earth direction, also indicate the estimated gain of the space station receiving antenna in the direction of those parts of the geostationary-satellite orbit which are not obstructed by the Earth by means of a diagram showing estimated antenna gain versus orbit longitude.

(MOD) D.6 Necessary bandwidth

If available, in the case of narrow-band carriers, indicate the necessary bandwidth.

(MOD) D.7 Modulation characteristics

If available, in the case of television carriers, indicate the characteristics of energy dispersal such as the peak-to-peak frequency deviation (MHz) and the sweep frequency (kHz) of the energy dispersal waveform.

(MOD) D.8 Characteristics of receiving earth stations

MOD *a)* For each space-to-Earth service area, when other than a simple frequency-changing transponder is used aboard the space station, indicate, in kelvins, the lowest total receiving system noise temperature on the earth stations referred to the output of the receiving antenna.

MOD *b)* If available, indicate for each space-to-Earth service area the actual radiation pattern (relative to isotropic) of the receiving earth station for each size of receiving earth station antenna having the highest off-beam level. When simple frequency-changing transponders are used on the space station, indicate also, if available, the pattern associated with each equivalent satellite link noise temperature indicated below.

ADD

Section E. Overall Link Characteristics

ADD E.1 Relationship between Earth-to-space and space-to-Earth frequency bands

Indicate, preferably in tabular form, for each usage[1], when available, the frequency bands to be used for corresponding up-link and down-link beams.

ADD E.2 Transmission gains and associated equivalent satellite link noise temperatures

For each space-to-Earth service area and for each projected usage[1] when simple frequency-changing transponders are used on a geostationary space station, indicate preferably in tabular form:

a) the lowest equivalent satellite link noise temperature and the associated value of transmission gain; and

b) the values of transmission gain and associated equivalent satellite link noise temperature that correspond to the highest ratio of transmission gain to equivalent satellite link noise temperature. The transmission gain is evaluated from the output of the space station receiving antenna to the output of the earth station receiving antenna. For each projected usage, indicate also the receiving antenna(s) of the space station to which each simple frequency-changing transponder will be connected.

MOD [1] A different usage will be considered to take place when different types of carriers are employed (different by virtue of maximum power spectral density), or when different types of receiving earth stations are employed (different by virtue of receiving antenna gain), or when up-link beams are connected to different down-link beams with their respective associated frequency bands.

(MOD) **Section F. Characteristics to Be Furnished for Space-to-Space Relays**

NOC Where the satellite network is connected to one or more satellite networks by means of space-to-space relay, indicate the following:

a) identity or identities of the other satellite network(s) to which the satellite network is connected;

b) transmit and receive frequency bands;

c) classes of emission;

d) nominal equivalent isotropically radiated power(s) (e.i.r.p.) on the beam axis.

(MOD) **Section G. Supplementary Information (if available)**

(MOD) G.1 General

NOC Supplementary information may be provided by an administration or one acting on behalf of a group of named administrations which so desire. This information may be used for interference calculations associated with the advance publication process. The information may consist of part or all of the data contained in the following items which are not exhaustive but provide an indication of the type of information which may be supplied.

ADD The attention of administrations is also drawn to techniques for assessing potential interference which may facilitate reaching an agreement between administrations under the provisions of this Appendix. These techniques may be found in the relevant CCIR texts.

(MOD) G.2 Earth-to-space direction

NOC For each Earth-to-space service area, the following information may be provided:

NOC *a)* class of emission, necessary bandwidth and modulation characteristics (including energy dispersal if employed) for each type of carrier transmitted;

NOC *b)* earth station e.i.r.p. for each type of carrier associated with each type and diameter of earth station antenna;

NOC *c)* technical description and system parameters of telecommand (except for coding data).

(MOD) G.3 Space-to-Earth direction

NOC For each space-to-Earth service area, the following information may be provided:

NOC *a)* class of emission, necessary bandwidth and modulation characteristics (including energy dispersal if employed) for each type of carrier;

NOC *b)* satellite transmitter power to be delivered to the satellite transmitting antenna for each type of carrier;

NOC *c)* technical description and system parameters of beacon and space telemetry emissions (except for coding data).

(MOD) G.4 Any other information which may be useful

ADD **Section H. Forms of Notice for Provision of Advance Publication Information**

ADD The Board shall develop and keep up-to-date forms of notice to meet fully the statutory provisions of this Appendix and related decisions of future conferences.

PAGE LAISSEE EN BLANC INTENTIONNELLEMENT

PAGE INTENTIONALLY LEFT BLANK

MOD

APPENDIX 28
Orb-88

MOD

TABLE II

Parameters Required for the Determination of Coordination Distance for a Receiving Earth Station

MOD

MOD

Space Radiocommunication Service Designation		Space Operation (1)	Meteorological-Satellite (1)	Meteorological-Satellite	Space Research			Fixed-Satellite		Fixed-Satellite		Fixed-Satellite		Fixed-Satellite Meteorological-Satellite Mobile Satellite		Earth Exploration-Satellite (1)	Space Research		Fixed-Satellite		Meteorological-Satellite	Fixed-Satellite	Mobile-Satellite
					Near Earth, Unmanned; Space Operations	Near Earth, Manned	Deep Space										Near Earth	Deep Space					
Frequency Bands (GHz)		1.525 - 1.535	1.670 - 1.700	1.700 - 1.790	1.700 - 1.710 2.200 - 2.290	2.200 - 2.290	2.290 - 2.300	2.500 - 2.690		3.400 - 4.200		4.500 - 4.800		7.250 - 7.750		8.025 - 8.400	8.400 - 8.500		10.7 - 12.75		17.7 - 40.0		
Modulation at Earth Station (2)					–	–	–	A	N	A	N	A	N	A	N	–	–	–	A	N		N	
Interference Parameters and Criteria	p_0 (%)				0.1	0.001	0.001	0.03	0.003	0.03	0.003	0.03	0.003	0.03	0.003	1.0	0.1	0.001	0.03	0.003		0.003	
	n				1(9)	1	1	3	3	3	3	3	3	3	3		2	1	2	1		1	
	p (%)				0.1(9)	0.001	0.001	0.01	0.001	0.01	0.001	0.01	0.001	0.01	0.001		0.05	0.001	0.015	0.003		0.003	
	J (dB)				–	–	–	–8	0	–8	0	–8	0	–8	0		–	–	–8	0		0	
	$M_0(p_0)$ (dB)				–	–	–	17	5	17	5(3)	17	5(3)	17	5(3)		–	–	17	5(3)		5(3)	
	W (dB)				–	–	–	4	0	4	0	4	0	4	0		–	–	4	0		0	
Terrestrial Station Parameters	E (dBW) in B (8)	55	55	92(6)	62(4)(6)	62(4)(6)	62(4)(6)	92(6)	92(6)	55	55	92(6)	92(6)	55	55	55	25(4)	25(4)	55	55		35(5)	
	P_t (dBW) in B	13	13	40(6)	10(4)(6)	10(4)(6)	10(4)(6)	40(6)	40(6)	13	13	40(6)	40(6)	13	13	13	–17(4)	–17(4)	10	10		–10(5)	
	ΔG (dB)	0	0	10(6)	10(6)	10(6)	10(6)	10(6)	10(6)	0	0	10(6)	10(6)	0	0	0	0	0	3	3		3	
Reference Bandwidth (7)	B(Hz)			10^6	1	1	1	10^6	10^6	10^6	10^6	10^6	10^6	10^6	10^6	10^6	1	1	10^6	10^6		10^6	
Permissible Interference Power	$P_r(p)$(dBW) in B				–216	–216	–222	–	–	–	–	–	–	–	–	–154	–216	–220	–	–		–	

(1) Parameters associated with these services may vary over a rather wide range. Further study is required before representative values become available.

(2) A = analogue modulation; N = digital modulation.

(3) See *Note 3* in Section 2. $M_0(p_0)$ may assume values between 5 et 40 dB, depending on frequency, rain-climatic zone and system design.

(4) These values are estimated for 1 Hz bandwidth and are 30 dB below the total power assumed for emission.

(5) These values assume a radio frequency bandwidth of no less than 100 MHz, and are 20 dB below total power assumed per emission.

(6) In these bands, the parameters for the terrestrial stations associated with transhorizon systems have been used. If an administration believes that transhorizon systems do not need to be considered, the line-of-sight radio-relay parameters associated with the frequency band of 3 400 - 4 200 MHz may be used to determine the coordination area in accordance with paragraph 2.3.1.

(7) In certain systems in fixed-satellite service it may be desirable to choose a greater reference bandwidth B when the system requirements indicate that this may be done. However, a greater bandwidth will result in smaller coordination distances and a later decision to reduce the reference bandwidth may require recoordination of the earth station. For narrow-band transmissions the reference bandwidth B should be assumed to be equal to the bandwidth occupied.

(8) For the definition of E, see Annex I.

ADD (9) n is taken to be 1 for earth stations supporting low orbit satellites. For earth stations supporting geostationary satellites, n takes a value of 2 and p becomes 0.05.

MOD

APPENDIX 29

Orb-88

NOC

Method of Calculation for Determining if Coordination is Required Between Geostationary-Satellite Networks Sharing the Same Frequency Bands

NOC 1 - 2.2.1.1

NOC 2.2.1.2 *Cases requiring independent treatment of the up-link and the down-link*

MOD If there is a change of modulation in the satellite or if the transmission originates on board the satellite, then the apparent increase in the noise temperature must be related to the total receiving system noise temperature of the specific link being examined (the space station or the earth station, whichever is applicable). In this case, the equivalent noise temperature of the entire satellite link and the transmission gain are not used and equations (1) and (2) above are used separetely as required (see § 3.2).

NOC 2.2.2 - 2.4

NOC 3. *Comparison between calculated percentage increase in noise temperature and the threshold value*

NOC 3.1 *Simple frequency-changing transponder on board the satellite*

MOD The calculated values of $\frac{\Delta T}{T}$ and $\frac{\Delta T'}{T'}$, expressed as percentages, shall be compared with the threshold value of 6% [1].

– If the calculated value of $\frac{\Delta T}{T}$, expressed as a percentage, due to any interfering emission from satellite link A′ to satellite link A, is no greater than the threshold value, coordination is not required with respect to interference from link A′ to link A.

– If the calculated value of $\frac{\Delta T}{T}$, expressed as a percentage, is greater than the threshold value, coordination is required.

The comparison of $\frac{\Delta T'}{T'}$, with the threshold value, expressed as a percentage, shall be carried out in a similar manner.

NOC 3.2 *Cases requiring independent treatment of the up-link and the down-link*

MOD *a)* In the case of interference into only one link, the up-link or the down-link, the value of $\Delta T_e / T_e$ or $\Delta T_s / T_s$, expressed as a percentage, shall be compared with the threshold value of 6% [1].

MOD *b)* In the case of interference into both the up-link and the down-link, between which there is a change of modulation on board the satellite, the values of $\Delta T_e / T_e$ and $\Delta T_s / T_s$, expressed as a percentage, shall each be compared with the threshold value of 6% [1].

MOD 4. Consideration of narrow-band and FM-TV carriers

NOC The method of calculation described in this Appendix may underestimate the interference from slow swept TV carriers into certain narrow-band (single channel per carrier, SCPC) carriers.

NOC In order to facilitate coordination between the satellite systems and to reduce the number of administrations involved in this procedure, the administrations whose SCPC assignments are either recorded in the Master Register or are under coordination may inform an administration notifying

---

ADD [1] Values other than 6% are used in the application of Appendix **30 (Orb-85)** and Appendix **30A (Orb-88)**.

its new assignment of the radio frequency channels used in their systems for SCPC transmission, so that the notifying administration may be able to avoid using these channels for FM-TV transmissions.

ADD For this special case, administrations are referred to relevant CCIR texts for guidance in facilitating subsequent coordination.

NOC Conversely, administrations introducing new systems using SCPC transmissions may seek appropriate information from other administrations on their FM-TV transmissions.

NOC Annexes I, II and III

ANNEX IV

NOC **Example of an Application of Appendix 29**

NOC 1 - 3

NOC 4. *Conclusion*

MOD In the example shown, the percentage increase in equivalent satellite link noise temperature is 7.8%. Since it exceeds the threshold value of 6%, coordination between the two networks is required.

APPENDIX 30 (Orb-85)

Orb-85

Provisions for all services and Associated Plans for the Broadcasting-Satellite Service in the Frequency Bands 11.7 - 12.2 GHz (in Region 3), 11.7 - 12.5 GHz (in Region 1) and 12.2 - 12.7 GHz (in Region 2)

(See Article **15**)

1. *List of Errata for Appendix 30 (Orb-85)*

1.1 Paragraph 5.2.6 of Article 5 of Appendix **30 (Orb-85)**:

reads: "... for Regions 1 and 3 ..."

shall read: "for Regions 1, 2 and 3 ..."

1.2 Annex 1, Section 4 of Appendix **30 (Orb-85)**:

reads: "... 4.3.1.3 ..."

shall read: "... 4.3.1.4 ..."

1.3 Annex 1, Section 8 *a)*, end of first paragraph:

reads: "... Section 5 of this Annex."

shall read: "... Sections 5 *a)* and 5 *b)* of this Annex applied to the frequency range 11.7 - 12.5 GHz."

end of second paragraph:

reads: "... Section 5 of this Annex."

shall read: "... Sections 5 *a)* and 5 *b)* of this Annex applied to the frequency range 11.7 - 12.5 GHz."

1.4 Curve A in Figure 7 "Co-polar and cross-polar receiving antenna reference patterns in Regions 1 and 3", Section 3.7.2, Annex 5 to Appendix **30 (Orb-85)**:

reads:

$$-\left[8.5 + 20 \log \left(\frac{\varphi}{\varphi_0}\right)\right] \quad \text{for} \quad 1.26\ \varphi_0 < \varphi \leqslant 9.55\ \varphi_0$$

shall read:

$$-\left[8.5 + 25 \log \left(\frac{\varphi}{\varphi_0}\right)\right] \quad \text{for} \quad 1.26\ \varphi_0 < \varphi \leqslant 9.55\ \varphi_0$$

2. *Footnote to Section 1.14 of Annex 5 to Appendix 30 (Orb-85) to be inserted:*

For Regions 1 and 3, see Section 1.11 of Annex 3 to Appendix **30A (Orb-88)** and Note 1 thereto.

PAGE LAISSEE EN BLANC INTENTIONNELLEMENT

PAGE INTENTIONALLY LEFT BLANK

APPENDIX 30A (Orb-88)

Orb-88

MOD

Provisions and Associated Plans for Feeder Links for the Broadcasting-Satellite Service (11.7 - 12.5 GHz in Region 1, 12.2 - 12.7 GHz in Region 2 and 11.7 - 12.2 GHz in Region 3) in the Frequency Bands 14.5 - 14.8 GHz [1] and 17.3 - 18.1 GHz in Regions 1 and 3, and 17.3 - 17.8 GHz in Region 2

TABLE OF CONTENTS

ADD [1] This use of the band 14.5 - 14.8 GHz is reserved for countries outside Europe.

Page

ANNEXES

ARTICLE 1

General Definitions

ADD 1.1 *Regions 1 and 3 feeder link Plan:* The Plan for the feeder links in the frequency bands 14.5 - 14.8 GHz [1] and 17.3 - 18.1 GHz for the broadcasting-satellite service in Regions 1 and 3 contained in this Appendix together with any modifications resulting from the successful application of the procedure of Article 4 of this Appendix herein referred to as the Regions 1 and 3 Plan.

MOD 1.2 *Region 2 feeder link Plan:* The Plan for the feeder links in the frequency band 17.3 - 17.8 GHz for the broadcasting-satellite service in Region 2 contained in this Appendix, together with any modifications resulting from the successful application of the procedure of Article 4 of this Appendix herein referred to as the Region 2 Plan.

MOD 1.3 *Frequency assignment in conformity with the Plans:* Any frequency assignment for a receiving space station or transmitting earth station which appears in the Regions 1 and 3 Plan or the Region 2 Plan or for which the procedure of Article 4 of this Appendix has been successfully applied.

NOC 1.4 *1983 Conference:* Regional Administrative Radio Conference for the Planning in Region 2 of the Broadcasting-Satellite Service in the Frequency Band 12.2 - 12.7 GHz and Associated Feeder Links in the Frequency Band 17.3 - 17.8 GHz, called in short Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2 (RARC Sat-R2), Geneva, 1983.

ADD [1] This use of the band 14.5 - 14.8 GHz is reserved for countries outside Europe.

NOC 1.5 *1985 Conference:* First Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1985, called in short WARC Orb-85.

ADD 1.6 *1988 Conference:* Second Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1988, called in short WARC Orb-88.

ARTICLE 2

MOD **Frequency Bands**

MOD 2.1 The provisions of this Appendix apply to the feeder links in the fixed satellite service (Earth-to-space) in the frequency bands 14.5 - 14.8 GHz and 17.3 - 18.1 GHz for the broadcasting-satellite service in Regions 1 and 3, and 17.3 - 17.8 GHz for the broadcasting-satellite service in Region 2 and to other services to which these bands are allocated in Regions 1, 2 and 3 so far as their relationship to the fixed-satellite service (Earth-to-space) in these bands is concerned.

ARTICLE 3

MOD **Execution of the Provisions and Associated Plans**

MOD 3.1 The Members of the Union in Regions 1, 2 and 3 shall adopt for their feeder-link space and earth stations in the fixed-satellite service (Earth-to-space) in the frequency bands referred to in this Appendix the characteristics specified in the appropriate Regional Plan and the associated provisions.

MOD 3.2 Members of the Union shall not change the characteristics specified in the Regions 1 and 3 Plan or in the Region 2 Plan, or bring into use assignments to receiving space stations or transmitting earth stations in the fixed-satellite service or to stations of the other services to which these frequency bands are allocated, except as provided for in the Radio Regulations and the appropriate Articles and Annexes of this Appendix.

ADD 3.3 The procedures for the use of interim systems in Region 2 for feeder links in the fixed-satellite service for the bands covered by this Appendix are given in Resolution **42 (Rev.Orb-88)**.

ARTICLE 4

MOD **Procedure for Modifications to the Plans**

MOD 4.1 When an administration intends to make a modification to one of the Regional Plans, i.e. either:

a) to modify the characteristics of any of its frequency assignments in the fixed-satellite service which are shown in the appropriate Regional Plan, or for which the procedure in this Article has been successfully applied, whether or not the station has been brought into use; *or*

b) to include in the Plan a new frequency assignment in the fixed-satellite service; *or*

c) to cancel a frequency assignment in the fixed-satellite service,

the following procedure shall be applied before any notification of the frequency assignment is made to the International Frequency Registration Board (see Article 5 of this Appendix and Resolution **42 (Rev.Orb-88)**).

MOD 4.1.1 Before an administration proposes to include in the Plan under the provisions of paragraph 4.1 *b)* a new frequency assignment for reception at a space station[1] or to include in the Plan a new frequency assignment for reception at a space station whose orbital position is not designated in the Plan to that administration, all of the assignments to the service areas involved should normally have been brought into service or have been notified to the Board in accordance with Article 5 of this Appendix. Should this not be the case, the administration concerned shall inform the Board of the reasons thereof.

MOD 4.2 *Proposed modifications to a frequency assignment in conformity with one of the Regional Plans or proposed inclusion in that Plan of a new frequency assignment*

ADD *For Regions 1 and 3*

MOD 4.2.1 An administration proposing a modification to the characteristics of a frequency assignment in conformity with the Regions 1 and 3 Plan or the inclusion of a new frequency assignment in that Plan shall seek the agreement of those administrations:

MOD 4.2.1.1 of Regions 1 and 3 having a feeder-link frequency assignment in the fixed-satellite service (Earth-to-space) in the same channel or an adjacent channel, in the same orbital position or an adjacent orbital position in the range ± 12.5°, which appears in the Plan or in respect of which proposed modifications to the Plan have already been published by the Board in accordance with the provisions of paragraphs 4.2.6.1 and 4.2.7 of this Article; *or*

MOD 4.2.1.2 having a frequency assignment in the band 17.7 - 18.1 GHz to an earth station in the fixed-satellite service (space-to-Earth), which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. **1060** of the Radio Regulations and which is located within the coordination area of the feeder-link fixed-satellite earth station; *or*

MOD 4.2.1.3 having a frequency assignment in the bands 14.5 - 14.8 GHz or 17.7 - 18.1 GHz to a terrestrial station in use or intended to be brought into use within three years of the projected date of bringing the feeder-link modification into use, and which is located within the coordination area of the feeder-link fixed-satellite earth station; *or*

MOD 4.2.1.4 having an assignment for feeder links in the fixed-satellite service (Earth-to-space) with the necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment, which is in conformity with the Region 2 feeder-link Plan, or in respect of which proposed modifications to the Plan have already been published by the Board in accordance with the provisions of paragraphs 4.2.6.1 and 4.2.7 of this Article;

NOC 4.2.1.5 which are considered affected.

NOC 4.2.1.6 The services of an administration are considered to be affected when the limits shown in Annex 1 to this Appendix are exceeded.

ADD 4.2.2 The agreement referred to in paragraph 4.2.1 is not required when an administration proposes to bring into use, with characteristics [1] appearing in the Plan, a fixed feeder-link earth station or a transportable feeder-link earth station in the bands 14.5 - 14.8 GHz or 17.3 - 18.1 GHz.

ADD *For Region 2*

MOD 4.2.3 An administration proposing a modification to the characteristics of a frequency assignment in conformity with the Region 2 Plan or the inclusion of a new frequency assignment in that Plan shall seek the agreement of those administrations:

MOD 4.2.3.1 of Region 2 having a feeder-link frequency assignment in the fixed-satellite service (Earth-to-space) in the same channel or an adjacent channel, which appears in the Plan or in respect of which proposed modifications to the Plan have already been published by the Board in accordance with the provisions of paragraphs 4.2.6.1 and 4.2.7 of this Article; *or*

ADD [1] The power to be taken into account is obtained by adding the values specified in columns 8 and 9 of the Plan.

MOD 4.2.3.2 having a frequency assignment in the band 17.7 - 17.8 GHz to an earth station in the fixed-satellite service (space-to-Earth), which is recorded in the Master Register or which has been coordinated in or is being coordinated under the provisions of No. **1060** of the Radio Regulations and which is located within the coordination area of the feeder-link fixed-satellite earth station; *or*

MOD 4.2.3.3 having a frequency assignment in the band 17.7 - 17.8 GHz to a terrestrial station in use or intended to be brought into use within three years of the projected date of bringing the feeder-link modification into use, and which is located within the coordination area of the feeder-link fixed-satellite earth station; *or*

MOD 4.2.3.4 having an assignment for feeder links in the fixed-satellite service (Earth-to-space) with the necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment, which is in conformity with the Regions 1 and 3 feeder-link Plan, or in respect of which proposed modifications to the Plan have already been published by the Board in accordance with the provisions of paragraphs 4.2.6.1 and 4.2.7 of this Article;

MOD 4.2.3.5 which are considered affected.

(MOD) 4.2.3.6 The services of an administration are considered to be affected when the limits shown in Annex 1 to this Appendix are exceeded.

ADD 4.2.4 The agreement referred to in paragraph 4.2.3 is not required when an administration proposes to bring into use, with characteristics appearing in the Plan, a fixed feeder-link earth station in the band 17.3 - 17.8 GHz or a transportable feeder-link earth station in the band 17.3 - 17.7 GHz. Administrations may communicate to the Board the characteristics of such earth stations for inclusion in the Plan.

ADD *For all Regions*

MOD 4.2.5 An administration intending to modify characteristics in one of the Regional Plans shall send to the Board, not earlier than eight years but preferably not later than eighteen months before the date on which the assignment is to be brought into use, the relevant information listed in Annex 2 to this Appendix.

ADD 4.2.6 If an administration wishes to modify its assignments in the Plans contained in Appendix **30 (Orb-85)** and in Appendix **30A (Orb-88)**, the eight-year period of paragraph 4.2.5 will be applicable in lieu of the five-year period specified in paragraph 4.3.5 of Appendix **30 (Orb-85)**.

(MOD) 4.2.6.1 Where as a result of the intended modification the limits defined in Annex 1 to this Appendix are not exceeded, this fact shall be indicated when submitting to the Board the information required by paragraph 4.2.5. The Board shall then publish this information in a special section of its weekly circular.

MOD 4.2.6.2 In all other cases the administration shall notify the Board of the names of the administrations whose agreement it considers should be sought in order to arrive at the agreement referred to in paragraphs 4.2.1 and 4.2.3 as well as of those with which agreement has already been reached.

MOD 4.2.7 The Board shall determine on the basis of Annex 1 to this Appendix the administrations whose frequency assignments are considered to be affected within the meaning of paragraphs 4.2.1 and 4.2.3. The Board shall include the names of those administrations with the information received under paragraph 4.2.6.2 and shall publish the complete information in a special section of its weekly circular. The Board shall immediately send the results of its calculations to the administration proposing the modification to the Plan.

(MOD) 4.2.8 The Board shall send a telegram to the administrations listed in the special section of the weekly circular drawing their attention to the information it contains and shall send them the results of its calculations.

(MOD) 4.2.9 An administration which feels that it should have been included in the list of administrations whose services are considered to be affected may, giving the technical reasons for so doing, request the Board to include its name. The Board shall study this request on the basis of Annex 1 to this Appendix and shall send a copy of the request with an appropriate recommendation to the administration proposing the modification to the Plan.

(MOD) 4.2.10 Any modification to a frequency assignment which is in conformity with the Plan or any inclusion in the Plan of a new frequency assignment which would have the effect of exceeding the limits specified in Annex 1 to this Appendix shall be subject to the agreement of all affected administrations.

(MOD) 4.2.11 The administration seeking agreement or the administration with which agreement is sought may request any additional technical information it considers necessary. The administrations shall inform the Board of such requests.

(MOD) 4.2.12 Comments from administrations on the information published pursuant to paragraph 4.2.7 should be sent either directly to the administration proposing the modification or through the Board. In any event the Board shall be informed that comments have been made.

(MOD) 4.2.13 An administration which has not notified its comments either to the administration seeking agreement or to the Board, within a period of four months following the date of the weekly circular referred to in paragraph 4.2.6.1 or paragraph 4.2.7 shall be understood to have agreed to the proposed modification. This time-limit may be extended by up to three months for an administration which has requested additional information under paragraph 4.2.11 or for an administration which has requested the assistance of the Board under paragraph 4.2.21. In the latter case the Board shall inform the administrations concerned of this request.

(MOD) 4.2.14 If, in seeking agreement, an administration modifies its initial proposal, it shall again apply the provisions of paragraph 4.2.5 and the consequent procedure with respect to any other administration whose services might be affected as a result of modifications to the initial proposal.

(MOD) 4.2.15 If no comments have been received on the expiry of the periods specified in paragraph 4.2.13, or if agreement has been reached with the administrations which have made comments and with which agreement is necessary, the administration proposing the modification may continue with the appropriate procedure in Article 5 of this Appendix and shall inform the Board, indicating the final characteristics of the frequency assignment together with the names of the administrations with which agreement has been reached.

(MOD) 4.2.16 The agreement of the administrations affected may also be obtained in accordance with this Article, for a specified period.

(MOD) 4.2.17 When the proposed modification to the Plan involves developing countries, administrations shall seek all practicable solutions conducive to the economical development of the broadcasting-satellite systems of these countries.

(MOD) 4.2.18 The Board shall publish in a special section of its weekly circular the information received under paragraph 4.2.15 together with the names of any administrations with which the provisions of this Article have been successfully applied. The frequency assignment concerned shall enjoy the same status as those appearing in the Plan and will be considered as a frequency assignment in conformity with the Plan.

(MOD) 4.2.19 When an administration proposing to modify the characteristics of a frequency assignment or to make a new frequency assignment receives notice of disagreement from an administration whose agreement it has sought, it should first endeavour to solve the problem by exploring all possible means of meeting its requirement. If the problem still cannot be solved by such means, the administration whose agreement has been sought should endeavour to overcome the difficulties as far as possible, and shall state the technical reasons for any disagreement if the administration seeking the agreement requests it to do so.

(MOD) 4.2.20 If no agreement is reached between the administrations concerned, the Board shall carry out any study that may be requested by these administrations; the Board shall inform them of the result of the study and shall make such recommendations as it may be able to offer for the solution of the problem.

(MOD) 4.2.21 An administration may at any stage in the procedure described, or before applying it, request the assistance of the Board, particularly in seeking the agreement of another administration.

(MOD) 4.2.22 The relevant provisions of Article 5 of this Appendix shall be applied when frequency assignments are notified to the Board.

NOC 4.3 *Cancellation of frequency assignments*

MOD When a frequency assignment in conformity with one of the Regional Plans is no longer required, whether or not as a result of a modification, the administration concerned shall immediately so inform the Board. The Board shall publish this information in a special section of its weekly circular and delete the assignment from the Plan.

MOD 4.4 *Master copies of the Plans*

MOD 4.4.1 The Board shall maintain up-to-date master copies of the Plans as well as master copies of the margin reports, including for each assignment the overall equivalent protection margins in respect of Region 2 and the feeder-link equivalent protection margins and the overall equivalent protection margins in respect of Regions 1 and 3, taking account of the application of the procedure specified in this Article. Each master copy of the margin reports shall contain the overall equivalent protection margins derived from the Plan as established by the 1983 Conference in the case of Region 2 and the feeder-link equivalent protection margins and the overall equivalent protection margins for the 1988 Conference in the case of Regions 1 and 3 and those derived from all modifications to the Plans as a result of the successful completion of the modification procedure of this Article.

MOD 4.4.2 The Secretary-General shall be informed by the Board of any modifications made to the Regional Plans and shall publish up-to-date versions of the Plans in an appropriate form when justified by the circumstances.

ARTICLE 5

MOD **Coordination, Notification, Examination and Recording in the Master International Frequency Register of Frequency Assignments to Feeder-Link Transmitting Earth Stations and Receiving Space Stations in the Fixed-Satellite Service**

MOD 5.1 *Coordination and notification*

ADD 5.1.1 When an administration wishes to determine whether it is possible to use, at a given location, an amount of power control which is in excess of that contained in column 9 of the Regions 1 and 3 feeder-link Plan, it shall request the Board to determine the amount of permissible power control (not to exceed 10 dB) from that given location using the procedure contained in Section 3.11 of Annex 3 to this Appendix.

MOD 5.1.2 Whenever an administration intends to bring into use a frequency assignment to a transmitting earth station or receiving space station in the fixed-satellite service in the bands between 14.5 and 14.8 GHz and between 17.3 and 18.1 GHz in Regions 1 and 3, and between 17.3 and 17.8 GHz in Region 2, it shall notify this frequency assignment to the Board. For this purpose, the notifying administration shall apply the following provisions.

ADD 5.1.3 Before an administration in Region 1 or 3 notifies to the Board or brings into use any frequency assignment to a transmitting feeder-link earth station in the bands 14.5 - 14.8 GHz and 17.7 - 18.1 GHz with an e.i.r.p. greater than the sum of the values specified in columns 8 and 9 of the Plan, it shall effect coordination of this assignment with each administration whose territory lies wholly or partly within the coordination area of the planned earth station using the method detailed in Appendix **28**.

ADD 5.1.4 Before an administration in Region 1 or 3 notifies to the Board or brings into use any frequency assignment to a transmitting feeder-link earth station in the bands 14.5 - 14.8 GHz and 17.7 - 18.1 GHz, it shall effect coordination of this assignment with each administration whose territory lies wholly or partly within the coordination area of the planned earth station, using the method detailed in Appendix **28**, in respect of notices concerning stations of the mobile and fixed services in the bands 14.5 - 14.8 GHz and 17.7 - 18.1 GHz and of the fixed-satellite service (space-to-Earth) in the band 17.7 - 18.1 GHz received by the Board prior to 29 August 1988 for recording in the Master Register.

ADD 5.1.5 If an administration with which coordination is sought under paragraph 5.1.4 does not respond within three months, the administration intending to bring into use a frequency assignment to a feeder-link earth station shall notify this frequency assignment in accordance with paragraph 5.1.2 above[1].

(MOD) 5.1.6 For any notification under 5.1.2, an individual notice for each frequency assignment shall be drawn up as prescribed in Annex 2 to this Appendix, the various sections of which specify the basic characteristics to be provided as appropriate. It is recommended that the notifying administration should also supply any other data it may consider useful.

(MOD) 5.1.7 Each notice must reach the Board not earlier than three years before the date on which the frequency assignment is to be brought into use. In any case, the notice must reach the Board not later than three months before that date[1].

ADD [1] In order to facilitate the coordination process, attention is drawn to Resolution **709 (Orb-88)**.

(MOD) 5.1.8 Any frequency assignment the notice of which reaches the Board after the applicable period specified in paragraph 5.1.7 shall, where it is to be recorded, bear a remark in the Master Register to indicate that it is not in conformity with paragraph 5.1.7.

(MOD) 5.1.9 Any notice made under paragraph 5.1.2 which does not contain the characteristics specified in Annex 2 to this Appendix shall be returned by the Board immediately by airmail to the notifying administration with the relevant reasons.

(MOD) 5.1.10 Upon receipt of a complete notice, the Board shall include its particulars, with the date of receipt, in its weekly circular which shall contain the particulars of all such notices received since the publication of the previous circular.

(MOD) 5.1.11 The circular shall constitute the acknowledgements to the notifying administration of the receipt of a complete notice.

(MOD) 5.1.12 Complete notices shall be considered by the Board in order of receipt. The Board shall not postpone its finding unless it lacks sufficient data to reach a decision; moreover, the Board shall not act upon any notice which has a technical bearing on an earlier notice still under consideration by the Board until it has reached a finding with respect to such earlier notice.

NOC 5.2 *Examination and recording*

MOD 5.2.1 The Board shall examine each notice:

a) with respect to its conformity with the Convention and the relevant provisions of the Radio Regulations (with the exception of those relating to *b), c), d)* and *e)* below); *and*

b) with respect to its conformity with the appropriate Regional Plan; *or*

c) with respect to its conformity with the appropriate Regional Plan, however, having characteristics differing from those in the Plan in one or more of the following aspects:

– use of a reduced e.i.r.p.,

– use of a reduced coverage area entirely situated within the coverage area appearing in the Plan,

– use of other modulating signals in accordance with the provisions of Section 3.1.3 to Annex 5 of Appendix **30 (Orb-85)**,

– in the case of Region 2, use of an orbital position under the conditions specified in paragraph B of Annex 7 to Appendix **30 (Orb-85)**,

– in the case of Regions 1 and 3, use of an orbital position under the conditions specified in Section 3.15 of Annex 3 to Appendix **30A (Orb-88)**[1],

– use of an antenna diameter greater than 5 metres for the 17.3 - 18.1 GHz band and 6 metres for the 14.5 - 14.8 GHz band without increasing the on-axis e.i.r.p.,

– in the case of Region 2, use of an antenna diameter greater than 5 metres resulting in a greater on-axis e.i.r.p. if the orbital separation with any other space station is greater than 0.5° ; *or*

ADD [1] The Board shall also apply this provision to paragraph 5.2.1 *c)* of Appendix **30 (Orb-85)** for Regions 1 and 3.

d) for Region 2, with respect to its conformity with the provisions of Resolution **42 (Rev.Orb-88)**;

ADD *e)* for Regions 1 and 3, with respect to its conformity with the provisions of paragraph 5.1.3 and also its conformity with paragraph 5.1.4 or 5.1.5 relating to coordination.

MOD 5.2.2 When the Board reaches a favourable finding with respect to paragraphs 5.2.1 *a)*, 5.2.1 *b)* and 5.2.1 *e)*, the frequency assignment of an administration shall be recorded in the Master Register. The date of receipt of the notice by the Board shall be entered in Column 2d. In relations between administrations all frequency assignments brought into use in conformity with the Plan and recorded in the Master Register shall be considered to have the same status irrespective of the dates entered in Column 2d for such frequency assignments.

MOD 5.2.2.1 When the Board reaches a favourable finding with respect to paragraphs 5.2.1 *a)*, 5.2.1 *c)* and 5.2.1 *e)*, the frequency assignment shall be recorded in the Master Register. The date of receipt of the notice by the Board shall be entered in Column 2d. In relations between administrations, all frequency assignments brought into use in conformity with the Plan and recorded in the Master Register shall be considered to have the same status irrespective of the dates entered in Column 2d for such frequency assignments. When recording these assignments, the Board shall indicate by an appropriate symbol the characteristics having a value different from that appearing in the Plan.

MOD 5.2.2.2 In the case of Region 2, when the Board reaches a favourable finding with respect to paragraph 5.2.1 *a)* but an unfavourable finding with respect to paragraphs 5.2.1 *b)* and 5.2.1 *c)*, it shall examine the notice with respect to the successful application of the provisions of Resolution **42 (Rev.Orb-88)**. A frequency assignment for which the provisions of Resolution **42 (Rev.Orb-88)** have been successfully applied shall be recorded in the Master Register with an appropriate symbol to indicate its interim status. The date of receipt of the notice by the Board shall be entered in Column 2d. In relations between administrations all frequency assignments

brought into use following the successful application of the provisions of Resolution **42 (Rev.Orb-88)** and recorded in the Master Register shall be considered to have the same status irrespective of the dates entered in Column 2d for such frequency assignments. If the finding with respect to paragraph 5.2.1 *d)* is unfavourable, the notice shall be returned immediately by airmail to the notifying administration.

ADD 5.2.2.3 In the case of Regions 1 and 3, when the Board reaches a favourable finding with respect to paragraph 5.2.1 *a)* but an unfavourable finding with respect to paragraphs 5.2.1 *b)* and 5.2.1 *c)*, the notice shall be returned immediately by airmail to the notifying administration with the Board's reasons for this finding and with such suggestions as the Board may be able to offer with a view to a satisfactory solution of the problem.

ADD 5.2.2.4 In the case of Regions 1 and 3, when the Board reaches a favourable finding with respect to paragraphs 5.2.1 *a)*, 5.2.1 *b)* and 5.2.1 *c)* but an unfavourable finding with respect to paragraph 5.2.1 *e)*, the notice shall be returned immediately by airmail to the notifying administration with the Board's reasons for this finding and with such suggestions as the Board may be able to offer with a view to a satisfactory solution of the problem. If the unfavourable finding under paragraph 5.2.1 *e)* is due to the coordination under paragraph 5.1.3 only not being effected, the administration shall undertake only to bring this assignment into use with an e.i.r.p. level not greater than the sum of the values specified in columns 8 and 9 of the Regions 1 and 3 Plan.

ADD 5.2.2.5 When an assignment is recorded as a result of a favourable finding with respect to paragraph 5.2.1 *e)*, a remark shall be included indicating that coordination has been effected.

NOC 5.2.3 Whenever a frequency assignment is recorded in the Master Register, the finding reached by the Board shall be indicated by a symbol in Column 13a.

(MOD) 5.2.4 When the Board reaches an unfavourable finding with respect to paragraphs 5.2.1 *a)*, 5.2.1 *b)* and 5.2.1 *c)*, the notice shall be returned immediately by airmail to the notifying administration with the Board's reasons for this finding and with such suggestions as the Board may be able to offer with a view to a satisfactory solution of the problem.

(MOD) 5.2.5 When the notifying administration resubmits the notice and the finding of the Board becomes favourable with respect to the appropriate parts of paragraph 5.2.1, the notice shall be treated as in paragraph 5.2.2, 5.2.2.1 or 5.2.2.2 as appropriate.

NOC 5.2.6 – 5.3.2

ARTICLE 6

MOD **Procedure Concerning Coordination, Notification and Recording in the Master International Frequency Register of Frequency Assignments to Receiving Terrestrial Stations in Regions 1 and 3 in the Bands 14.5 - 14.8 GHz and 17.7 - 18.1 GHz, and in Region 2 in the Band 17.7 - 17.8 GHz, when Frequency Assignments to Feeder-Link Transmitting Earth Stations for the Broadcasting-Satellite Service in Conformity with the Regions 1 and 3 Plan or the Region 2 Plan are Involved**

MOD 6.1 Administrations planning to implement assignments for terrestrial stations in Regions 1 and 3 in the bands 14.5 - 14.8 GHz and 17.7 - 18.1 GHz, and in Region 2 in the 17.7 - 17.8 GHz band should evaluate the level of interference assessed on the basis of coordination contours calculated in accordance with Appendix **28** to the Radio Regulations[1], which might be caused by the closest feeder-link earth station which could be located on the border of the territory of another administration. Should the administration planning terrestrial stations find that interference may be caused by such a feeder-link earth station, it may request the administration responsible for the feeder-link earth station to indicate the geographical coordinates, the antenna characteristics and the elevation angle of the horizon around its actual and planned feeder-link earth stations.

ADD [1] In the case of Regions 1 and 3, the feeder-link earth-station power to be taken into account is obtained by adding the values specified in columns 8 and 9 of the Plan.

MOD 6.2 In the case of Region 2, when the entry in the Plan contains information on specific earth stations, this shall be used in the interference calculations mentioned in paragraph 6.1 above. When such information is not contained in the Region 2 Plan, an administration which receives a request under paragraph 6.1 shall, within a period of three months, communicate the details of the feeder-link earth stations to the administration planning the terrestrial station, and to the Board in order to update the Plan.

MOD 6.3 In the case of Regions 1 and 3, an administration which receives a request under paragraph 6.1 shall, within a period of three months, communicate the details of the feeder-link stations to the administration planning the terrestrial station, and to the Board for information.

MOD 6.4 If, at the end of a period of three months, the administration responsible for the terrestrial station does not receive a reply, it may request the assistance of the Board.

MOD 6.5 If the administration responsible for the feeder-link earth station does not communicate to the Board, within a period of three months, the information requested under paragraph 6.1, this administration shall only implement its feeder-link earth station provided it does not cause harmful interference to the terrestrial station under consideration.

ADD 6.6 If, as a result of the application of this Article, an agreement is reached with the administration responsible for the feeder-link earth station or no comments have been received, the administration responsible for the terrestrial station may notify this station under Article **12** of the Radio Regulations for recording in the Master International Frequency Register. A remark shall be included indicating either that an agreement has been reached or that no comments have been received.

ARTICLE 7

MOD **Procedure Concerning Coordination, Notification and Recording in the Master International Frequency Register of Frequency Assignments to Stations in the Fixed-Satellite Service (Space-to-Earth) in Regions 1 and 3 in the Band 17.7 - 18.1 GHz and in Region 2 in the band 17.7 - 17.8 GHz, when Frequency Assignments to Feeder Links for Broadcasting-Satellite Stations Appearing in the Regions 1 and 3 Plan or the Region 2 Plan are Involved**

MOD 7.1 The provisions of Articles **11** and **13** and Appendix **29** of the Radio Regulations are applicable to transmitting space stations in the fixed satellite service in the band 17.7 - 18.1 GHz, together with the provisions of Annex 4 to this Appendix, except that in relation to feeder-link stations, the relevant criteria mentioned in Appendix **29** to the Radio Regulations are replaced by those given in Section 1 of Annex 4 to this Appendix.

MOD 7.2 Administrations planning to implement assignments for receiving earth stations in Regions 1 and 3 in the 17.7 - 18.1 GHz band and in Region 2 in the 17.7 - 17.8 GHz band in the fixed-satellite service (space-to-Earth) should evaluate the level of interference, assessed on the basis of coordination contours calculated in accordance with Section 3 of Annex 4 to this Appendix, which might be caused by the closest feeder-link earth station which could be located on the border of the territory of another administration. Should the administration planning receiving earth stations find that interference may be caused by such a feeder-link earth station, it may request the administration responsible for the feeder-link earth stations to indicate the geographical coordinates, the antenna characteristics and the elevation angle of the horizon around its actual and planned feeder-link earth stations.

MOD 7.3 In the case of Region 2, when the entry in the Plan contains information on specific earth stations this shall be used in the interference calculations mentioned in paragraph 7.2 above. When such information is not contained in the Plan an administration which receives a request under paragraph 7.2 shall, within a period of three months, communicate the details of the feeder-link earth stations to the administration planning the receiving earth station, and to the Board in order to update the Plan.

ADD 7.4 In the case of Regions 1 and 3, an administration which receives a request under paragraph 7.2 shall, within a period of three months, communicate the details of the feeder-link earth stations to the administration planning the receiving earth station, and to the Board for information.

NOC 7.5 If, at the end of the period of three months, the administration responsible for the fixed-satellite receiving earth station does not receive a reply, it may request the assistance of the Board.

MOD 7.6 If the administration responsible for the feeder-link earth stations does not communicate to the Board, within a period of three months, the information requested under paragraph 7.2, this administration shall only implement its feeder-link earth station provided it does not cause harmful interference to the fixed-satellite earth station under consideration.

ADD 7.7 If, as a result of the application of this Article, an agreement is reached with the administration responsible for the feeder-link earth station or no comments have been received, and when the station is recorded in the Master Register in accordance with Article **13** of the Radio Regulations, the Board shall enter a remark indicating either that an agreement has been reached or that no comments have been received.

NOC

ARTICLE 8

Miscellaneous Provisions Relating to the Procedures

ARTICLE 9

MOD

Plan for Feeder Links for the Broadcasting-Satellite Service in the Fixed-Satellite Service in the Frequency Band 17.3 - 17.8 GHz in Region 2

NOC 9.1 COLUMN HEADINGS OF THE PLAN

NOC Col. 1. *Beam identification* (Column 1 contains the symbol designating the country or the geographical area taken from Table B1 of the Preface to the International Frequency List followed by the symbol designating the service area).

NOC Col. 2. *Nominal orbital position*, in degrees and hundredths of a degree.

NOC Col. 3. *Channel number* (see Table 2 showing channel numbers and corresponding assigned frequencies).

NOC Col. 4. *Boresight geographical coordinates*, in degrees and hundredths of a degree.

NOC Col. 5. *Antenna beamwidth.* This column contains two figures corresponding to the major axis and the minor axis respectively of the elliptical cross section half-power beam, in degrees and hundredths of a degree.

NOC Col. 6. *Orientation of the ellipse* determined as follows: in a plane normal to the beam axis, the direction of a major axis of the ellipse is specified as the angle measured anticlockwise from a line parallel to the equatorial plane to the major axis of the ellipse to the nearest degree.

NOC Col. 7. *Polarization* (1 = direct, 2 = indirect).[1]

NOC Col. 8. Earth station *e.i.r.p.* in the direction of maximum radiation, in dBW.

MOD Col. 9. *Remarks*[2].

NOC 9.2 TEXT FOR SYMBOLS IN REMARKS COLUMN OF THE PLAN

NOC 1 – 2

MOD 3. This assignment may cause interference to feeder-link assignments of Spain, Guinea-Bissau and Portugal in the Regions 1 and 3 feeder-link Plan adopted at the 1988 Conference and shall only be brought into use if:

a) the administrations of Spain, Guinea-Bissau and Portugal agree; *or*

MOD [1] See Annex 3 (Section 4.8) to this Appendix.

ADD [2] *Note:* The location of earth stations, together with the antenna characteristics and elevation angle of the horizon, are given as an annex to this Plan, and will be published when the Plan is republished in accordance with paragraph 4.4.2 of this Appendix.

b) their feeder-link equivalent protection margins, as defined in Section 1.7 of Annex 3 to this Appendix, are positive.

The affected administrations shall be informed by the notifying administration of the required changes in characteristics before this assignment is brought into use.

NOC 4 – 8

MOD 9/GR . . . This assignment is part of a group, the number of which follows the symbol. The group consists of the beams and has the number of channels assigned to it as indicated in the table below.

a) The overall equivalent protection margin to be used for the application of Article 4 of this Appendix and Resolution **42 (Rev.Orb-88)** shall be calculated on the following basis:

– for the calculation of interference to assignments that are part of a group, only the interference contributions from assignments that are not part of the same group are to be included; *and*

– for the calculation of interference from assignments belonging to a group of assignments that are not part of that same group, only the worst interference contribution from that group shall be used on a test point to test point basis.

b) If an administration notifies the same frequency in more than one beam of a group for use at the same time, the overall *C/I* produced by all emissions from that group shall not exceed the *C/I* calculated on the basis of *a)* above.

NOC TABLE 1

NOC *Country symbols*

NOC TABLE 2

ADD

ARTICLE 9A

Plan for Feeder Links for the Broadcasting-Satellite Service in the Fixed-Satellite Service in the Frequency Bands 14.5 - 14.8 and 17.3 - 18.1 GHz in Regions 1 and 3

9A.1 COLUMN HEADINGS OF THE PLAN

Col. 1. *Beam identification* (Column 1 contains the symbol designating the country or the geographical area taken from Table B1 of the Preface to the International Frequency List followed by the symbol designating the service area).

Col. 2. *Nominal orbital position*, in degrees and tenths of a degree.

Col. 3. *Channel number* (see Tables 2A and 2B showing channel numbers and corresponding assigned frequencies).

Col. 4. *Boresight geographical coordinates*, in degrees and tenths of a degree.

Col. 5. *Antenna beamwidth.* This column contains two figures corresponding to the major axis and the minor axis respectively of the elliptical cross-section half-power beam, in degrees and hundredths of a degree.

Col. 6. *Orientation of the ellipse* determined as follows: in a plane normal to the beam axis, the direction of a major axis of the ellipse is specified as the angle measured anticlockwise from a line parallel to the equatorial plane to the major axis of the ellipse, to the nearest degree.

Col. 7. *Polarization* (1 = direct, 2 = indirect).

Col. 8. Nominal earth station *e.i.r.p.*, in dBW.

Col. 9. Permitted increase in earth station *e.i.r.p.* in dB for the purpose of power control (see Section 3.11 of Annex 3 to this Appendix).

Col. 10. *Remarks.*

9A.2 TEXT FOR SYMBOLS IN REMARKS COLUMN OF THE PLAN

1. Fast roll-off space station receiving antenna as defined in Annex 3 (Section 3.7.3) of this Appendix.

2. For this assignment the diameter of the earth station antenna is 7 m and the system noise temperature is 3000 K.

3. India may also locate feeder-link earth stations near the point 29 °N, 77.3 °E on the condition that this does not affect the equivalent protection margins of other administrations.

4. In order to improve the up-link margins for channel 23, the satellite receiving antenna will use a shaped beam.

5. This assignment in the Plan is for the period up to 31 December 2001 and during this period Saudi Arabia may use the frequencies 14 516.90 MHz and 14 574.44 MHz instead of channels 01 and 04 respectively.

6. During the 1988 Conference, the Kingdom of Bhutan became the 165th Member of the Union and the Conference decided to provide four assignments for a feeder-link to a space station of the broadcasting-satellite service, which does not yet have any assignments in Appendix **30 (Orb-85)**.

7. This assignment uses feeder-link frequencies which are not a linear translation of the down-link Plan. This results in potential radiation of a coherent unwanted frequency corresponding to the second harmonic of the shift frequency and falling in the frequency band allocated to down-links (11.7 - 12.5 GHz).

Every possible and sufficient technical means shall be adopted in the space station to eliminate such unwanted frequency radiation.

8. This assignment is part of a group, the number of which follows the symbol. The group consists of the beams and has the number of channels assigned to it as indicated in Table 1.

a) The overall equivalent protection margin to be used for the application of Article 4 of this Appendix shall be calculated on the following basis:

– for the calculation of interference to assignments that are part of a group, only the interference contributions from assignments that are not part of the same group are to be included; *and*

– for the calculation of interference from assignments belonging to a group of assignments that are not part of that same group, only the worst interference contribution from that group shall be used on a test point to test point basis.

b) If an administration notifies the same frequency in more than one beam of a group for use at the same time, the overall *C/I* produced by all emissions from that group shall not exceed the *C/I* calculated on the basis of *a)* above.

MOD

TABLE 1

Group	Beams in the group	Number of channels assigned to the group
GR1	TKL05800, TKL05801	2 channels
GR2	NIU05400, NIU05401	2 channels
GR3	CKH05200, CKH05201	4 channels
GR4	CKH05300, CKH05301	4 channels
GR5	REU09700, REU09701	5 channels
GR6	NCL10000, NCL10001	4 channels
GR7	MYT09800, MYT09801	5 channels
GR8	WAL10200, WAL10201	4 channels
GR9	PLM33700, PLM33701	5 channels
GR10	CAR33800, CAR33801	5 channels
GR11	WAK33400, WAK33401	5 channels
GR12	MRL33300, MRL33301	5 channels
GR13	SMA33500, SMA33501	5 channels
GR14	MRA33200, MRA33201	5 channels
GR15	GUM33100, GUM33101	5 channels

9. The Federal Republic of Germany and Switzerland have agreed that their feeder-link channels can be interchanged for a limited period of time ending in the year 2001 as follows:

2 with 22, 6 with 26, 10 with 30, 14 with 34, 18 with 38.

PART A

TABLE 2A

Table showing correspondence between channel numbers and assigned frequencies for the feeder links in the frequency band 14.5 - 14.8 GHz

Channel No.	Assigned feeder-link frequency (MHz)
1	14 525.30
2	14 544.48
3	14 563.66
4	14 582.84
5	14 602.02
6	14 621.20
7	14 640.38
8	14 659.56
9	14 678.74
10	14 697.92
11	14 717.10
12	14 736.28
13	14 755.46
14	14 774.64

14 525.30 MHz (01)

1	2	3	4		5		6	7	8	9	10
ARS00300	17.0	01	44.6	23.4	4.21	2.48	145	1	82.0	0.5	
IFB02100	5.0	01	24.5	−28.0	3.13	1.68	27	1	82.0	2.8	
IND04300	56.0	01	77.8	11.1	1.36	1.28	172	2	82.0	10.0	3.
IND04400	68.0	01	79.5	22.3	2.19	1.42	146	2	82.0	6.1	3.
ISR11000	−13.0	01	34.9	31.4	0.94	0.60	117	2	82.0	4.1	
MRC20900	−25.0	01	−8.9	28.9	3.96	1.55	50	1	82.0	0.9	
NMB02500	−19.0	01	17.5	−21.6	2.66	1.90	48	1	82.0	2.0	
YMS26700	11.0	01	48.8	15.2	1.76	1.54	176	1	82.0	2.1	

14 544.48 MHz (02)

CPV30100	−31.0	02	−24.0	16.0	0.86	0.70	144	1	82.0	2.5	
ETH09200	23.0	02	39.7	9.1	3.50	2.40	124	1	82.0	10.0	
IND04500	56.0	02	76.2	19.5	1.58	1.58	21	1	82.0	10.0	3.
IND04800	68.0	02	86.2	25.0	1.56	0.90	120	1	82.0	6.3	3.
MOZ30700	−1.0	02	34.0	−18.0	3.57	1.38	55	1	82.0	3.6	
NIG11900	−19.0	02	7.8	9.4	2.16	2.02	45	2	82.0	2.8	
PAK12700	38.0	02	69.6	29.5	2.30	2.16	14	2	82.0	3.9	
PNG13100	110.0	02	147.7	−6.3	2.50	2.18	169	2	89.0	10.0	
SNG15100	74.0	02	103.8	1.3	0.60	0.60	0	1	82.0	10.0	
STP24100	−13.0	02	7.0	0.8	0.60	0.60	0	1	82.0	10.0	
TGO22600	−25.0	02	0.8	8.6	1.52	0.60	105	1	82.0	5.5	
UGA05100	11.0	02	32.3	1.2	1.46	1.12	60	2	82.0	5.6	

14 563.66 MHz (03)

IND03800	56.0	03	75.9	33.4	1.52	1.08	33	2	82.0	10.0	3.
IND04700	68.0	03	93.3	11.1	1.92	0.60	96	2	82.0	10.0	3.
IR10900	34.0	03	54.2	32.4	3.82	1.82	149	1	82.0	3.3	
YMS26700	11.0	03	48.8	15.2	1.76	1.54	176	1	82.0	2.9	
ZMB31400	–1.0	03	27.5	–13.1	2.38	1.48	39	2	82.0	2.9	

14 582.84 MHz (04)

ARS34000	17.0	04	44.6	23.4	4.21	2.48	145	2	82.0	0.5	
CPV30100	–31.0	04	–24.0	16.0	0.86	0.70	144	1	82.0	2.5	
IND04000	56.0	04	73.0	25.0	1.82	1.48	58	1	82.0	10.0	3.
IND04200	68.0	04	79.3	27.7	2.14	1.16	147	1	82.0	10.0	3.
MOZ30700	–1.0	04	34.0	–18.0	3.57	1.38	55	1	82.0	3.6	
NIG11900	–19.0	04	7.8	9.4	2.16	2.02	45	2	82.0	2.8	
PAK28300	38.0	04	74.7	33.9	1.34	1.13	160	2	82.0	2.8	
PNG27100	128.0	04	148.0	–6.7	2.80	2.05	155	2	89.0	10.0	
STP24100	–13.0	04	7.0	0.8	0.60	0.60	0	1	82.0	10.0	
TGO22600	–25.0	04	0.8	8.6	1.52	0.60	105	1	82.0	5.5	
UGA05100	11.0	04	32.3	1.2	1.46	1.12	60	2	82.0	5.6	

14 602.02 MHz (05)

1	2	3	4		5		6	7	8	9	10
IFB02100	5.0	05	24.5	−28.0	3.13	1.68	27	1	82.0	2.8	
IND03900	56.0	05	72.7	11.2	1.26	0.60	107	2	82.0	10.0	3.
IND04600	68.0	05	84.7	20.5	1.60	0.86	30	2	82.0	10.0	3.
ISR11000	−13.0	05	34.9	31.4	0.94	0.60	117	2	82.0	4.1	
MRC20900	−25.0	05	−8.9	28.9	3.96	1.55	50	1	82.0	0.9	
NMB02500	−19.0	05	17.5	−21.6	2.66	1.90	48	1	82.0	2.0	
YMS26700	11.0	05	48.8	15.2	1.76	1.54	176	1	82.0	2.1	
ZMB31400	−1.0	05	27.5	−13.1	2.38	1.48	39	2	82.0	3.4	

14 621.20 MHz (06)

CPV30100	−31.0	06	−24.0	16.0	0.86	0.70	144	1	82.0	2.5	
ETH09200	23.0	06	39.7	9.1	3.50	2.40	124	1	82.0	10.0	
IND03700	68.0	06	93.0	25.5	1.46	1.13	40	1	82.0	6.4	3.
IND04100	56.0	06	78.4	16.0	2.08	1.38	35	1	82.0	10.0	3.
MOZ30700	−1.0	06	34.0	−18.0	3.57	1.38	55	1	82.0	3.7	
NIG11900	−19.0	06	7.8	9.4	2.16	2.02	45	2	82.0	2.8	
PAK12700	38.0	06	69.6	29.5	2.30	2.16	14	2	82.0	3.9	
PNG13100	110.0	06	147.7	−6.3	2.50	2.18	169	2	89.0	10.0	
SNG15100	74.0	06	103.8	1.3	0.60	0.60	0	1	82.0	10.0	
STP24100	−13.0	06	7.0	0.8	0.60	0.60	0	1	82.0	10.0	
TGO22600	−25.0	06	0.8	8.6	1.52	0.60	105	1	82.0	5.5	
UGA05100	11.0	06	32.3	1.2	1.46	1.12	60	2	82.0	5.6	

14 640.38 MHz (07)

IFB02100	5.0	07	24.5	−28.0	3.13	1.68	27	1	82.0	2.8	
IND04300	56.0	07	77.8	11.1	1.36	1.28	172	2	82.0	10.0	3.
IND04600	68.0	07	84.7	20.5	1.60	0.86	30	2	82.0	10.0	3.
IRN10900	34.0	07	54.2	32.4	3.82	1.82	149	1	82.0	3.3	
MRC20900	−25.0	07	−8.9	28.9	3.96	1.55	50	1	82.0	0.9	
SEN22200	−37.0	07	−14.4	13.8	1.46	1.04	139	1	82.0	5.4	
YMS26700	11.0	07	48.8	15.2	1.76	1.54	176	1	82.0	2.1	
ZMB31400	−1.0	07	27.5	−13.1	2.38	1.48	39	2	82.0	3.4	

14 659.56 MHz (08)

CPV30100	−31.0	08	−24.0	16.0	0.86	0.70	144	1	82.0	2.5	
ETH09200	23.0	08	39.7	9.1	3.50	2.40	124	1	82.0	10.0	
IND04100	56.0	08	78.4	16.0	2.08	1.38	35	1	82.0	10.0	3.
IND04800	68.0	08	86.2	25.0	1.56	0.90	120	1	82.0	10.0	3.
MOZ30700	−1.0	08	34.0	−18.0	3.57	1.38	55	1	82.0	3.3	
NIG11900	−19.0	08	7.8	9.4	2.16	2.02	45	2	82.0	2.8	
PAK28300	38.0	08	74.7	33.9	1.34	1.13	160	2	82.0	2.8	
PNG27100	128.0	08	148.0	−6.7	2.80	2.05	155	2	89.0	10.0	
STP24100	−13.0	08	7.0	0.8	0.60	0.60	0	1	82.0	10.0	
UGA05100	11.0	08	32.3	1.2	1.46	1.12	60	2	82.0	5.6	

14 678.74 MHz (09)

1	2	3	4		5		6	7	8	9	10
IFB02100	5.0	09	24.5	−28.0	3.13	1.68	27	1	82.0	2.8	
IND03800	56.0	09	75.9	33.4	1.52	1.08	33	2	82.0	10.0	3.
IND04400	68.0	09	79.5	22.3	2.19	1.42	146	2	82.0	6.1	3.
ISR11000	−13.0	09	34.9	31.4	0.94	0.60	117	2	82.0	4.1	
MRC20900	−25.0	09	−8.9	28.9	3.96	1.55	50	1	82.0	0.9	
NMB02500	−19.0	09	17.5	−21.6	2.66	1.90	48	1	82.0	2.0	
YMS26700	11.0	09	48.8	15.2	1.76	1.54	176	1	82.0	2.1	
ZMB31400	−1.0	09	27.5	−13.1	2.38	1.48	39	2	82.0	3.4	

14 697.92 MHz (10)

ETH09200	23.0	10	39.7	9.1	3.50	2.40	124	1	82.0	10.0	
IND04200	68.0	10	79.3	27.7	2.14	1.16	147	1	82.0	3.2	3.
IND04500	56.0	10	76.2	19.5	1.5B	1.58	21	1	82.0	10.0	3.
NIG11900	−19.0	10	7.8	9.4	2.16	2.02	45	2	82.0	2.8	
PNG13100	110.0	10	147.7	−6.3	2.50	2.18	169	2	89.0	10.0	
SNG15100	74.0	10	103.8	1.3	0.60	0.60	0	1	82.0	10.0	
TGO22600	−25.0	10	0.8	8.6	1.52	0.60	105	1	82.0	5.5	
UGA05100	11.0	10	32.3	1.2	1.46	1.12	60	2	82.0	5.6	

14 717.10 MHz (11)

IFB02100	5.0	11	24.5	−28.0	3.13	1.68	27	1	82.0	2.8	
IND04700	68.0	11	93.3	11.1	1.92	0.60	96	2	82.0	10.0	3.
IRN10900	34.0	11	54.2	32.4	3.82	1.82	149	1	82.0	3.3	
ISR11000	−13.0	11	34.9	31.4	0.94	0.60	117	2	82.0	4.1	
MRC20900	−25.0	11	−8.9	28.9	3.96	1.55	50	1	82.0	0.9	
SEN22200	−37.0	11	−14.4	13.8	1.46	1.04	139	1	82.0	5.4	
ZMB31400	−1.0	11	27.5	−13.1	2.38	1.48	39	2	82.0	2.9	

14 736.28 MHz (12)

CPV30100	−31.0	12	−24.0	16.0	0.86	0.70	144	1	82.0	2.5	
ETH09200	23.0	12	39.7	9.1	3.50	2.40	124	1	82.0	10.0	
IND04000	56.0	12	73.0	25.0	1.82	1.48	58	1	82.0	10.0	3.
MOZ30700	−1.0	12	34.0	−18.0	3.57	1.38	55	1	82.0	3.3	
PAK21000	38.0	12	72.1	30.8	1.16	0.72	90	2	82.0	3.B	
PNG27100	128.0	12	148.0	−6.7	2.80	2.05	155	2	89.0	10.0	
STP24100	−13.0	12	7.0	0.8	0.60	0.60	0	1	82.0	10.0	

14 755.46 MHz (13)

1	2	3	4		5		6	7	8	9	10
IND03900	56.0	13	72.7	11.2	1.26	0.60	107	2	82.0	10.0	3.
NMB02500	−19.0	13	17.5	−21.6	2.66	1.90	48	1	82.0	2.7	

14 774.64 MHz (14)

IND03700	68.0	14	93.0	25.5	1.46	1.13	40	1	82.0	6.4	3.
PNG13100	110.0	14	147.7	−6.3	2.50	2.18	169	2	89.0	10.0	
SNG15100	74.0	14	103.8	1.3	0.60	0.60	0	1	82.0	10.0	
TGO22600	−25.0	14	0.8	8.6	1.52	0.60	105	1	82.0	5.5	

PART B

TABLE 2B

Table showing correspondence between channel numbers and assigned frequencies for the feeder links in the frequency band 17.3 GHz - 18.1 GHz

Channel No.	Assigned feeder-link frequency (MHz)
1	17 327.48
2	17 346.66
3	17 365.84
4	17 385.02
5	17 404.20
6	17 423.38
7	17 442.56
8	17 461.74
9	17 480.92
10	17 500.10
11	17 519.28
12	17 538.46
13	17 557.64
14	17 576.82
15	17 596.00
16	17 615.18
17	17 634.36
18	17 653.54
19	17 672.72
20	17 691.90

Channel No.	Assigned feeder-link frequency (MHz)
21	17 711.08
22	17 730.26
23	17 749.44
24	17 768.62
25	17 787.80
26	17 806.98
27	17 826.16
28	17 845.34
29	17 864.52
30	17 883.70
31	17 902.88
32	17 922.06
33	17 941.24
34	17 960.42
35	17 979.60
36	17 998.78
37	18 017.96
38	18 037.14
39	18 056.32
40	18 075.50

1	2	3	4		5		6	7	8	9	10
AFG24600	50.0	01	67.0	34.3	1.89	1.19	18	2	84.0	3.4	
AUS00500	98.0	01	130.5	−24.3	6.22	4.71	51	1	87.0	4.6	1.
CAR33800	122.0	01	151.1	11.6	6.48	3.49	179	2	87.0	3.9	8/GR10
CAR33801	122.0	01	−157.5	21.0	2.02	0.60	115	2	87.0	2.2	8/GR10
CHN15500	62.0	01	101.9	33.5	5.10	2.80	143	1	84.0	10.0	
CHN16200	92.0	01	108.1	33.7	5.00	4.00	148	1	84.0	8.2	
CHN16300	79.8	01	116.0	39.2	1.20	0.80	132	2	84.0	10.0	
CME30000	−13.0	01	12.7	6.2	2.54	1.68	87	2	84.0	5.4	
E 12900	−31.0	01	−3.1	39.9	2.10	1.14	154	1	84.0	5.9	
F 09300	−19.0	01	2.6	45.9	2.50	0.98	160	2	84.0	0.9	
FJI19300	152.0	01	179.4	−17.9	1.04	0.98	67	2	84.0	10.0	
GUI19200	−37.0	01	−11.0	10.2	1.58	1.04	147	1	85.0	7.6	
IND03900	56.0	01	72.7	11.2	1.26	0.60	107	2	84.0	10.0	3.
INS03500	104.0	01	115.2	−1.7	9.14	3.43	170	2	84.0	10.0	
J 11100	110.0	01	134.5	31.5	3.52	3.30	68	1	87.0	3.7	
LBY28000	−25.0	01	17.5	26.3	3.68	1.84	130	1	84.0	1.5	
MDG23600	29.0	01	46.2	−18.6	2.57	0.80	67	1	84.0	10.0	
NZL05500	158.0	01	172.3	−39.7	2.88	1.56	47	2	84.0	10.0	
PLM33700	170.0	01	−166.3	−0.2	7.97	1.04	72	2	87.0	10.0	8/GR9
PLM33701	170.0	01	−124.8	39.2	4.43	0.73	132	2	87.0	2.2	8/GR9
POL13200	−1.0	01	17.2	51.8	2.00	2.00	0	1	87.0	0.4	
QAT24700	17.0	01	51.1	25.3	0.60	0.60	0	2	84.0	1.5	
SMR31100	−37.0	01	12.5	43.9	0.60	0.60	0	2	83.0	10.0	
SMZ31300	−1.0	01	31.5	−26.5	0.62	0.60	66	2	82.0	4.7	
THA14200	74.0	01	100.7	13.2	2.B2	1.54	106	2	84.0	9.0	
TUR14500	5.0	01	34.3	39.0	3.13	1.38	168	2	84.0	10.0	
TZA22500	11.0	01	34.6	−6.2	2.41	1.72	129	2	84.0	6.5	
URS06400	23.0	01	47.2	40.9	2.00	2.00	0	1	89.0	4.1	2.
URS06702	44.0	01	73.8	41.4	2.00	2.00	0	1	89.0	3.6	2.
WAK33400	140.0	01	152.5	11.7	7.89	3.52	0	1	87.0	3.2	8/GR11
WAK33401	140.0	01	−157.5	21.0	1.63	0.67	13I	2	87.0	2.2	8/GR11
YUG14800	−7.0	01	18.6	43.8	2.21	0.92	156	2	85.0	10.0	

ALG25100	−25.0	02	1.5	27.6	3.65	2.94	135	2	84.0	1.6	
ARS27500	17.0	02	44.6	23.4	4.21	2.48	145	1	84.0	1.4	
AUS00800	128.0	02	133.7	−24.4	6.78	5.90	172	1	87.0	4.0	1.
BOT29700	−1.0	02	23.3	−22.2	2.13	1.50	36	1	85.0	2.7	
CHN15400	62.0	02	101.9	33.5	5.10	2.80	143	2	84.0	4.3	
CHN16100	92.0	02	108.1	33.7	5.00	4.00	148	2	84.0	8.2	
CKH05200	158.0	02	−161.0	−19.8	1.02	0.64	132	1	84.0	3.9	8/GR3
CKH05201	158.0	02	172.3	−39.7	2.88	1.56	47	1	84.0	7.7	8/GR3
CLN21900	50.0	02	80.6	7.7	1.18	0.60	106	2	84.0	10.0	
D 08700	−19.0	02	9.6	49.9	1.62	0.72	147	1	84.0	0.2	9.
FNL10300	5.0	02	17.0	61.5	2.00	1.00	10	1	84.0	4.2	
GNB30400	−31.0	02	−15.0	12.0	0.90	0.60	172	1	84.0	7.4	
IND03700	68.0	02	93.0	25.5	1.46	1.13	40	1	84.0	9.0	3.
INS02800	80.2	02	113.6	−1.4	6.73	3.33	160	1	84.0	10.0	
IRL21100	−31.0	02	−8.2	53.2	0.84	0.60	162	2	84.0	3.5	
KOR11200	110.0	02	127.5	36.0	1.24	1.02	168	2	89.0	3.2	
LAO28400	74.0	02	103.7	18.1	2.16	0.78	133	1	84.0	9.6	
MAU24200	29.0	02	59.8	−18.9	1.62	1.24	55	2	84.0	10.0	
MLA22800	86.0	02	114.1	3.9	2.34	1.12	45	2	84.0	10.0	
MLI32700	−37.0	02	−2.0	19.0	2.66	1.26	127	2	87.0	1.5	
MRL33300	146.0	02	153.1	11.5	7.87	3.64	1	2	87.0	3.1	8/GR12
MRL33301	146.0	02	−157.5	21.0	1.63	0.67	131	2	87.0	2.2	8/GR12
NCL10000	140.0	02	166.0	−21.0	1.14	0.72	146	2	84.0	9.1	8/GR6
NCL10001	140.0	02	−177.1	−13.6	1.22	0.60	46	2	84.0	9.6	8/GR6
PAK12700	38.0	02	69.6	29.5	2.30	2.16	14	2	84.0	3.7	
ROU13600	−1.0	02	25.0	45.7	1.38	0.66	155	2	86.0	1.7	
SOM31200	23.0	02	45.0	6.4	3.26	1.54	71	2	84.0	3.7	
TCD14300	−13.0	02	18.1	15.5	3.40	1.72	107	1	84.0	1.4	
WAL10200	140.0	02	−176.8	−14.0	0.74	0.60	29	2	84.0	10.0	8/GR8
WAL10201	140.0	02	166.1	−21.3	1.31	0.82	133	2	84.0	9.6	8/GR8
YEM26600	11.0	02	44.3	15.1	1.14	0.70	109	2	84.0	2.6	
ZAI32300	−19.0	02	21.3	−6.8	2.80	1.52	149	2	84.0	8.0	

17 365.84 MHz (03)

1	2	3	4		5		6	7	8	9	10
AFG24500	50.0	03	67.0	34.3	1.89	1.19	18	2	84.0	3.4	
AUS00400	98.0	03	130.5	−24.3	6.22	4.71	51	1	87.0	4.6	1.
BEN23300	−19.0	03	2.2	9.5	1.44	0.68	97	1	84.0	7.6	
BRU33000	74.0	03	114.7	4.4	0.60	0.60	0	2	84.0	10.0	
CHN15700	62.0	03	101.9	33.5	5.10	2.80	143	1	84.0	10.0	
CHN16000	92.0	03	108.1	33.7	5.00	4.00	148	1	84.0	8.2	
COM20700	29.0	03	44.1	−12.1	0.76	0.60	149	1	84.0	10.0	
GAB26000	−13.0	03	11.8	−0.6	1.43	1.12	64	2	84.0	10.0	
GMB30200	−37.0	03	−15.1	13.4	0.79	0.60	4	1	83.0	7.6	
GRC10500	5.0	03	24.5	38.0	2.03	1.29	159	2	84.0	10.0	
IND04300	56.0	03	77.8	11.1	1.36	1.28	172	2	84.0	10.0	3.
INS03600	104.0	03	115.2	−1.7	9.14	3.43	170	2	84.0	10.0	
IRN10900	34.0	03	54.2	32.4	3.82	1.82	149	1	84.0	3.1	
J 11100	110.0	03	134.5	31.5	3.52	3.30	68	1	87.0	3.7	
LBN27900	11.0	03	35.8	33.9	0.60	0.60	0	1	84.0	5.2	
LBR24400	−31.0	03	−9.3	6.6	1.22	0.70	133	2	84.0	10.0	
LBY32100	−25.0	03	17.5	26.3	3.68	1.84	130	1	84.0	1.5	
LIE25300	−37.0	03	9.5	47.1	0.60	0.60	0	2	84.0	0.4	
LUX11400	−19.0	03	6.0	49.8	0.68	0.68	0	2	84.0	0.9	
MRA33200	122.0	03	151.1	11.6	6.48	3.49	179	2	87.0	3.9	8/GR14
MRA33201	122.0	03	−157.5	21.0	2.02	0.60	115	2	87.0	2.2	8/GR14
NRU30900	134.0	03	167.0	−0.5	0.60	0.60	0	1	84.0	10.0	
POR13300	−31.0	03	−8.0	39.6	0.92	0.60	112	1	84.0	5.4	
SMA33500	170.0	03	−166.3	−0.2	7.97	1.04	72	1	87.0	10.0	8/GR13
SMA33501	170.0	03	−124.8	39.2	4.43	0.73	132	1	87.0	2.2	8/GR13
SMO05700	158.0	03	−172.3	−13.7	0.60	0.60	0	2	84.0	10.0	
TCH14400	−1.0	03	17.2	51.8	2.00	2.00	0	1	84.0	1.8	
URS06100	23.0	03	24.8	56.7	2.00	2.00	0	1	89.0	4.3	2., 4.
URS07300	44.0	03	58.0	59.0	2.00	2.00	0	2	89.0	3.7	2.
VTN32500	86.0	03	108.0	14.8	3.80	1.90	126	1	84.0	10.0	
VUT12800	140.0	03	168.0	−16.4	1.52	0.68	87	1	84.0	10.0	
YUG14900	−7.0	03	18.6	43.8	2.21	0.92	156	2	84.0	9.5	

17 385.02 MHz (04)

ALG25200	−25.0	04	1.5	27.6	3.65	2.94	135	2	84.0	1,5	
AND34100	−37.0	04	1.6	42.5	0.60	0.60	0	1	84.0	0.6	
ARS00300	17.0	04	44.6	23.4	4.21	2.48	145	1	84.0	1.4	
AUS00700	128.0	04	133.6	−24.4	6.75	5.90	172	1	87.0	4.0	1.
AUT01600	−19.0	04	12.2	47.5	1.14	0.63	166	1	84.0	0.7	
BUL02000	−1.0	04	25.0	43.0	2.00	2.00	0	2	84.0	3.3	
CHN15600	62.0	04	101.9	33.5	5.10	2.80	143	2	84.0	10.0	
CHN16100	92.0	04	108.1	33.7	5.00	4.00	148	2	84.0	8.2	
CKH05300	158.0	04	−161.0	−19.8	1.00	0.60	132	1	84.0	3.9	8/GR4
CKH05301	158.0	04	172.3	−39.7	2.88	1.56	47	1	84.0	7.7	8/GR4
EGY02600	−7.0	04	29.7	26.8	2.33	1.72	136	1	86.0	1.5	
G 02700	−31.0	04	−3.5	53.8	1.84	0.72	142	2	84.0	1.4	
IND04800	68.0	04	86.2	25.0	1.56	0.90	120	1	86.0	8.8	3.
INS02800	80.2	04	113.6	−1.4	6.73	3.33	160	1	84.0	10.0	
KOR11200	110.0	04	127.5	36.0	1.24	1.02	168	2	89.0	3.6	
LAO28400	74.0	04	103.7	18.1	2.16	0.78	133	1	84.0	10.0	
MAU24300	29.0	04	56.8	−13.9	1.56	1.38	65	2	84.0	10.0	
MLA22800	86.0	04	114.1	3.9	2.34	1.12	45	2	84.0	10.0	
MLI32800	−37.0	04	−7.6	13.2	1.74	1.24	171	2	87.0	5.9	
MLT14700	−13.0	04	14.3	35.9	0.60	0.60	0	2	84.0	10.0	
OCE10100	−160.0	04	−145.0	−16.3	4.34	3.54	4	1	84.0	10.0	
PAK28300	38.0	04	74.7	33.9	1.34	1.13	160	2	84.0	3.7	
RRW31000	11.0	04	30.0	−2.1	0.66	0.60	42	1	84.0	7.0	
S 13800	5.0	04	17.0	61.5	2.00	1.00	10	1	84.0	4.2	
URS06000	23.0	04	37.7	55.8	2.00	2.00	0	2	89.0	2.7	2.
ZAI32200	−19.0	04	22.4	0.0	2.16	1.88	48	2	84.0	10.0	

1	2	3	4		5		6	7	8	9	10
AFG24600	50.0	05	67.0	34.3	1.89	1.19	18	2	84.D	3.4	
AUS00500	98.0	05	130.5	−24.3	6.22	4.71	51	1	87.0	4.6	1.
BTN03100	86.0	05	90.5	27.3	1.13	0.82	0	2	84.0	9.0	6.
CAR33800	122.0	05	151.1	11.6	6.48	3.49	179	2	87.0	3.9	8/GR10
CAR33801	122.0	05	−157.5	21.0	2.02	0.60	115	2	87.0	2.2	8/GR10
CHN15500	62.0	05	101.9	33.5	5.10	2.80	143	1	84.0	10.0	
CHN16200	92.0	05	108.1	33.7	5.00	4.00	148	1	84.0	8.2	
CHN16400	79.8	05	112.2	37.4	1.06	0.76	111	2	84.0	10.0	
CME30000	−13.0	05	12.7	6.2	2.54	1.68	87	2	84.0	5.4	
E 12900	−31.0	05	−3.1	39.9	2.10	1.14	154	1	84.0	3.1	
F 09300	−19.0	05	2.6	45.9	2.50	0.98	160	2	84.0	0.7	
FJI19300	152.0	05	179.4	−17.9	1.04	0.98	67	2	84.0	10.0	
GUI19200	−37.0	05	−11.0	10.2	1.58	1.04	147	1	85.0	6.5	
IND04400	68.0	05	79.5	22.3	2.19	1.42	146	2	84.0	8.6	3.
INS03500	104.0	05	115.2	−1.7	9.14	3.43	170	2	84.0	10.0	
J 11100	110.0	05	134.5	31.5	3.52	3.30	68	1	87.0	3.7	
LBY28000	−25.0	05	17.5	26.3	3.68	1.84	130	1	84.0	1.5	
MDG23600	29.0	05	46.2	−18.6	2.57	0.80	67	1	84.0	10.0	
NZL05500	158.0	05	172.3	−39.7	2.88	1.56	47	2	84.0	10.0	
PLM33700	170.0	05	−166.3	−0.2	7.97	1.04	72	2	87.0	10.0	8/GR9
PLM33701	170.0	05	−124.8	39.2	4.43	0.73	132	2	87.0	2.2	8/GR9
POL13200	−1.0	05	17.2	51.8	2.00	2.00	0	1	87.0	0.2	
QAT24700	17.0	05	51.1	25.3	0.60	0.60	0	2	84.0	1.5	
SMR31100	−37.0	05	12.5	43.9	0.60	0.60	0	2	83.0	8.8	
SWZ31300	−1.0	05	31.5	−26.5	0.62	0.60	66	2	82.0	4.7	
THA14200	74.0	05	100.7	13.2	2.82	1.54	106	2	84.0	8.9	
TUR14500	5.0	05	34.3	39.0	3.13	1.38	168	2	84.0	10.0	
TZA22500	11.0	05	34.6	−6.2	2.41	1.72	129	2	84.0	6.1	
URS06400	23.0	05	47.2	40.9	2.00	2.00	0	1	89.0	4.1	2.
URS06700	44.0	05	37.7	55.8	2.00	2.00	0	2	89.0	2.0	2.
WAK33400	140.0	05	152.5	11.7	7.89	3.52	0	1	87.0	3.2	8/GR11
WAK33401	140.0	05	−157.5	21.0	1.63	0.67	131	2	87.0	2.2	8/GR11
YUG14800	−7.0	05	18.6	43.8	2.21	0.92	156	2	85.0	9.3	

ALG25100	−25.0	06	1.5	27.6	3.65	2.94	135	2	84.0	1.6	
ARS27500	17.0	06	44.6	23.4	4.21	.2.48	145	1	84.0	1.4	
AUS00800	128.0	06	133.7	−24.4	6.78	5.90	172	1	87.0	4.0	1.
BOT29700	−1.0	06	23.3	−22.2	2.13	1.50	36	1	85.0	2.7	
CHN15400	62.0	06	101.9	33.5	5.10	2.80	143	2	84.0	10.0	
CHN16100	92.0	06	108.1	33.7	5.00	4.00	148	2	84.0	8.2	
CKH05200	158.0	06	−161.0	−19.8	1.02	0.64	132	1	84.0	3.9	8/GR3
CKH05201	158.0	06	172.3	−39.7	2.88	1.56	47	1	84.0	7.7	8/GR3
CLN21900	50.0	06	80.6	7.7	1.18	0.60	106	2	84.0	10.0	
D 08700	−19.0	06	9.6	49.9	1.62	0.72	147	1	84.0	0.5	9.
FNL10300	5.0	06	17.0	61.5	2.00	1.00	10	1	84.0	4.2	
GNB30400	−31.0	06	−15.0	12.0	0.90	0.60	172	1	84.0	7.4	
IND04500	56.0	06	76.2	19.5	1.58	1.58	21	1	84.0	8.0	3.
INS02800	80.2	06	113.6	−1.4	6.73	3.33	160	1	84.0	10.0	
IRL21100	−31.0	06	−8.2	53.2	0.84	0.60	162	2	84.0	3.9	
KOR11200	110.0	06	127.5	36.0	1.24	1.02	168	2	89.0	3.6	
LAO28400	74.0	06	103.7	18.1	2.16	0.78	133	1	84.0	10.0	
MAU24200	29.0	06	59.8	−18.9	1.62	1.24	55	2	84.0	10.0	
MLA22800	86.0	06	114.1	3.9	2.34	1.12	45	2	84.0	10.0	
MLI32700	−37.0	06	−2.0	19.0	2.66	1.26	127	2	87.0	1.5	
MRL33300	146.0	06	153.1	11.5	7.87	3.64	1	2	87.0	3.1	8/GR12
MRL33301	146.0	06	−157.5	21.0	1.63	0.67	131	2	87.0	2.2	8/GR12
NCL10000	140.0	06	166.0	−21.0	1.14	0.72	146	2	84.0	9.1	8/GR6
NCL10001	140.0	06	−177.1	−13.6	1.22	0.60	46	2	84.0	9.6	8/GR6
PAK12700	38.0	06	69.6	29.5	2.30	2.16	14	2	84.0	3.7	
ROU13600	−1.0	06	25.0	45.7	1.38	0.66	155	2	86.0	1.7	
SOM31200	23.0	06	45.0	6.4	3.26	1.54	71	2	84.0	3.7	
TCD14300	−13.0	06	18.1	15.5	3.40	1.72	107	1	84.0	1.4	
WAL10200	140.0	06	−176.8	−14.0	0.74	0.60	29	2	84.0	10.0	8/GR8
WAL10201	140.0	06	166.1	−21.3	1.31	0.82	133	2	84.0	9.6	8/GR8
YEM26600	11.0	06	44.3	15.1	1.14	0.70	109	2	84.0	2.6	
ZAI32300	−19.0	06	21.3	−6.8	2.80	1.52	149	2	84.0	8.0	

1	2	3	4		5		6	7	8	9	10
AFG24500	50.0	07	67.0	34.3	1.89	1.19	18	2	84.0	3.4	
AUS00400	98.0	07	130.5	−24.3	6.22	4.71	51	1	87.0	4.6	1.
BEN23300	−19.0	07	2.2	9.5	1.44	0.68	97	1	84.0	7.6	
BRU33000	74.0	07	114.7	4.4	0.60	0.60	0	2	84.0	10.0	
CHN15700	62.0	07	101.9	33.5	5.10	2.80	143	1	84.0	10.0	
CHN16000	92.0	07	108.1	33.7	5.00	4.00	148	1	84.0	8.2	
COM20700	29.0	07	44.1	−12.1	0.76	0.60	149	1	84.0	10.0	
GAB26000	−13.0	07	11.8	−0.6	1.43	1.12	64	2	84.0	10.0	
GMB30200	−37.0	07	−15.1	13.4	0.79	0.60	4	1	83.0	7.6	
GRC10500	5.0	07	24.5	38.0	2.03	1.29	159	2	84.0	10.0	
IND04700	68.0	07	93.3	11.1	1.92	0.60	96	2	84.0	10.0	3.
INS03600	104.0	07	115.2	−1.7	9.14	3.43	170	2	84.0	10.0	
IRN10900	34.0	07	54.2	32.4	3.82	1.82	149	1	84.0	3.1	
J 11100	110.0	07	134.5	31.5	3.52	3.30	68	1	87.0	3.7	
LBN27900	11.0	07	35.8	33.9	0.60	0.60	0	1	84.0	5.2	
LBR24400	−31.0	07	−9.3	6.6	1.22	0.70	133	2	84.0	10.0	
LBY32100	−25.0	07	17.5	26.3	3.68	1.84	130	1	84.0	1.5	
LIE25300	−37.0	07	9.5	47.1	0.60	0.60	0	2	84.0	0.4	
LUX11400	−19.0	07	6.0	49.8	0.68	0.68	0	2	84.0	0.9	
MRA33200	122.0	07	151.1	11.6	6.48	3.49	179	2	87.0	3.9	8/GR14
MRA33201	122.0	07	−157.5	21.0	2.02	0.60	115	2	87.0	2.2	8/GR14
NRU30900	134.0	07	167.0	−0.5	0.60	0.60	0	1	84.0	10.0	
POR13300	−31.0	07	−8.0	39.6	0.92	0.60	112	1	84.0	5.4	
SMA33500	170.0	07	−166.3	−0.2	7.97	1.04	72	1	87.0	10.0	8/GR13
SMA33501	170.0	07	−124.8	39.2	4.43	0.73	132	1	87.0	2.2	8/GR13
SMO05700	158.0	07	−172.3	−13.7	0.60	0.60	0	2	84.0	10.0	
TCH14400	−1.0	07	17.2	51.8	2.00	2.00	0	1	84.0	1.8	
URS06100	23.0	07	24.8	56.7	2.00	2.00	0	1	89.0	4.3	2., 4.
URS07200	44.0	07	58.0	59.0	2.00	2.00	0	2	89.0	3.7	2.
VTN32500	86.0	07	108.0	14.8	3.80	1.90	126	1	84.0	10.0	
VUT12800	140.0	07	168.0	−16.4	1.52	0.68	87	1	84.0	10.0	
YUG14900	−7.0	07	18.6	43.8	2.21	0.92	156	2	84.0	9.5	

ALG25200	−25.0	08	1.5	27.6	3.65	2.94	135	2	84.0	1.5	
AND34100	−37.0	08	1.6	42.5	0.60	0.60	0	1	84.0	0.6	
ARS00300	17.0	08	44.6	23.4	4.21	2.48	145	1	84.0	1.4	
AUS00700	128.0	0B	133.6	−24.4	6.75	5.90	172	1	87.0	4.0	1.
AUT01600	−19.0	08	12.2	47.5	1.14	0.63	166	1	84.0	0.7	
BUL02000	−1.0	08	25.0	43.0	2.00	2.00	0	2	84.0	3.3	
CHN15600	62.0	08	101.9	33.5	5.10	2.80	143	2	84.0	10.0	
CHN17300	92.0	08	115.7	27.4	1.14	0.94	99	2	84.0	9.3	
CKH05300	158.0	08	−161.0	−19.8	1.00	0.60	132	1	84.0	3.9	8/GR4
CKH05301	158.0	08	172.3	−39.7	2.88	1.56	47	1	84.0	7.7	8/GR4
EGY02600	−7.0	08	29.7	26.8	2.33	1.72	136	1	86.0	1.5	
G 02700	−31.0	08	−3.5	53.8	1.84	0.72	142	2	84.0	1.4	
IND04000	56.0	08	73.0	25.0	1.82	1.48	58	1	84.0	4.7	3.
INS02800	80.2	08	113.6	−1.4	6.73	3.33	160	1	84.0	10.0	
KDR11200	110.0	08	127.5	36.0	1.24	1.02	168	2	89.0	3.6	
LAO28400	74.0	08	103.7	18.1	2.16	0.78	133	1	84.0	10.0	
MAU24300	29.0	08	56.8	−13.9	1.56	1.38	65	2	84.0	10.0	
MLA22800	86.0	08	114.1	3.9	2.34	1.12	45	2	84.0	10.0	
MLI32800	−37.0	08	−7.6	13.2	1.74	1.24	171	2	87.0	5.9	
MLT14700	−13.0	08	14.3	35.9	0.60	0.60	0	2	84.0	10.0	
OCE10100	−160.0	08	−145.0	−16.3	4.34	3.54	4	1	84.0	10.0	
PAK28300	38.0	08	74.7	33.9	1.34	1.13	160	2	84.0	3.7	
RRW31000	11.0	08	30.0	−2.1	0.66	0.60	42	1	84.0	7.0	
S 13800	5.0	08	17.0	61.5	2.00	1.00	10	1	84.0	4.2	
URS06000	23.0	08	37.7	55.8	2.00	2.00	0	2	89.0	2.7	2.
ZAI32200	−19.0	08	22.4	0.0	2.16	1.88	48	2	84.0	10.0	

1	2	3	4		5		6	7	8	9	10
AFG24600	50.0	09	67.0	34.3	1.89	1.19	18	2	84.0	3.4	
AUS00500	98.0	09	130.5	−24.3	6.22	4.71	51	1	87.0	4.6	1.
BTN03100	86.0	09	90.5	27.3	1.13	0.82	0	2	84.0	8.9	6.
CAR33800	122.0	09	151.1	11.6	6.48	3.49	179	2	87.0	3.9	8/GR10
CAR33801	122.0	09	−157.5	21.0	2.02	0.60	115	2	87.0	2.2	8/GR10
CHN15500	62.0	09	101.9	33.5	5.10	2.80	143	1	84.0	10.0	
CHN16200	92.0	09	108.1	33.7	5.00	4.00	148	1	84.0	8.2	
CHN16500	79.8	09	111.4	41.8	1.58	1.20	15	2	84.0	3.9	
CME30000	−13.0	09	12.7	6.2	2.54	1.68	87	2	84.0	5.4	
E 12900	−31.0	09	−3.1	39.9	2.10	1.14	154	1	84.0	3.1	
F 09300	−19.0	09	2.6	45.9	2.50	0.98	160	2	84.0	0.7	
FJI19300	152.0	09	179.4	−17.9	1.04	0.98	67	2	84.0	10.0	
GUI19200	−37.0	09	−11.0	10.2	1.58	1.04	147	1	85.0	6.5	
IND03900	56.0	09	72.7	11.2	1.26	0.60	107	2	84.0	10.0	3.
INS03500	104.0	09	115.2	−1.7	9.14	3.43	170	2	84.0	10.0	
J 11100	110.0	09	134.5	31.5	3.52	3.30	68	1	87.0	3.7	
LBY28000	−25.0	09	17.5	26.3	3.68	1.84	130	1	84.0	1.5	
MDG23600	29.0	09	46.2	−18.6	2.57	0.80	67	1	84.0	10.0	
NZL05500	158.0	09	172.3	−39.7	2.88	1.56	47	2	84.0	10.0	
PLM33700	170.0	09	−166.3	−0.2	7.97	1.04	72	2	87.0	10.0	8/GR9
PLM33701	170.0	09	−124.8	39.2	4.43	0.73	132	2	87.0	2.2	8/GR9
POL13200	−1.0	09	17.2	51.8	2.00	2.00	0	1	87.0	0.2	
QAT24700	17.0	09	51.1	25.3	0.60	0.60	0	2	84.0	1.5	
SMR31100	−37.0	09	12.5	43.9	0.60	0.60	0	2	83.0	8.8	
SWZ31300	−1.0	09	31.5	−26.5	0.62	0.60	66	2	82.0	4.7	
THA14200	74.0	09	100.7	13.2	2.B2	1.54	106	2	84.0	8.9	
TUR14500	5.0	09	34.3	39.0	3.13	1.38	168	2	84.0	10.0	
TZA22500	11.0	09	34.6	−6.2	2.41	1.72	129	2	84.0	6.1	
URS06400	23.0	09	47.2	40.9	2.00	2.00	0	1	89.0	4.1	2.
URS06700	44.0	09	37.7	55.8	2.00	2.00	0	2	89.0	2.0	2.
WAK33400	140.0	09	152.5	11.7	7.89	3.52	0	1	87.0	3.2	8/GR11
WAK33401	140.0	09	−157.5	21.0	1.63	0.67	131	2	87.0	2.2	8/GR11
YUG14800	−7.0	09	18.6	43.8	2.21	0.92	156	2	85.0	9.3	

ALG25100	−25.0	10	1.5	27.6	3.65	2.94	135	2	84.0	1.6	
ARS27500	17.0	10	44.6	23.4	4.21	2.48	145	1	84.0	1.4	
AUS00800	128.0	10	133.7	−24.4	6.78	5.90	172	1	87.0	4.0	1.
BOT29700	−1.0	10	23.3	−22.2	2.13	1.50	36	1	85.0	2.7	
CHN15400	62.0	10	101.9	33.5	5.10	2.80	143	2	84.0	4.7	
CHN17100	92.0	10	117.2	32.0	1.20	0.74	126	2	84.0	10.0	
CHN18700	79.8	10	106.6	26.7	1.14	0.94	179	1	84.0	9.3	
CKH05200	158.0	10	−161.D	−19.8	1.02	0.64	132	1	84.0	3.9	8/GR3
CKH05201	158.0	10	172.3	−39.7	2.88	1.56	47	1	84.0	7.7	8/GR3
CLN21900	50.0	10	80.6	7.7	1.18	0.60	106	2	84.0	10.0	
D 08700	−19.0	10	9.6	49.9	1.62	0.72	147	1	84.0	0.5	9.
FNL10300	5.0	10	17.0	61.5	2.00	1.00	10	1	84.0	4.2	
GNB30400	−31.0	10	−15.0	12.0	0.90	0.60	172	1	84.0	7.4	
IND03700	68.0	10	93.0	25.5	1.46	1.13	40	1	84.0	9.7	3.
IRL21100	−31.0	10	−8.2	53.2	0.84	0.60	162	2	84.0	3.9	
KOR11200	110.0	10	127.5	36.0	1.24	1.02	168	2	89.0	3.6	
LAO28400	74.0	10	103.7	18.1	2.16	0.78	133	1	84.0	10.0	
MAU24200	29.0	10	59.8	−18.9	1.62	1.24	55	2	84.0	10.0	
MLI32700	−37.0	10	−2.0	19.0	2.66	1.26	127	2	87.0	1.5	
MRL33300	146.0	10	153.1	11.5	7.87	3.64	1	2	87.0	3.1	8/GR12
MMRL33301	146.0	10	−157.5	21.0	1.63	0.67	131	2	87.0	2.2	8/GR12
NCL10000	140.0	10	166.0	−21.0	1.14	0.72	146	2	84.0	9.1	8/GR6
NCL10001	140.0	10	−177.1	−13.6	1.22	0.60	46	2	84.0	9.6	8/GR6
PAK12700	38.0	10	69.6	29.5	2.30	2.16	14	2	84.0	3.7	
ROU13600	−1.0	10	25.0	45.7	1.38	0.66	155	2	86.0	1.7	
SOM31200	23.0	10	45.0	6.4	3.26	1.54	71	2	84.0	3.7	
TCD14300	−13.0	10	18.1	15.5	3.40	1.72	107	1	84.0	1.4	
WAL10200	140.0	10	−176.8	−14.0	0.74	0.60	29	2	84.0	10.0	8/GR8
WAL10201	140.0	10	166.1	−21.3	1.31	0.82	133	2	84.0	9.6	8/GR8
YEM26600	11.0	10	44.3	15.1	1.14	0.70	109	2	84.0	2.6	
ZAI32300	−19.0	10	21.3	−6.8	2.80	1.52	149	2	84.0	8.0	

17 519.28 MHz (11)

1	2	3	4		5		6	7	8	9	10
AFG24500	50.0	11	67.0	34.3	1.89	1.19	18	2	86		
AUS00400	98.0	11	130.5	−24.3	6.22	4.71	51	1	87.0	4.6	1.
BEN23300	−19.0	11	2.2	9.5	1.44	0.68	97	1	84.0	7.6	
CHN15700	62.0	11	101.9	33.5	5.10	2.80	143	1	84.0	10.0	
CHN16000	92.0	11	108.1	33.7	5.00	4.00	148	1	84.0	8.2	
COM20700	29.0	11	44.1	−12.1	0.76	0.60	149	1	84.0	10.0	
GAB26000	−13.0	11	11.8	−0.6	1.43	1.12	64	2	84.0	10.0	
GMB30200	−37.0	11	−15.1	13.4	0.79	0.60	4	1	83.0	7.6	
GRC10500	5.0	11	24.5	38.0	2.03	1.29	159	2	84.0	10.0	
IND04300	56.0	11	77.8	11.1	1.36	1.28	172	2	84.0	10.0	3.
INS03600	104.0	11	115.2	−1.7	9.14	3.43	170	2	84.0	10.0	
IRN10900	34.0	11	54.2	32.4	3.82	1.82	149	1	84.0	3.1	
J 11100	110.0	11	134.5	31.5	3.52	3.30	68	1	87.0	3.7	
LBN27900	11.0	11	35.8	33.9	0.60	0.60	0	1	84.0	5.2	
LBR24400	−31.0	11	−9.3	6.6	1.22	0.70	133	2	84.0	10.0	
LBY32100	−25.0	11	17.5	26.3	3.68	1.84	130	1	84.0	1.5	
LIE25300	−37.0	11	9.5	47.1	0.60	0.60	0	2	84.0	0.4	
LUX11400	−19.0	11	6.0	49.8	0.68	0.68	0	2	84.0	0.9	
MRA33200	122.0	11	151.1	11.6	6.48	3.49	179	2	87.0	3.9	8/GR14
MRA33201	122.0	11	−157.5	21.0	2.02	0.60	115	2	87.0	2.2	8/GR14
NRU30900	134.0	11	167.0	−0.5	0.60	0.60	0	1	84.0	10.0	
POR13300	−31.0	11	−8.0	39.6	0.92	0.60	112	1	84.0	5.4	
SMA33500	170.0	11	−166.3	−0.2	7.97	1.04	72	1	87.0	10.0	8/GR13
SMA33501	170.0	11	−124.8	39.2	4.43	0.73	132	1	87.0	2.2	8/GR13
SMO05700	158.0	11	−172.3	−13.7	0.60	0.60	0	2	84.0	10.0	
TCH14400	−1.0	11	17.2	51.8	2.00	2.00	0	1	84.0	1.8	
URS06101	23.0	11	29.5	51.4	2.00	2.00	0	1	89.0	3.9	2.
VTN32500	86.0	11	108.0	14.8	3.80.	1.90	126	1	84.0	10.0	
VUT12800	140.0	11	168.0	−16.4	1.52	0.68	87	1	84.0	10.0	
YUG14900	−7.0	11	18.6	43.8	2.21	0.92	156	2	84.0	9.5	

ALG25200	−25.0	12	1.5	27.6	3.65	2.94	135	2	84.0	1.5	
AND34100	−37.0	12	1.6	42.5	0.60	0.60	0	1	84.0	0.6	
ARS00300	17.0	12	44.6	23.4	4.21	2.48	145	1	84.0	1.4	
AUS00700	128.0	12	133.6	−24.4	6.75	5.90	172	1	87.0	4.0	1.
AUT01600	−19.0	12	12.2	47.5	1.14	0.63	166	1	84.0	0.7	
BGD22000	74.0	12	90.3	23.6	1.46	0.84	135	1	84.0	8.7	
BUL02000	−1.0	1Z	25.0	43.0	2.00	2.00	0	2	84.0	3.3	
CHN15600	62.0	1Z	101.9	33.5	5.10	2.80	143	2	84.0	10.0	
CHN17000	92.0	12	119.5	33.0	1.34	0.64	155	2	84.0	10.0	
CHN17800	79.8	12	111.5	27.4	1.22	0.86	130	1	84.0	9.6	
CKH05300	158.0	12	−161.0	−19.8	1.00	0.60	132	1	84.0	3.9	8/GR4
CKH05301	158.0	12	172.3	−39.7	2.88	1.56	47	1	84.0	7.7	8/GR4
DNK08900	5.0	12	17.0	61.5	2.00	1.00	10	1	84.0	4.2	
EGY02600	−7.0	12	29.7	26.8	2.33	1.72	136	1	86.0	1.5	
G 02700	−31.0	12	−3.5	53.8	1.84	0.72	142	2	84.0	1.4	
IND04800	68.0	12	86.2	25.0	1.56	0.90	120	1	86.0	8.8	3.
KOR11200	110.0	12	127.5	36.0	1.24	1.02	168	2	89.0	3.4	
MAU24300	29.0	12	56.8	−13.9	1.56	1.38	65	2	84.0	10.0	
MLD30600	44.0	12	73.1	6.0	0.96	0.60	90	1	84.0	10.0	
MLI32800	−37.0	12	−7.6	13.2	1.74	1.24	171	2	87.0	5.9	
MLT14700	−13.0	12	14.3	35.9	0.60	0.60	0	2	84.0	10.0	
OCE10100	−160.0	12	−145.0	−16.3	4.34	3.54	4	1	84.0	10.0	
PAK21000	38.0	12	72.1	30.8	1.16	0.72	90	2	84.0	5.0	
RRW31000	11.0	12	30.0	−2.1	0.66	0.60	42	1	84.0	7.0	
URS06000	23.0	12	37.7	55.8	2.00	2.00	0	2	89.0	2.7	2.
URS06900	44.0	12	64.B	38.3	2.00	2.00	0	2	89.0	3.7	2.
ZAI32200	−19.0	12	22.4	0.0	2.16	1.88	48	2	84.0	10.0	

1	2	3	4		5		6	7	8	9	10
AFG24600	50.0	13	67.0	34.3	1.89	1.19	18	2	84.0	3.4	
AUS00500	98.0	13	130.5	−24.3	6.22	4.71	51	1	87.0	4.6	1.
BTN03100	86.0	13	90.5	27.3	1.13	0.82	0	2	84.0	8.9	6.
CAR33800	122.0	13	151.1	11.6	6.48	3.49	179	2	87.0	3.9	8/GR10
CAR33801	122.0	13	−157.5	21.0	2.02	0.60	115	2	87.0	2.2	8/GR10
CHN15501	62.0	13	88.3	31.5	3.38	1.45	162	1	84.0	3.3	
CHN18000	92.0	13	113.1	23.1	4.70	3.50	96	1	84.0	10.0	
CME30000	−13.0	13	12.7	6.2	2.54	1.68	87	2	84.0	5.4	
E 12900	−31.0	13	−3.1	39.9	2.10	1.14	154	1	84.0	3.1	
F 09300	−19.0	13	2.6	45.9	2.50	0.98	160	2	84.0	0.7	
GUI19200	−37.0	13	−11.0	10.2	1.58	1.04	147	1	85.0	6.5	
IND04400	68.0	13	79.5	22.3	2.19	1.42	146	2	84.0	8.6	3.
INS03500	104.0	13	115.2	−1.7	9.14	3.43	170	2	84.0	10.0	
J 11100	110.0	13	134.5	31.5	3.52	3.30	68	1	87.0	3.7	
LBY28000	−25.0	13	17.5	26.3	3.68	1.84	130	1	84.0	1.5	
MDG23600	29.0	13	46.2	−18.6	2.57	0.80	67	1	84.0	10.0	
NZL05500	158.0	13	172.3	−39.7	2.88	1.56	47	2	84.0	1.6	
NZL28700	128.0	13	173.0	−41.0	3.30	1.28	48	2	84.0	10.0	
PLM33700	170.0	13	−166.3	−0.2	7.97	1.04	72	2	87.0	10.0	8/GR9
PLM33701	170.0	13	−124.8	39.2	4.43	0.73	132	2	87.0	2.2	8/GR9
POL13200	−1.0	13	17.2	51.8	2.00	2.00	0	1	87.0	0.2	
QAT24700	17.0	13	51.1	25.3	0.60	0.60	0	2	84.0	1.5	
SMR31100	−37.0	13	12.5	43.9	0.60	0.60	0	2	83.0	8.8	
SWZ31300	−1.0	13	31.5	−26.5	0.62	0.60	66	2	82.0	4.7	
THA14200	74.0	13	100.7	13.2	2.82	1.54	106	2	84.0	10.0	
TUR14500	5.0	13	34.3	39.0	3.13	1.38	168	2	84.0	10.0	
TZA22500	11.0	13	34.6	−6.2	2.41	1.72	129	2	84.0	6.1	
URS06400	23.0	13	47.2	40.9	2.00	2.00	0	1	89.0	4.1	2.
URS06701	44.0	13	58.0	59.0	2.00	2.00	0	1	89.0	3.7	2.
WAK33400	140.0	13	152.5	11.7	7.89	3.52	0	1	87.0	3.2	8/GR11
WAK33401	140.0	13	−157.5	21.0	1.63	0.67	131	2	87.0	2.2	8/GR11
YUG14800	−7.0	13	18.6	43.8	2.21	0.92	156	2	85.0	9.3	

ALG25100	−25.0	14	1.5	27.6	3.65	2.94	135	2	84.0	1.6	
ARS27500	17.0	14	44.6	23.4	4.21	2.48	145	1	84.0	1.4	
AUS00800	128.0	14	133.7	−24.4	6.78	5.90	172	1	87.0	4.0	1.
BGD22000	74.0	14	90.3	23.6	1.46	0.84	135	1	84.0	8.7	
BOT29700	−1.0	14	23.3	−22.2	2.13	1.50	36	1	85.0	2.7	
CHN15401	62.0	14	83.9	40.5	2.75	2.05	177	2	84.0	3.4	
CHN17200	92.0	14	120.4	29.1	0.96	0.84	123	2	84.0	10.0	
CHN18100	79.8	14	108.5	23.8	1.41	1.08	153	1	84.0	10.0	
CKH05200	158.0	14	−161.0	−19.8	1.02	0.64	132	1	84.0	2.2	8/GR3
CKH05201	158.0	14	172.3	−39.7	2.88	1.56	47	1	84.0	1.6	8/GR3
CLN21900	50.0	14	80.6	7.7	1.18	0.60	106	2	84.0	10.0	
D 08700	−19.0	14	9.6	49.9	1.62	0.72	147	1	84.0	0.5	9.
GNB30400	−31.0	14	−15.0	12.0	0.90	0.60	172	1	84.0	7.4	
IND04500	56.0	14	76.2	19.5	1.58	1.58	21	1	84.0	8.0	3.
IRL21100	−31.0	14	−8.2	53.2	0.84	0.60	162	2	84.0	3.9	
KRE28600	110.0	14	127.0	39.1	1.30	1.10	31	2	87.0	3.2	
MAU24200	29.0	14	59.8	−18.9	1.62	1.24	55	2	84.0	10.0	
MLI32700	−37.0	14	−2.0	19.0	2.66	1.26	127	2	87.0	1.5	
MRL33300	146.0	14	153.1	11.5	7.87	3.64	1	2	87.0	3.4	8/GR12
MRL33301	146.0	14	−157.5	21.0	1.63	0.67	131	2	87.0	2.2	8/GR12
NCL10000	140.0	14	166.0	−21.0	1.14	0.72	146	2	84.0	9.6	8/GR6
NCL10001	140.0	14	−177.1	−13.6	1.22	0.60	46	2	84.0	10.0	8/GR6
NOR12000	5.0	14	17.0	61.5	2.00	1.00	10	1	84.0	4.2	
PAK21000	38.0	14	72.1	30.8	1.16	0.72	90	2	84.0	5.5	
ROU13600	−1.0	14	25.0	45.7	1.38	0.66	155	2	86.0	1.7	
SOM31200	23.0	14	45.0	6.4	3.26	1.54	71	2	84.0	3.7	
TCD14300	−13.0	14	18.1	15.5	3.40	1.72	107	1	84.0	1.4	
WAL10200	140.0	14	−176.8	−14.0	0.74	0.60	29	2	84.0	9.6	8/GR8
WAL10201	140.0	14	166.1	−21.3	1.31	0.82	133	2	84.0	9.1	8/GR8
YEM26600	11.0	14	44.3	15.1	1.14	0.70	109	2	84.0	2.6	
ZAI32300	−19.0	14	21.3	−6.8	2.80	1.52	149	2	84.0	8.0	

17 596.00 MHz (15)

1	2	3	4		5		6	7	8	9	10
AFG24500	50.0	15	67.0	34.3	1.89	1.19	18	2	84.0	3.4	
AUS00400	98.0	15	130.5	−24.3	6.22	4.71	51	1	87.0	4.6	1.
BEN23300	−19.0	15	2.2	9.5	1.44	0.68	97	1	84.0	7.6	
CHN15800	79.8	15	106.0	32.5	5.00	3.70	150	2	84.0	3.6	
CHN17400	92.0	15	118.1	25.9	1.02	0.84	82	1	84.0	10.0	
COM20700	29.0	15	44.1	−12.1	0.76	0.60	149	1	84.0	10.0	
GAB26000	−13.0	15	11.8	−0.6	1.43	1.12	64	2	84.0	10.0	
GMB30200	−37.0	15	−15.1	13.4	0.79	0.60	4	1	83.0	7.6	
GRC10500	5.0	15	24.5	38.0	2.03	1.29	159	2	84.0	10.0	
IND04700	68.0	15	93.3	11.1	1.92	0.60	96	2	84.0	10.0	3.
INS03600	104.0	15	115.2	−1.7	9.14	3.43	170	2	84.0	10.0	
IRN10900	34.0	15	54.2	32.4	3.82	1.82	149	1	84.0	3.1	
J 11100	110.0	15	134.5	31.5	3.52	3.30	68	1	87.0	3.2	
LBN27900	11.0	15	35.8	33.9	0.60	0.60	0	1	84.0	5.2	
LBR24400	−31.0	15	−9.3	6.6	1.22	0.70	133	2	84.0	10.0	
LBY32100	−25.0	15	17.5	26.3	3.68	1.84	130	1	84.0	1.5	
LIE25300	−37.0	15	9.5	47.1	0.60	0.60	0	2	84.0	0.4	
LUX11400	−19.0	15	6.0	49.8	0.68	0.68	0	2	84.0	0.9	
MRA33200	122.0	15	151.1	11.6	6.48	3.49	179	2	87.0	3.9	8/GR14
MRA33201	122.0	15	−157.5	21.0	2.02	0.60	115	2	87.0	2.2	8/GR14
NRU30900	134.0	15	167.0	−0.5	0.60	0.60	0	1	84.0	10.0	
POR13300	−31.0	15	−8.0	39.6	0.92	0.60	112	1	84.0	5.4	
SMA33500	170.0	15	−166.3	−0.2	7.97	1.04	72	1	87.0	10.0	8/GR13
SMA33501	170.0	15	−124.8	39.2	4.43	0.73	132	1	87.0	2.2	8/GR13
SMO05700	158.0	15	−172.3	−13.7	0.60	0.60	0	2	84.0	10.0	
TCH14400	−1.0	15	17.2	51.8	2.00	2.00	0	1	84.0	1.8	
URS06100	23.0	15	24.8	56.7	2.00	2.00	0	1	89.0	4.3	2., 4.
VTN32500	86.0	15	108.0	14.8	3.80	1.90	126	1	84.0	10.0	
VUT12800	140.0	15	168.0	−16.4	1.52	0.68	87	1	84.0	10.0	
YUG14900	−7.0	15	18.6	43.8	2.21	0.92	156	2	84.0	9.5	

ALG25200	−25.0	16	1.5	27.6	3.65	2.94	135	2	84.0	1:5	
AND34100	−37.0	16	1.6	42.5	0.60	0.60	0	1	84.0	0.6	
ARS00300	17.0	16	44.6	23.4	4.21	2.48	145	1	84.0	1.4	
AUS00700	128.0	16	133.6	−24.4	6.75	5.90	172	1	87.0	4.0	1.
AUT01600	−19.0	16	12.2	47.5	1.14	0.63	166	1	84.0	0.7	
BUL02000	−1.0	16	25.0	43.0	2.00	2.00	0	2	84.0	3.3	
CHN16900	92.0	16	118.5	36.4	1.16	0.76	11	2	84.0	10.0	
CHN18600	62.0	16	102.5	30.2	1.91	1.23	147	1	84.0	10.0	
CKH05300	158.0	16	−161.0	−19.8	1.00	0.60	132	1	84.0	2.2	8/GR4
CKH05301	158.0	16	172.3	−39.7	2.88	1.56	47	1	84.0	10.0	8/GR4
DNK08900	5.0	16	17.0	61.5	2.00	1.00	10	1	84.0	4.2	
EGY02600	−7.0	16	29.7	26.8	2.33	1.72	136	1	86.0	1.5	
G 02700	−31.0	16	−3.5	53.8	1.84	0.72	142	2	84.0	1.4	
IND04000	56.0	16	73.0	25.0	1.82	1.48	58	1	84.0	4.7	3.
KRE28600	110.0	16	127.0	39.1	1.30	1.10	31	2	87.0	3.2	
MAU24300	29.0	16	56.8	−13.9	1.56	1.38	65	2	84.0	10.0	
MLA22700	86.0	16	102.1	4.1	1.62	0.82	135	2	84.0	10.0	
MLD30600	44.0	16	73.1	6.0	0.96	0.60	90	1	84.0	10.0	
MLI32800	−37.0	16	−7.6	13.2	1.74	1.24	171	2	87.0	5.9	
MLT14700	−13.0	16	14.3	35.9	0.60	0.60	0	2	84.0	10.0	
OCE10100	−160.0	16	−145.0	−16.3	4.34	3.54	4	1	84.0	10.0	
PHL28500	98.0	16	121.3	11.1	3.46	1.76	99	2	84.0	10.0	
RRW31000	11.0	16	30.0	−2.1	0.66	0.60	42	1	84.0	7.0	
URS06000	23.0	16	37.7	55.8	2.00	2.00	0	2	89.0	2.7	2.
URS06900	44.0	16	64.8	38.3	2.00	2.00	0	2	89.0	3.7	2.
ZAI32200	−19.0	16	22.4	0.0	2.16	1.88	48	2	84.0	10.0	

17 634.36 MHz (17)

1	2	3	4		5		6	7	8	9	10
AUS00500	98.0	17	130.5	−24.3	6.22	4.71	51	1	87.0	4.8	1.
BRM29800	74.0	17	97.1	19.1	3.58	1.48	104	2	84.0	9.6	
BTN03100	86.0	17	90.5	27.3	1.13	0.82	0	2	84.0	8.9	6.
CAR33800	122.0	17	151.1	11.6	6.48	3.49	179	2	87.0	9.6	8/GR10
CAR33801	122.0	17	−157.5	21.0	2.02	0.60	115	2	87.0	10.0	8/GR10
CHN16700	92.0	17	124.3	43.7	1.98	0.72	156	1	84.0	7.9	
CHN18200	79.8	17	108.7	35.1	1.42	0.88	109	2	84.0	10.0	
CME30000	−13.0	17	12.7	6.2	2.54	1.68	87	2	84.0	5.4	
E 12900	−31.0	17	−3.1	39.9	2.10	1.14	154	1	84.0	3.1	
F 09300	−19.0	17	2.6	45.9	2.50	0.98	160	2	84.0	0.7	
GUI19200	−37.0	17	−11.0	10.2	1.58	1.04	147	1	85.0	6.5	
IND04600	68.0	17	84.7	20.5	1.60	0.86	30	2	84.0	10.0	3.
INS03200	80.2	17	113.6	−1.4	6.73	3.33	160	1	84.0	10.0	
LBY28000	−25.0	17	17.5	26.3	3.68	1.84	130	1	84.0	1.5	
MDG23600	29.0	17	46.2	−18.6	2.57	0.80	67	1	84.0	10.0	
NPL12200	50.0	17	83.7	28.3	1.72	0.60	163	1	84.0	10.0	
NZL28700	128.0	17	173.0	−41.0	3.30	1.28	48	2	84.0	10.0	
PLM33700	170.0	17	−166.3	−0.2	7.97	1.04	72	2	87.0	9.6	8/GR9
PLM33701	170.0	17	−124.8	39.2	4.43	0.73	132	2	87.0	10.0	8/GR9
POL13200	−1.0	17	17.2	51.8	2.00	2.00	0	1	87.0	0.2	
QAT24700	17.0	17	51.1	25.3	0.60	0.60	0	2	84.0	1.5	
SMR31100	−37.0	17	12.5	43.9	0.60	0.60	0	2	83.0	8.8	
SWZ31300	−1.0	17	31.5	−26.5	0.62	0.60	66	2	82.0	4.7	
TUR14500	5.0	17	34.3	39.0	3.13	1.38	168	2	84.0	10.0	
TZA22500	11.0	17	34.6	−6.2	2.41	1.72	129	2	84.0	6.1	
URS06400	23.0	17	47.2	40.9	2.00	2.00	0	1	89.0	4.1	2.
WAK33400	140.0	17	152.5	11.7	7.89	3.52	0	1	87.0	9.6	8/GR11
WAK33401	140.0	17	−157.5	21.0	1.63	0.67	131	2	87.0	5.7	8/GR11
YUG14800	−7.0	17	18.6	43.8	2.21	0.92	156	2	85.0	9.3	

ALG25100	−25.0	18	1.5	27.6	3.65	2.94	135	2	84.0	1:6	
ARS27500	17.0	18	44.6	23.4	4.21	2.48	145	1	84.0	1.4	
AUS00800	128.0	18	133.7	−24.4	6.78	5.90	172	1	87.0	4.1	1.
BGD22000	74.0	18	90.3	23.6	1.46	0.84	135	1	84.0	6.5	
BOT29700	−1.0	18	23.3	−22.2	2.13	1.50	36	1	85.0	2.7	
CBG29900	68.0	18	105.0	12.7	1.01	0.90	110	2	84.0	10.0	
CHN15900	79.8	18	106.0	32.5	5.00	3.70	150	1	84.0	3.6	
CHN18500	62.0	18	95.7	35.4	2.10	1.14	156	2	84.0	10.0	
D 08700	−19.0	18	9.6	49.9	1.62	0.72	147	1	84.0	0.5	9.
GNB30400	−31.0	18	−15.0	12.0	0.90	0.60	172	1	84.0	7.4	
IND04100	56.0	18	78.4	16.0	2.08	1.38	35	1	84.0	10.0	3.
INS03000	80.2	18	113.6	−1.4	6.73	3.33	160	2	84.0	10.0	
IRL21100	−31.0	18	−8.2	53.2	0.84	0.60	162	2	84.0	3.9	
KRE28600	110.0	18	127.0	39.1	1.30	1.10	31	2	87.0	2.0	
MAU24200	29.0	18	59.8	−18.9	1.62	1.24	55	2	84.0	10.0	
MLA22700	86.0	18	102.1	4.1	1.62	0.82	135	2	84.0	10.0	
MLI32700	−37.0	18	−2.0	19.0	2.66	1.26	127	2	87.0	1.5	
MRL33300	146.0	18	153.1	11.5	7.87	3.64	1	2	87.0	9.6	8/GR12
MRL33301	146.0	18	−157.5	21.0	1.63	0.67	131	2	87.0	6.9	8/GR12
NOR12000	5.0	18	17.0	61.5	2.00	1.00	10	1	84.0	4.2	
PAK281Q0	38.0	18	65.2	27.9	1.52	1.42	28	2	84.0	5.2	
PHL28500	98.0	18	121.3	11.1	3.46	1.76	99	2	84.0	10.0	
ROU13600	−1.0	18	25.0	45.7	1.38	0.66	155	2	86.0	1.7	
SOM31200	23.0	18	45.0	6.4	3.26	1.54	71	2	84.0	3.7	
TCD14300	−13.0	18	18.1	15.5	3.40	1.72	107	1	84.0	1.4	
URS07000	44.0	18	73.8	41.4	2.00	2.00	0	1	89.0	2.8	2.
YEM26600	11.0	18	44.3	15.1	1.14	0.70	109	2	84.0	2.6	
ZAI32300	−19.0	18	21.3	−6.8	2.80	1.52	149	2	84.0	8.0	

17 672.72 MHz (19)

1	2	3	4		5		6	7	8	9	10
AUS00400	98.0	19	130.5	−24.3	6.22	4.71	51	1	87.0	4.6	1.
BEN23300	−19.0	19	2.2	9.5	1.44	0.68	97	1	84.0	7.6	
BRM29800	74.0	19	97.1	19.1	3.58	1.48	104	2	84.0	9.6	
CHN15800	79.8	19	106.0	32.5	5.00	3.70	150	2	84.0	3.6	
CHN17900	92.0	19	112.2	21.9	1.84	1.22	37	1	84.0	10.0	
GAB26000	−13.0	19	11.8	−0.6	1.43	1.12	64	2	84.0	10.0	
GMB30200	−37.0	19	−15.1	13.4	0.79	0.60	4	1	83.0	7.6	
GRC10500	5.0	19	24.5	38.0	2.03	1.29	159	2	84.0	10.0	
IND03800	56.0	19	75.9	33.4	1.52	1.08	33	2	84.0	5.1	3.
INS03200	80.2	19	113.6	−1.4	6.73	3.33	160	1	84.0	10.0	
INS03600	104.0	19	115.2	−1.7	9.14	3.43	170	2	84.0	10.0	
IRN10900	34.0	19	54.2	32.4	3.82	1.82	149	1	84.0	3.1	
LBN27900	11.0	19	35.8	33.9	0.60	0.60	0	1	84.0	5.2	
LBY32100	−25.0	19	17.5	26.3	3.68	1.84	130	1	84.0	1.5	
LIE25300	−37.0	19	9.5	47.1	0.60	0.60	0	2	84.0	0.5	
LUX11400	−19.0	19	6.0	49.8	0.68	0.68	0	2	84.0	0.8	
MRA33200	122.0	19	151.1	11.6	6.48	3.49	179	2	87.0	9.6	8/GR14
MRA33201	122.0	19	−157.5	21.0	2.02	0.60	115	2	87.0	10.0	8/GR14
NIU05400	158.0	19	−169.8	−19.0	0.60	0.60	0	1	84.0	10.0	8/GR2
NIU05401	158.0	19	172.3	−39.7	2.88	1.56	47	1	84.0	7.7	8/GR2
NPL12200	50.0	19	83.7	28.3	1.72	0.60	163	1	84.0	10.0	
POR13300	−31.0	19	−8.0	39.6	0.92	0.60	112	1	84.0	5.3	
SMA33500	170.0	19	−166.3	−0.2	7.97	1.04	72	1	87.0	9.6	8/GR13
SMA33501	170.0	19	−124.8	39.2	4.43	0.73	132	1	87.0	10.0	8/GR13
TCH14400	−1.0	19	17.2	51.8	2.00	2.00	0	1	84.0	1.2	
URS06100	23.0	19	24.8	56.7	2.00	2.00	0	1	89.0	4.3	2., 4.
URS07700	110.0	19	137.0	50.5	2.00	2.00	0	1	89.0	2.5	2.
YUG14900	−7.0	19	18.6	43.8	2.21	0.92	156	2	84.0	9.4	

17 691.90 MHz (20)

ALG25200	−25.0	20	1.5	27.6	3.65	2.94	135	2	84.0	1.5	
AND34100	−37.0	20	1.6	42.5	0.60	0.60	0	1	84.0	0.3	
ARS00300	17.0	20	44.6	23.4	4.21	2.48	145	1	84.0	2.2	
AUS00700	128.0	20	133.6	−24.4	6.75	5.90	172	1	87.0	4.1	1.
AUT01600	−19.0	20	12.2	47.5	1.14	0.63	166	1	84.0	1.6	
BGD22000	74.0	20	90.3	23.6	1.46	0.84	135	1	84.0	6.7	
BUL02000	−1.0	20	25.0	43.0	2.00	2.00	0	2	84.0	2.5	
CBG29900	68.0	20	105.0	12.7	1.01	0.90	110	2	84.0	10.0	
CHN15900	79.8	20	106.0	32.5	5.00	3.70	150	1	84.0	3.6	
CHN18400	62.0	20	101.0	37.9	2.78	0.82	144	2	84.0	4.2	
DNK08900	5.0	20	17.0	61.5	2.00	1.00	10	1	84.0	4.2	
EGY02600	−7.0	20	29.7	26.8	2.33	1.72	136	1	86.0	1.6	
G 02700	−31.0	20	−3.5	53.8	1.84	0.72	142	2	84.0	4.8	
IND04200	68.0	20	79.3	27.7	2.14	1.16	147	1	89.0	4.7	3.
INS03000	80.2	20	113.6	−1.4	6.73	3.33	160	2	84.0	10.0	
KRE28600	110.0	20	127.0	39.1	1.30	1.10	31	2	87.0	2.0	
MLA22700	86.0	20	102.1	4.1	1.62	0.82	135	2	84.0	10.0	
MLI32800	−37.0	20	−7.6	13.2	1.74	1.24	171	2	87.0	5.9	
PAK28200	38.0	20	68.5	25.8	1.32	0.62	133	2	84.0	5.0	
PHL28500	98.0	20	121.3	11.1	3.46	1.76	99	2	84.0	10.0	
RRW31000	11.0	20	30.0	−2.1	0.66	0.60	42	1	84.0	7.6	
TKL05800	158.0	20	−171.8	−8.9	0.70	0.60	35	2	84.0	10.0	8/GR1
TKL05801	158.0	20	172.3	−39.7	2.88	1.56	47	2	84.0	7.7	8/GR1
URS06500	23.0	20	37.7	55.8	2.00	2.00	0	2	89.0	1.1	2.
URS06600	44.0	20	64.8	38.3	2.00	2.00	0	1	89.0	3.8	2.
URS07900	140.0	20	137.0	50.5	2.00	2.00	0	1	89.0	10.0	2.
ZAI32200	−19.0	20	22.4	0.0	2.16	1.88	48	2	84.0	10.0	

17 711.08 MHz (21)

1	2	3	4		5		6	7	8	9	10
ALB29600	−7.0	21	20.1	41.0	1.17	0.65	128	2	84.0	9.8	
AUS00500	98.0	21	130.5	−24.3	6.22	4.71	51	1	87.0	4.8	1.
BEL01800	−19.0	21	4.6	50.6	0.82	0.60	167	2	84.0	0.5	
BFA10700	−31.0	21	−1.5	12.2	1.45	1.14	29	2	84.0	8.1	
BLR06200	23.0	21	29.5	51.4	2.00	2.00	0	1	89.0	0.8	2.
BRM29800	74.0	21	97.1	19.1	3.58	1.48	104	2	84.0	9.6	
CHN17500	92.0	21	121.4	23.8	1.14	0.82	64	1	84.0	10.0	
CHN17600	79.8	21	113.7	33.9	1.20	0.80	141	2	84.0	10.0	
CYP08600	5.0	21	33.3	35.1	0.60	0.60	0	2	84.0	10.0	
DDR21600	−1.0	21	17.2	51.8	2.00	2.00	0	1	84.0	0.0	
DJI09900	23.0	21	42.5	11.6	0.60	0.60	0	2	84.0	3.7	
GUM33100	122.0	21	151.1	11.6	6.48	3.49	179	1	87.0	3.9	8/GR15
GUM33101	122.0	21	−157.5	21.0	2.02	0.60	115	1	87.0	2.2	8/GR15
IND03800	56.0	21	75.9	33.4	1.52	1.08	33	2	84.0	5.1	3.
INS03200	80.2	21	113.6	−1.4	6.73	3.33	160	1	84.0	10.0	
ISL04900	−31.0	21	−19.0	64.9	1.D0	0.60	177	1	82.0	3.1	
KEN24900	11.0	21	37.9	1.1	2.29	1.56	94	2	84.0	6.4	
MCO11600	−37.0	21	7.4	43.7	0.60	0.60	0	2	83.0	6.0	
NPL12200	50.0	21	83.7	28.3	1.72	0.60	163	1	84.0	10.0	
NZL28700	128.0	21	173.0	−41.0	3.30	1.28	48	2	84.0	10.0	
TON21500	170.0	21	−174.7	−18.0	1.41	0.68	85	1	84.0	10.0	
UAE27400	17.0	21	53.6	24.4	0.98	0.80	162	2	84.0	2.5	

17 730.26 MHz (22)

AUS00800	128.0	22	133.7	−24.4	6.78	5.90	172	1	87.0	4.1	1.
BDI27000	11.0	22	29.9	−3.1	0.71	0.60	80	1	84.0	7.5	
BGD22000	74.0	22	90.3	23.6	1.46	0.84	135	1	84.0	6.5	
CBG29900	68.0	22	105.0	12.7	1.01	0.90	110	2	84.0	10.0	
CHN15900	79.8	22	106.0	32.5	5.00	3.70	150	1	84.0	3.6	
CHN16800	92.0	22	124.8	48.1	2.68	0.92	157	1	84.0	4.0	
CHN18300	62.0	22	104.8	39.0	1.48	0.60	142	2	84.0	4.5	
COG23500	−13.0	22	14.6	−0.7	2.02	1.18	59	1	84.0	10.0	
CTI23700	−31.0	22	−5.8	7.4	1.55	1.43	162	1	84.0	10.0	
FNL10400	5.0	22	17.0	61.5	2.00	1.00	10	1	84.0	1.6	
HNG10600	−1.0	22	22.2	45.6	2.00	2.00	0	2	84.0	1.3	
IND04200	68.0	22	79.3	27.7	2.14	1.16	147	1	89.0	4.7	3.
INS03000	80.2	22	113.6	−1.4	6.73	3.33	160	2	84.0	10.0	
KRE28600	110.0	22	127.0	39.1	1.30	1.10	31	2	87.0	1.6	
KWT11300	17.0	22	47.6	29.2	0.68	0.60	145	1	84.0	3.2	
MLA22700	86.0	22	102.1	4.1	1.62	0.82	135	2	84.0	10.0	
MTN22300	−37.0	22	−12.2	18.5	2.62	1.87	150	2	86.0	1.4	
PAK28100	38.0	22	65.2	27.9	1.52	1.42	28	2	84.0	5.4	
PHL28500	98.0	22	121.3	11.1	3.46	1.76	99	2	84.0	10.0	
REU09700	29.0	22	55.6	−19.2	1.56	0.78	96	2	84.0	10.0	8/GR5
REU09701	29.0	22	3.7	45.2	1.94	1.68	24	2	84.0	6.1	8/GR5
SDN23100	−7.0	22	29.9	12.9	2.64	2.08	155	1	86.0	2.5	
SUI14000	−19.0	22	8.2	46.6	0.98	0.70	171	1	84.0	0.3	9.
SYR22900	11.0	22	38.3	34.9	1.04	0.90	7	2	84.0	3.2	
TUN15000	−25.0	22	9.5	33.5	1.88	0.72	135	2	84.0	3.4	
URS07000	44.0	22	73.8	41.4	2.00	2.00	0	1	89.0	2.7	2.
URS08100	140.0	22	168.5	65.5	2.00	2.00	0	2	89.0	10.0	2.

17 749.44 MHz (23)

1	2	3	4		5		6	7	8	9	10
AGL29500	−13.0	23	16.5	−12.0	3.09	2.26	84	2	84.0	4.2	
ARS34000	17.0	23	44.6	23.4	4.21	2.48	145	2	84.0	1.4	
AUS00400	98.0	23	130.5	−24.3	6.22	4.71	51	1	87.0	4.8	1.
BRM29800	74.0	23	97.1	19.1	3.58	1.48	104	2	84.0	9.6	
CHN15800	79.8	23	106.0	32.5	5.00	3.70	150	2	84.0	3.6	
CNR13000	−31.0	23	−15.7	28.4	1.54	0.60	5	1	84.0	4.5	
CVA08500	−37.0	23	10.8	41.5	2.00	0.60	138	1	84.0	10.0	
GHA10800	−25.0	23	−1.2	7.9	1.48	1.06	102	1	83.0	6.0	
GNE30300	−19.0	23	10.3	1.5	0.68	0.60	10	1	84.0	10.0	
HOL21300	−19.0	23	5.4	52.0	0.76	0.60	171	2	84.0	0.5	
IND04600	68.0	23	84.7	20.5	1.60	0.86	30	2	84.0	10.0	3.
INS03200	80.2	23	113.6	−1.4	6.73	3.33	160	1	84.0	10.0	
ISL05000	5.0	23	−19.5	61.0	2.20	0.80	4	2	84.0	1.8	
JOR22400	11.0	23	35.8	31.4	0.84	0.78	114	1	85.0	2.5	
NIU05400	158.0	23	−169.8	−19.0	0.60	0.60	0	1	84.0	9.6	8/GR2
NIU05401	158.0	23	172.3	−39.7	2.88	1.56	47	1	84.0	1.4	8/GR2
SDN23000	−7.0	23	29.9	9.8	2.95	2.17	123	2	86.0	2.8	
SRL25900	−31.0	23	−11.8	8.6	0.78	0.68	114	2	84.0	10.0	
URS06100	23.0	23	24.8	56.7	2.00	2.00	0	1	89.0	4.3	2., 4.
URS064X0	23.0	23	47.2	40.9	2.00	2.00	0	2	89.0	3.9	2., 4.
URS07700	110.0	23	137.0	50.5	2.00	2.00	0	1	89.0	2.6	2.
ZWE13500	−1.0	23	29.6	−18.8	1.46	1.36	37	1	85.0	3.0	

17 768.62 MHz (24)

AUS00700	128.0	24	133.6	−24.4	6.75	5.90	172	1	87.0	4.1	1.
AZR13400	−31.0	24	−23.4	36.1	2.56	0.70	158	2	84.0	6.2	7.
CAF25800	−13.0	24	21.0	6.3	2.25	1.68	31	1	84.0	8.4	
CBG29900	68.0	24	105.0	12.7	1.01	0.90	110	2	84.0	10.0	
CHN16600	92.0	24	121.1	41.7	1.52	0.78	154	1	84.0	7.9	
CHN17700	79.8	24	111.8	30.8	1.42	0.82	160	1	84.0	10.0	
CHN18800	62.0	24	101.5	25.1	1.86	1.08	132	1	84.0	10.0	
DNK09000	5.0	24	17.0	61.5	2.00	1.00	10	1	84.0	1.6	
I 08200	−19.0	24	12.3	41.3	2.38	0.98	137	1	84.0	2.0	
IND04100	56.0	24	78.4	16.0	2.08	1.38	35	1	84.0	10.0	3.
INS03000	80.2	24	113.6	−1.4	6.73	3.33	160	2	84.0	10.0	
IRQ25600	11.0	24	43.5	33.0	2.28	1.32	145	2	84.0	3.1	
LSO30500	5.0	24	27.8	−29.8	0.66	0.60	36	2	84.0	4.7	
MLA22700	86.0	24	102.1	4.1	1.62	0.82	135	2	84.0	10.0	
MTN28800	−37.0	24	−7.8	23.4	1.63	1.10	141	2	86.0	1.4	
MWI30800	−1.0	24	34.1	−13.0	1.54	0.60	87	2	84.0	2.7	
MYT09800	29.0	24	45.1	−12.8	0.60	0.60	0	2	84.0	10.0	8/GR7
MYT09801	29.0	24	3.7	45.6	1.98	1.71	22	2	84.0	6.1	8/GR7
NGR11500	−25.0	24	8.3	16.8	2.54	2.08	44	2	85.0	1.5	
OMA12300	17.0	24	55.6	21.0	1.88	1.02	100	1	85.0	2.0	
PAK28200	38.0	24	68.5	25.8	1.32	0.62	133	2	84.0	5.0	
PHL28500	98.0	24	121.3	11.1	3.46	1.76	99	2	84.0	10.0	
SDN23200	−7.0	24	29.6	18.4	2.54	2.09	167	1	86.0	1.4	
TKL05800	158.0	24	−171.8	−8.9	0.70	0.60	35	2	84.0	9.6	8/GR1
TKL05801	158.0	24	172.3	−39.7	2.88	1.56	47	2	84.0	1.4	8/GR1
URS06601	44.0	24	73.B	41.4	2.00	2.00	0	2	89.0	4.5	2.
URS07900	140.0	24	137.0	50.5	2.00	2.00	0	1	89.0	10.0	2.

17 787.80 MHz (25)

1	2	3	4		5		6	7	8	9	10
ALB29600	−7.0	25	20.1	41.0	1.17	0.65	128	2	84.0	10.0	
BEL01800	−19.0	25	4.6	50.6	0.82	0.60	167	2	84.0	0.5	
BFA10700	−31.0	25	−1.5	12.2	1.45	1.14	29	2	84.0	8.1	
BLR06201	23.0	25	24.8	56.7	2.00	2.00	0	1	89.0	4.3	2.
CYP08600	5.0	25	33.3	35.1	0.60	0.60	0	2	84.0	10.0	
DDR21600	−1.0	25	17.2	51.8	2.00	2.00	0	1	84.0	0.0	
DJI09900	23.0	25	42.5	11.6	0.60	0.60	0	2	84.0	3.7	
GUM33100	122.0	25	151.1	11.6	6.48	3.49	179	1	87.0	3.9	8/GR15
GUM33101	122.0	25	−157.5	21.0	2.02	0.60	115	1	87.0	2.2	8/GR15
ISL04900	−31.0	25	−19.0	64.9	1.00	0.60	177	1	82.0	6.0	
KEN24900	11.0	25	37.9	1.1	2.29	1.56	94	2	84.0	6.4	
MCO11600	−37.0	25	7.4	43.7	0.60	0.60	0	2	83.0	10.0	
MNG24800	74.0	25	107.5	47.8	2.00	2.00	0	1	89.0	3.8	2.
TON21500	170.0	25	−174.7	−18.0	1.41	0.68	85	1	84.0	10.0	
UAE27400	17.0	25	53.6	24.4	0.98	0.80	162	2	84.0	2.5	
URS07800	110.0	25	110.0	60.0	2.00	2.00	0	2	89.0	10.0	2.

AUS00600	98.0	26	130.5	−24.3	6.22	4.71	51	2	87.0	10.0	1.
AUS00900	128.0	26	133.7	−24.4	6.78	5.90	172	2	87.0	4.1	1.
BDI27000	11.0	26	29.9	−3.1	0.71	0.60	80	1	84.0	7.5	
COG23500	−13.0	26	14.6	−0.7	2.02	1.18	59	1	84.0	10.0	
CTI23700	−31.0	26	−5.8	7.4	1.55	1.43	162	1	84.0	10.0	
FNL10400	5.0	26	17.0	61.5	2.00	1.00	10	1	84.0	1.6	
HNG10600	−1.0	26	22.2	45.6	2.00	2.00	0	2	84.0	1.1	
KWT11300	17.0	26	47.6	29.2	0.68	0.60	145	1	84.0	2.6	
MTN22300	−37.0	26	−12.2	18.5	2.62	1.87	150	2	86.0	1.4	
REU09700	29.0	26	55.6	−19.2	1.56	0.78	96	2	84.0	10.0	8/GR5
REU09701	29.0	26	3.7	45.2	1.94	1.68	24	2	84.0	6.1	8/GR5
SDN23100	−7.0	26	29.9	12.9	2.64	2.08	155	1	86.0	2.5	
SUI14000	−19.0	26	8.2	46.6	0.98	0.70	171	1	84.0	0.3	9.
SYR22900	11.0	26	38.3	34.9	1.04	0.90	7	2	84.0	2.8	
TUN15000	−25.0	26	9.5	33.5	1.88	0.72	135	2	84.0	3.4	
URS06800	44.0	26	73.8	41.4	2.00	2.00	0	1	89.0	10.0	2.
URS07400	74.0	26	37.7	55.8	2.00	2.00	0	2	89.0	4.0	2.
URS08000	140.0	26	137.0	50.5	2.00	2.00	0	2	89.0	10.0	2.

17 826.16 MHz (27)

1	2	3	4		5		6	7	8	9	10
AGL29500	−13.0	27	16.5	−12.0	3.09	2.26	84	2	84.0	4.2	
BHR25500	17.0	27	50.5	26.1	0.60	0.60	0	2	84.0	3.0	
CNR13000	−31.0	27	−15.7	28.4	1.54	0.60	5	1	84.0	4.5	
CVA08300	−37.0	27	12.4	41.8	0.60	0.60	0	1	84.0	10.0	
DNK09100	5.0	27	−19.5	61.0	2.20	0.80	4	2	84.0	1.8	
GHA10800	−25.0	27	−1.2	7.9	1.48	1.06	102	1	83.0	6.0	
GNE30300	−19.0	27	10.3	1.5	0.68	0.60	10	1	84.0	10.0	
HOL21300	−19.0	27	5.4	52.0	0.76	0.60	171	2	84.0	0.5	
JOR22400	11.0	27	35.8	31.4	0.84	0.78	114	1	85.0	2.5	
SDN23000	−7.0	27	29.9	9.8	2.95	2.17	123	2	86.0	2.8	
SRL25900	−31.0	27	−11.8	8.6	0.78	0.68	114	2	84.0	10.0	
URS05900	23.0	27	47.2	40.9	2.00	2.00	0	1	89.0	3.9	2.
URS07700	110.0	27	137.0	50.5	2.00	2.00	0	1	89.0	10.0	2.
ZWE13500	−1.0	27	29.6	−18.8	1.46	1.36	37	1	85.0	3.0	

AUS00600	98.0	28	130.5	−24.3	6.22	4.71	51	2	87.0	10.0	1.
AUS00900	128.0	28	133.7	−24.4	6.78	5.90	172	2	87.0	4.1	1.
AZR13400	−31.0	28	−23.4	36.1	2.56	0.70	158	2	84.0	6.2	7.
CAF25800	−13.0	28	21.0	6.3	2.25	1.68	31	1	84.0	8.4	
I 08200	−19.0	28	12.3	41.3	2.38	0.98	137	1	84.0	2.0	
IRQ25600	11.0	28	43.5	33.0	2.28	1.32	145	2	84.0	2.7	
LSO30500	5.0	28	27.8	−29.8	0.66	0.60	36	2	84.0	4.7	
MTN28800	−37.0	28	−7.8	23.4	1.63	1.10	141	2	86.0	1.4	
MW130800	−1.0	28	34.1	−13.0	1.54	0.60	87	2	84.0	2.7	
MYT09800	29.0	28	45.1	−12.8	0.60	0.60	0	2	84.0	10.0	8/GR7
MYT09801	29.0	28	3.7	45.6	1.98	1.71	22	2	84.0	6.1	8/GR7
NGR11500	−25.0	28	8.3	16.8	2.54	2.08	44	2	85.0	1.5	
NOR12100	5.0	28	17.0	61.5	2.00	1.00	10	1	84.0	1.6	
OMA12300	17.0	28	55.6	21.0	1.88	1.02	100	1	85.0	2.0	
SDN23200	−7.0	28	29.6	18.4	2.54	2.09	167	1	86.0	1.4	
URS06602	44.0	28	58.0	59.0	2.00	2.00	0	1	89.0	10.0	2.
URS07600	74.0	28	92.8	56.1	2.00	2.00	0	2	89.0	0.3	2.
URS07900	140.0	28	137.0	50.5	2.00	2.00	0	1	89.0	10.0	2.

17 864.52 MHz (29)

1	2	3	4		5		6	7	8	9	10
ALB29600	−7.0	29	20.1	41.0	1.17	0.65	128	2	84.0	10.0	
BEL01800	−19.0	29	4.6	50.6	0.82	0.60	167	2	84.0	0.5	
BFA10700	−31.0	29	−1.5	12.2	1.45	1.14	29	2	84.0	8.1	
CYP08600	5.0	29	33.3	35.1	0.60	0.60	0	2	84.0	10.0	
DDR21600	−1.0	29	17.2	51.8	2.00	2.00	0	1	84.0	0.0	
DJI09900	23.0	29	42.5	11.6	0.60	0.60	0	2	84.0	3.7	
GUM33100	122.0	29	151.1	11.6	6.48	3.49	179	1	87.0	3.9	8/GR15
GUM33101	122.0	29	−157.5	21.0	2.02	0.60	115	1	87.0	2.2	8/GR15
ISL04900	−31.0	29	−19.0	64.9	1.00	0.60	177	1	82.0	6.0	
KEN24900	11.0	29	37.9	1.1	2.29	1.56	94	2	84.0	6.4	
MCO11600	−37.0	29	7.4	43.7	0.60	0.60	0	2	83.0	10.0	
MNG24800	74.0	29	107.5	47.8	2.00	2.00	0	1	89.0	0.6	2.
SEN22200	−37.0	29	−14.4	13.8	1.46	1.04	139	1	85.0	6.4	
TON21500	170.0	29	−174.7	−18.0	1.41	0.68	85	1	84.0	10.0	
UAE27400	17.0	29	53.6	24.4	0.98	0.80	162	2	84.0	2.2	
UKR06300	23.0	29	29.5	51.4	2.00	2.00	0	1	89.0	4.0	2.

AUS00600	98.0	30	130.5	−24.3	6.22	4.71	51	2	87.0	10.0	1.
AUS00900	128.0	30	133.7	−24.4	6.78	5.90	172	2	87.0	4.1	1.
BDI27000	11.0	30	29.9	−3.1	0.71	0.60	80	1	84.0	7.5	
COG23500	−13.0	30	14.6	−0.7	2.02	1.18	59	1	84.0	10.0	
CTI23700	−31.0	30	−5.8	7.4	1.55	1.43	162	1	84.0	10.0	
HNG10600	−1.0	30	22.2	45.6	2.00	2.00	0	2	84.0	1.1	
KWT11300	17.0	30	47.6	29.2	0.68	0.60	145	1	84.0	2.6	
MTN22300	−37.0	30	−12.2	18.5	2.62	1.87	150	2	86.0	1.4	
REU09700	29.0	30	55.6	−19.2	1.56	0.78	96	2	84.0	10.0	8/GR5
REU09701	29.0	30	3.7	45.2	1.94	1.68	24	2	84.0	6.1	8/GR5
S 13900	5.0	30	17.0	61.5	2.00	1.00	10	1	84.0	1.6	
SDN23100	−7.0	30	29.9	12.9	2.64	2.08	155	1	86.0	2.5	
SUI14000	−19.0	30	8.2	46.6	0.98	0.70	171	1	84.0	0.3	9.
SYR22900	11.0	30	38.3	34.9	1.04	0.90	7	2	84.0	2.8	
TUNI5000	−25.0	30	9.5	33.5	1.88	0.72	135	2	84.0	3.4	
URS06801	44.0	30	64.8	38.3	2.00	2.00	0	1	89.0	10.0	2.
URS07400	74.0	30	37.7	55.8	2.00	2.00	0	2	89.0	4.0	2.
URS08000	140.0	30	137.0	50.5	2.00	2.00	0	2	89.0	10.0	2.

17 902.88 MHz (31)

1	2	3	4		5		6	7	8	9	10
AGL29500	−13.0	31	16.5	−12.0	3.09	2.26	84	2	84.0	4.2	
BHR25500	17.0	31	50.5	26.1	0.60	0.60	0	2	84.0	3.0	
CNR13000	−31.0	31	−15.7	28.4	1.54	0.60	5	1	84.0	4.5	
CVA08300	−37.0	31	12.4	41.8	0.60	0.60	0	1	84.0	10.0	
GHA10800	−25.0	31	−1.2	7.9	1.48	1.06	102	1	83.0	6.0	
GNE30300	−19.0	31	10.3	1.5	0.68	0.60	10	1	84.0	10.0	
HOL21300	−19.0	31	5.4	52.0	0.76	0.60	171	2	84.0	0.5	
ISL05000	5.0	31	−19.5	61.0	2.20	0.80	4	2	84.0	1.8	
JOR22400	11.0	31	35.8	31.4	0.84	0.78	114	1	85.0	2.5	
SDN23000	−7.0	31	29.9	9.8	2.95	2.17	123	2	86.0	2.8	
SRL25900	−31.0	31	−11.8	8.6	0.78	0.68	114	2	84.0	10.0	
URS05901	23.0	31	29.5	51.4	2.00	2.00	0	2	89.0	3.9	2.
URS07701	110.0	31	137.0	50.5	2.00	2.00	0	2	89.0	10.0	2.
ZWE13500	−1.0	31	29.6	−18.8	1.46	1.36	37	1	85.0	3.0	

AUS00600	98.0	32	130.5	−24.3	6.22	4.71	51	2	87.0	10.0	1.
AUS00900	128.0	32	133.7	−24.4	6.78	5.90	172	2	87.0	4.1	1.
AZR13400	−31.0	32	−23.4	36.1	2.56	0.70	158	2	84.0	6.2	7.
CAF25800	−13.0	32	21.0	6.3	2.25	1.68	31	1	84.0	8.4	
I 08200	−19.0	32	12.3	41.3	2.38	0.98	137	1	84.0	2.0	
IRQ25600	11.0	32	43.5	33.0	2.28	1.32	145	2	84.0	2.7	
LSO30500	5.0	32	27.8	−29.8	0.66	0.60	36	2	84.0	4.7	
MTN28800	−37.0	32	−7.8	23.4	1.63	1.10	141	2	86.0	1.4	
MWI30800	−1.0	32	34.1	−13.0	1.54	0.60	87	2	84.0	2.7	
MYT09800	29.0	32	45.1	−12.8	0.60	0.60	0	2	84.0	10.0	8/GR7
MYT09801	29.0	32	3.7	45.6	1.98	1.71	22	2	84.0	6.1	8/GR7
NGR11500	−25.0	32	8.3	16.8	2.54	2.08	44	2	85.0	1.5	
NOR12100	5.0	32	17.0	61.5	2.00	1.00	10	1	84.0	1.6	
OMA12300	17.0	32	55.6	21.0	1.88	1.02	100	1	85.0	2.0	
SDN23200	−7.0	32	29.6	18.4	2.54	2.09	167	1	86.0	1.4	
URS06601	44.0	32	73.8	41.4	2.00	2.00	0	2	89.0	10.0	2.
URS07500	74.0	32	92.8	56.1	2.00	2.00	0	2	89.0	0.1	2.
URS07900	140.0	32	137.0	50.5	2.00	2.00	0	1	89.0	10.0	2.

17 941.24 MHz (33)

1	2	3	4		5		6	7	8	9	10
ALB29600	−7.0	33	20.1	41.0	1.17	0.65	128	2	84.0	10.0	
BEL01800	−19.0	33	4.6	50.6	0.82	0.60	167	2	84.0	0.5	
BFA10700	−31.0	33	−1.5	12.2	1.45	1.14	29	2	84.0	8.1	
CYP08600	5.0	33	33.3	35.1	0.60	0.60	0	2	84.0	10.0	
DDR21600	−1.0	33	17.2	51.8	2.00	2.00	0	1	84.0	0.0	
DJI09900	23.0	33	42.5	11.6	0.60	0.60	0	2	84.0	3.7	
GUM33100	122.0	33	151.1	11.6	6.48	3.49	179	1	87.0	3.9	8/GR15
GUM33101	122.0	33	−157.5	21.0	2.02	0.60	115	1	87.0	2.2	8/GR15
ISL04900	−31.0	33	−19.0	64.9	1.00	0.60	177	1	82.0	6.0	
KEN24900	11.0	33	37.9	1.1	2.29	1.56	94	2	84.0	6.4	
MCO11600	−37.0	33	7.4	43.7	0.60	0.60	0	2	83.0	10.0	
MNG24800	74.0	33	107.5	47.8	2.00	2.00	0	1	89.0	0.6	2.
SEN22200	−37.0	33	−14.4	13.8	1.46	1.04	139	1	85.0	6.4	
TON21500	170.0	33	−174.7	−18.0	1.41	0.68	85	1	84.0	10.0	
UAE27400	17.0	33	53.6	24.4	0.98	0.80	162	2	84.0	2.2	
UKR06300	23.0	33	29.5	51.4	2.00	2.00	0	1	89.0	4.0	2.

17 960.42 MHz (34)

BDI27000	11.0	34	29.9	−3.1	0.71	0.60	80	1	84.0	7.5	
COG23500	−13.0	34	14.6	−0.7	2.02	1.18	59	1	84.0	10.0	
CTI23700	−31.0	34	−5.8	7.4	1.55	1.43	162	1	84.0	10.0	
HNG10600	−1.0	34	22.2	45.6	2.00	2.00	0	2	84.0	1.1	
KWT11300	17.0	34	47.6	29.2	0.68	0.60	145	1	84.0	2.6	
MTN22300	−37.0	34	−12.2	18.5	2.62	1.87	150	2	86.0	1.4	
REU09700	29.0	34	55.6	−19.2	1.56	0.78	96	2	84.0	10.0	8/GR5
REU09701	29.0	34	3.7	45.2	1.94	1.68	24	2	84.0	6.1	8/GR5
S 13800	5.0	34	17.0	61.5	2.00	1.00	10	1	84.0	1.6	
SDN23100	−7.0	34	29.9	12.9	2.64	2.08	155	1	86.0	2.5	
SUI14000	−19.0	34	8.2	46.6	0.98	0.70	171	1	84.0	0.3	9.
SYR22900	11.0	34	38.3	34.9	1.04	0.90	7	2	84.0	2.8	
TUN15000	−25.0	34	9.5	33.5	1.88	0.72	135	2	84.0	3.4	
URS07100	44.0	34	73.8	41.4	2.00	2.00	0	1	89.0	10.0	2.
URS07400	74.0	34	37.7	55.8	2.00	2.00	0	2	89.0	4.0	2.
URS08000	140.0	34	137.0	50.5	2.00	2.00	0	2	89.0	10.0	2.

17 979.60 MHz (35)

1	2	3	4		5		6	7	8	9	10
AGL29500	−13.0	35	16.5	−12.0	3.09	2.26	84	2	84.0	4.2	
BHR25500	17.0	35	50.5	26.1	0.60	0.60	0	2	84.0	3.0	
CNR13000	−31.0	35	−15.7	28.4	1.54	0.60	5	1	84.0	4.5	
CVA08300	−37.0	35	12.4	41.8	0.60	0.60	0	1	84.0	10.0	
DNK09100	5.0	35	−19.5	61.0	2.20	0.80	4	2	84.0	1.8	
GHA10800	−25.0	35	−1.2	7.9	1.48	1.06	102	1	83.0	6.0	
GNE30300	−19.0	35	10.3	1.5	0.68	0.60	10	1	84.0	10.0	
HOL21300	−19.0	35	5.4	52.0	0.76	0.60	171	2	84.0	0.5	
JOR22400	11.0	35	35.8	31.4	0.84	0.78	114	1	85.0	2.5	
SDN23000	−7.0	35	29.9	9.8	2.95	2.17	123	2	86.0	2.8	
SRL25900	−31.0	35	−11.8	8.6	0.78	0.68	114	2	84.0	10.0	
URS05902	23.0	35	37.7	55.8	2.00	2.00	0	2	89.0	2.7	2.
URS07701	110.0	35	137.0	50.5	2.00	2.00	0	2	89.0	10.0	2.
ZWE13500	−1.0	35	29.6	−18.8	1.46	1.36	37	1	85.0	3.0	

AUS00600	98.0	36	130.5	−24.3	6.22	4.71	51	2	87.0	10.0	1.
AUS00900	128.0	36	133.7	−24.4	6.78	5.90	172	2	87.0	4.1	1.
AZR13400	−31.0	36	−23.4	36.1	2.56	0.70	158	2	84.0	6.2	7.
CAF25800	−13.0	36	21.0	6.3	2.25	1.68	31	1	84.0	8.4	
DNK09000	5.0	36	17.0	61.5	2.00	1.00	10	1	84.0	4.2	
I 08200	−19.0	36	12.3	41.3	2.38	0.98	137	1	84.0	2.0	
IRQ25600	11.0	36	43.5	33.0	2.28	1.32	145	2	84.0	2.7	
LSO30500	5.0	36	27.8	−29.8	0.66	0.60	36	2	84.0	4.7	
MTN28800	−37.0	36	−7.8	23.4	1.63	1.10	141	2	86.0	1.4	
MWI30800	−1.0	36	34.1	−13.0	1.54	0.60	87	2	84.0	2.7	
MYT09800	29.0	36	45.1	−12.8	0.60	0.60	0	2	84.0	10.0	8/GR7
MYT09801	29.0	36	3.7	45.6	1.98	1.71	22	2	84.0	6.1	8/GR7
NGR11500	−25.0	36	8.3	16.8	2.54	2.08	44	2	85.0	1.5	
OMA12300	17.0	36	55.6	21.0	1.88	1.02	100	1	85.0	2.0	
SDN23200	−7.0	36	29.6	18.4	2.54	2.09	167	1	86.0	1.4	
URS06603	44.0	36	37.7	55.8	2.00	2.00	0	2	89.0	10.0	2.
URS07900	140.0	36	137.0	50.5	2.00	2.00	0	1	89.0	10.0	2.

18 017.96 MHz (37)

1	2	3	4		5		6	7	8	9	10
ALB29600	−7.0	37	20.1	41.0	1.17	0.65	128	2	84.0	10.0	
BEL01800	−19.0	37	4.6	50.6	0.82	0.60	167	2	84.0	0.5	
BFA10700	−31.0	37	−1.5	12.2	1.45	1.14	29	2	84.0	8.1	
CYP08600	5.0	37	33.3	35.1	0.60	0.60	0	2	84.0	10.0	
DDR21600	−1.0	37	17.2	51.8	2.00	2.00	0	1	84.0	0.0	
DJI09900	23.0	37	42.5	11.6	0.60	0.60	0	2	84.0	3.7	
GUM33100	122.0	37	151.1	11.6	6.48	3.49	179	1	87.0	9.6	8/GR15
GUM33101	122.0	37	−157.5	21.0	2.02	0.60	115	1	87.0	10.0	8/GR15
ISL04900	−31.0	37	−19.0	64.9	1.00	0.60	177	1	82.0	6.0	
KEN24900	11.0	37	37.9	1.1	2.29	1.56	94	2	84.0	6.4	
MCO11600	−37.0	37	7.4	43.7	0.60	0.60	0	2	83.0	10.0	
MNG24800	74.0	37	107.5	47.8	2.00	2.00	0	1	89.0	4.0	2.
SEN22200	−37.0	37	−14.4	13.8	1.46	1.04	139	1	85.0	6.4	
UAE27400	17.0	37	53.6	24.4	0.98	0.80	162	2	84.0	2.2	
UKR06300	23.0	37	29.5	51.4	2.00	2.00	0	1	89.0	4.0	2.

BDI27000	11.0	38	29.9	−3.1	0.71	0.60	80	1	84.0	7.5	
COG23500	−13.0	38	16.6	−0.7	2.02	1.18	59	1	84.0	10.0	
CTI23700	−31.0	38	−5.8	7.4	1.55	1.43	162	1	84.0	10.0	
HNG10600	−1.0	38	22.2	45.6	2.00	2.00	0	2	84.0	1.1	
KWT11300	17.0	38	47.6	29.2	0.68	0.60	145	1	84.0	2.6	
MTN22300	−37.0	38	−12.2	18.5	2.62	1.87	150	2	86.0	1.4	
NOR12000	5.0	38	17.0	61.5	2.00	1.00	10	1	84.0	1.6	
REU09700	29.0	38	55.6	−19.2	1.56	0.78	96	2	84.0	9.6	8/GR5
REU09701	29.0	38	3.7	45.2	1.94	1.68	24	2	84.0	6.1	8/GR5
SDN23100	−7.0	38	29.9	12.9	2.64	2.08	155	1	86.0	2.5	
SUI14000	−19.0	38	8.2	46.6	0.98	0.70	171	1	84.0	0.3	9.
SYR33900	11.0	38	37.6	34.2	1.32	0.88	74	2	84.0	3.0	
TUN27200	−25.0	38	2.5	32.0	3.59	1.75	175	2	84.0	3.1	
URS07100	44.0	38	73.8	41.4	2.00	2.00	0	1	89.0	10.0	2.
URS07400	74.0	38	37.7	55.8	2.00	2.00	0	2	89.0	4.0	2.
URS08000	140.0	38	137.0	50.5	2.00	2.00	0	2	89.0	10.0	2.

18 056.32 MHz (39)

1	2	3	4		5		6	7	8	9	10
AGL29500	−13.0	39	16.5	−12.0	3.09	2.26	84	2	84.0	4.2	
BHR25500	17.0	39	50.5	26.1	0.60	0.60	0	2	84.0	2.6	
CNR13000	−31.0	39	−15.7	28.4	1.54	0.60	5	1	84.0	4.5	
CVA08300	−37.0	39	12.4	41.8	0.60	0.60	0	1	84.0	10.0	
GHA10800	−25.0	39	−1.2	7.9	1.48	1.06	102	1	83.0	6.0	
GNE30300	−19.0	39	10.3	1.5	0.68	0.60	10	1	84.0	10.0	
HOL21300	−19.0	39	5.4	52.0	0.76	0.60	171	2	84.0	0.5	
ISL05000	5.0	39	−19.5	61.0	2.20	0.80	4	2	84.0	1.8	
JOR22400	11.0	39	35.8	31.4	0.84	0.78	114	1	85.0	2.2	
MNG24800	74.0	39	107.5	47.8	2.00	2.00	0	1	89.0	4.0	2.
SDN23000	−7.0	39	29.9	9.8	2.95	2.17	123	2	86.0	2.8	
SRL25900	−31.0	39	−11.8	8.6	0.78	0.68	114	2	84.0	10.0	
URS05902	23.0	39	37.7	55.8	2.00	2.00	0	2	89.0	4.5	2.
URS07701	110.0	39	137.0	50.5	2.00	2.00	0	2	89.0	10.0	2.
ZWE13500	−1.0	39	29.6	−18.8	1.46	1.36	37	1	85.0	3.0	

18 075.50 MHz (40)

AUS00600	98.0	40	130.5	−24.3	6.22	4.71	51	2	87.0	10.0	1.
AUS00900	128.0	40	133.7	−24.4	6.78	5.90	172	2	87.0	10.0	1.
AZR13400	−31.0	40	−23.4	36.1	2.56	0.70	158	2	84.0	6.2	7.
CAF25800	−13.0	40	21.0	6.3	2.25	1.68	31	1	84.0	8.4	
I 08200	−19.0	40	12.3	41.3	2.38	0.98	137	1	84.0	4.7	
IRQ25600	11.0	40	43.5	33.0	2.28	1.32	145	2	84.0	2.7	
LSO30500	5.0	40	27.8	−29.8	0.66	0.60	36	2	84.0	4.7	
MTN28800	−37.0	40	−7.8	23.4	1.63	1.10	141	2	86.0	1.4	
MWI30800	−1.0	40	34.1	−13.0	1.54	0.60	87	2	84.0	2.7	
MYT09800	29.0	40	45.1	−12.8	0.60	0.60	0	2	84.0	9.6	8/GR7
MYT09801	29.0	40	3.7	45.6	1.98	1.71	22	2	84.0	6.1	8/GR7
NGR11500	−25.0	40	8.3	16.8	2.54	2.08	44	2	85.0	1.5	
OMA12300	17.0	40	55.6	21.0	1.88	1.02	100	1	85.0	3.2	
S 13900	5.0	40	17.0	61.5	2.00	1.00	10	1	84.0	1.6	
SDN23200	−7.0	40	29.6	18.4	2.54	2.09	167	1	86.0	1.6	
URS06603	44.0	40	37.7	55.8	2.00	2.00	0	2	89.0	10.0	2.
URSO7900	140.0	40	137.0	50.5	2.00	2.00	0	1	89.0	10.0	2.

PAGE LAISSEE EN BLANC INTENTIONNELLEMENT

PAGE INTENTIONALLY LEFT BLANK

ARTICLE 10

NOC

Interference

MOD 10.1 The Members of the Union shall endeavour to agree on the action required to reduce harmful interference which might be caused by the application of these provisions and the associated Plans.

ARTICLE 11

MOD

Period of Validity of the Provisions and Associated Plans

MOD 11.1 The provisions and associated Plans have been prepared in order to meet the requirements for feeder links for the broadcasting-satellite service in the bands concerned for a period extending until at least 1 January 1994.

MOD 11.2 In any event, the provisions and associated Plans shall remain in force until their revision by a competent administrative radio conference convened in accordance with the relevant provisions of the Convention in force.

ANNEX 1

MOD **Limits for Determining Whether a Service of an Administration is Considered to be Affected by a Proposed Modification to One of the Regional Plans or When It Is Necessary Under This Appendix to Seek the Agreement of Any Other Administration**

MOD 1. *Limits applicable to protect a frequency assignment in the band 17.7 - 18.1 GHz to an earth station in the fixed-satellite service (space-to-Earth)* (see paragraphs 4.2.1.2 and 4.2.3.2 of Article 4)

NOC An administration shall be considered as being affected if, upon application of the procedures of Section 3 of Annex 4 to this Appendix, that administration is included in the coordination area of the frequency assignment to a transmitting feeder-link earth station.

MOD For the purpose of this calculation, the feeder-link transmitting earth station parameters notified by the administration, which may differ from those given in Annex 3 to this Appendix, are used.

MOD 2. *Limits applicable to protect a terrestrial station in the bands 14.5 - 14.8 GHz and 17.7 - 18.1 GHz* (see paragraphs 4.2.1.3 and 4.2.3.3 of Article 4)

MOD An administration shall be considered as being affected if, upon application of the procedures of Appendix **28** to the Radio Regulations, that administration is included in the coordination area of the frequency assignment to a transmitting feeder-link earth station[1].

ADD [1] In Regions 1 and 3, for the application of the procedures of Appendix **28**, the e.i.r.p. for the feeder-link earth station is the sum of the values specified in columns 8 and 9 of the Plan.

MOD For the purpose of this calculation, the feeder-link transmitting earth station parameters notified by the administration, which may differ from those given in Annex 3 to this Appendix, are used.

MOD 3. *Limits to the change in the overall equivalent protection margin with respect to frequency assignments in conformity with the Region 2 Plan* [1]

MOD With respect to the modification to the Region 2 Plan and when it is necessary under this Appendix to seek the agreement of any other administration of Region 2, except in cases covered by Resolution **42 (Rev.Orb-88)**, an administration shall be considered affected if the overall equivalent protection margin[2] corresponding to a test point of its entry in the Plan, including the cumulative effect of any previous modification to the Plan or any previous agreement, falls more than 0.25 dB below 0 dB, or, if already negative, more than 0.25 dB below the value resulting from:

- the Plan as established by the 1983 Conference; *or*
- a modification of the assignment in accordance with this Appendix; *or*
- a new entry in the Plan under Article 4 of this Appendix; *or*
- any agreement reached in accordance with this Appendix except for Resolution **42 (Rev.Orb-88)**.

MOD [1] With respect to Section 3 the limit specified relates to the overall equivalent protection margin calculated in accordance with Section 1.12 of Annex 3 to this Appendix.

NOC [2] For the definition of the overall equivalent protection margin, see Section 1.14 of Annex 5 to Appendix **30 (Orb-85)**.

ADD 4. *Limits to the change in the feeder-link equivalent protection margin with respect to frequency assignments in conformity with the Regions 1 and 3 Plan* [1]

MOD With respect to the modification to the Regions 1 and 3 Plan and when it is necessary under this Appendix to seek the agreement of any other administration of Region 1 or 3, an administration shall be considered affected if the feeder-link equivalent protection margin[2] corresponding to a test point of its entry in the Plan, including the cumulative effect of any previous modification to the Plan or any previous agreement, falls more than 0.25 dB below 0 dB, or, if already negative, more than 0.25 dB below the value resulting from:

- the Plan as established by the 1988 Conference; *or*
- a modification of the assignment in accordance with this Appendix; *or*
- a new entry in the Plan under Article 4 of this Appendix; *or*
- any agreement reached in accordance with this Appendix.

ADD 5. *Limits applicable to protect a frequency assignment in the bands 17.3 - 18.1 GHz (Regions 1 and 3) and 17.3 - 17.8 GHz (Region 2) to a receiving space station in the fixed-satellite service (Earth-to-space)*

An administration in Region 1 or 3 shall be considered affected by a proposed modification in Region 2 or vice versa when the power flux-density arriving at the receiving space station of a broadcasting-satellite

---

ADD [1] With respect to Section 4, the limit specified relates to the feeder-link equivalent protection margin calculated in accordance with Section 1.7 of Annex 3 to this Appendix.

ADD [2] For the definition of the equivalent protection margin, see Section 1.7 of Annex 3 to this Appendix.

feeder-link station would cause an increase in the noise temperature of the feeder-link space station which exceeds the threshold value of $\Delta T/T$ corresponding to 3%,

where:

$\Delta T/T$ is calculated in accordance with the method given in Appendix **29**, except that the maximum power densities per hertz averaged over the worst 1 MHz are replaced by power densities per hertz averaged over the total RF bandwidth of the feeder-link carriers (24 MHz for Region 2 and 27 MHz for Regions 1 and 3).

Interim systems of Region 2 in accordance with Resolution **42 (Rev.Orb-88)** shall not be taken into consideration when applying this provision to proposed modifications to the Regions 1 and 3 Plan. However, this provision shall be applied to Region 2 interim systems with respect to the Regions 1 and 3 Plan.

ANNEX 2

MOD

Basic Characteristics to be Furnished in Notices[1] Relating to Feeder-Link Stations in the Fixed-Satellite Service Operating in the Frequency Bands 14.5 - 14.8 GHz and 17.3 - 18.1 GHz[2]

MOD 1. The following information shall be provided in notices relating to both transmitting earth stations and receiving space stations.

MOD [1] The Board shall develop and keep up-to-date forms of notice to meet fully the statutory provisions of this Annex. The Board is further invited to consider the feasibility of a single notice for feeder-link earth stations operating within more than one feeder-link service area.

NOC [2] Only those notices relating to frequency assignments for space stations and earth stations used for telecommand and tracking purposes associated with the Plan shall be furnished in accordance with Appendix **3**.

1.1 Country and beam identification.

1.2 Assigned frequency.

1.3 Assigned frequency band.

1.4 Date of bringing into use.

1.5 Designation of emission (in accordance with Article **4** of the Radio Regulations).

1.6 Modulation characteristics:

a) type of modulation;

b) pre-emphasis characteristics;

c) TV system;

d) sound-broadcasting characteristics;

e) frequency deviation;

f) composition of the baseband;

g) type of multiplexing of the video and sound signals;

h) energy dispersal characteristics.

MOD 2. The following additional information shall be provided in notices relating to transmitting earth stations.

2.1 Identity of the transmitting feeder-link station.

2.2 In the case of Region 2, geographical coordinates of the feeder-link earth station in the frequency band 17.7 - 17.8 GHz.

2.3 In all other cases, feeder-link service area for a feeder-link earth station identified by a set of a maximum of ten feeder-link test points.

2.4 Identity of the associated space station with which communication is to be established.

2.5 Rain-climatic zone for each test point (for guidance see Figures 1, 2 and 3 of Annex 3 to this Appendix).

2.6 Power characteristics of the transmission:

a) The following information is required for each assigned frequency:

- total transmitting power (dBW) in the assigned frequency band supplied to the input of the antenna;
- for the band 17.3 - 18.1 GHz, the maximum power density per Hz (dB(W/Hz)) supplied to the input of the antenna averaged over the worst 1 MHz band;
- for the band 14.5 - 14.8 GHz, the maximum power density per Hz (dB(W/Hz)) supplied to the input of the antenna averaged over the worst 4 kHz band;
- for the band 17.3 - 17.8 GHz, the maximum power density per Hz (dB(W/Hz)) supplied to the input of the antenna averaged over the total RF bandwidth (24 MHz for Region 2 or 27 MHz for Regions 1 and 3).

b) Additional information required if power control is used (see Sections 3.11 and 4.10 of Annex 3 to this Appendix):

- range, expressed in dB, above the transmitting power used in *a)* above.

2.7 Transmitting antenna characteristics of the earth station:

a) antenna diameter (metres);

b) gain of the antenna in the direction of maximum radiation referred to an isotropic radiator (dBi);

c) half-power beamwidth in degrees (describe in detail if not symmetrical);

d) measured radiation diagram of the antenna (taking as a reference the direction of maximum radiation), or reference radiation diagram to be used for coordination;

e) type of polarization;

f) sense of polarization;

g) horizon elevation angle in degrees and the antenna gain in the direction of the horizon for each azimuth[1] around the earth station;

h) altitude of the antenna above mean sea level, in metres;

i) minimum elevation angle, in degrees.

2.8 Regular hours of operation (UTC).

2.9 Coordination.

2.10 Agreements.

2.11 Other information.

2.12 Operating administration or company.

ADD 3. The following information shall be provided in notices relating to receiving space stations.

3.1 Orbital position (from the Greenwich Meridian).

3.2 Identity of the space station.

3.3 Class of station.

3.4 Space station receiving antenna characteristics:

a) gain of the antenna in the direction of maximum radiation referred to an isotropic radiator (dBi);

b) shape of the beam (circular, elliptical or other);

c) pointing accuracy (degrees);

d) type of polarization;

ADD [1] At suitable increments, e.g. every five degrees, in tabular or graphic form.

e) sense of polarization;

f) for circular beams, indicate the following:

- half-power beamwidth in degrees;
- co-polar and cross-polar radiation patterns;
- nominal intersection of the antenna beam axis with the Earth (boresight longitude and latitude);

g) for elliptical beams, indicate the following:

- co-polar and cross-polar radiation patterns;
- rotation accuracy (degrees);
- orientation (degrees);
- major axis (degrees) at the half-power beamwidth;
- minor axis (degrees) at the half-power beamwidth;
- nominal intersection of the antenna beam axis with the Earth (boresight longitude and latitude);

h) for beams of other than circular or elliptical shape, indicate the following:

- co-polar and cross-polar gain contours plotted on a map of the Earth's surface, preferably in a radial projection from the satellite onto a plane perpendicular to the axis from the centre of the Earth to the satellite. The isotropic gain shall be indicated at each contour which corresponds to a decrease in gain of 2, 4, 6, 10 and 20 dB and thereafter at 10 dB intervals down to a value of 0 dB relative to an isotropic radiator;
- wherever practicable, a numerical equation or table providing the necessary information to allow the gain contours to be plotted;

i) for an assignment in the bands 14.5 - 14.8 GHz or 17.7 - 18.1 GHz, the isotropic gain in the direction of those parts

of the geostationary-satellite orbit which are not obstructed by the Earth. Use a diagram showing estimated isotropic gain relative to orbit longitude.

3.5 Receiver system noise temperature referred to the output of the antenna (kelvins).

3.6 Station-keeping accuracy (degrees).

3.7 Regular hours of operation (UTC).

3.8 Coordination.

3.9 Agreements.

3.10 Other information.

3.11 Operating administration or company.

3.12 Range of automatic gain control[1].

ANNEX 3 *)

NOC

Technical Data Used in Establishing the Provisions and Associated Plans and Which Should Be Used for their Application

NOC

1. DEFINITIONS

NOC 1.1 *Feeder link*

MOD The term feeder link, as defined in No. **109** of the Radio Regulations, is further qualified to indicate a fixed-satellite service link in the frequency band 17.3 - 17.8 GHz in the Region 2 broadcasting-satellite

---

ADD [1] See Sections 3.10 and 4.9 of Annex 3 to this Appendix.

*) *Note by the General Secretariat:* Subsequent to WARC ORB-88, certain errors have been discovered in the technical information for fast roll-off antenna patterns as contained in Appendices 30A and 30B. This technical information as corrected by the IFRB derives from other relevant Conference decisions and is given in the provisional IFRB Rule of Procedure No. H38, published in IFRB Circular-letter No. 790 of 12 july 1989. Copies of the latter may be obtained directly from the IFRB.

service Plan and in the frequency bands 14.5 - 14.8 GHz, and 17.3 - 18.1 GHz in the Regions 1 and 3 Plan from any earth station within the feeder-link service area to the associated space station in the broadcasting-satellite service.

NOC 1.2 – 1.5

MOD 1.6 *Second adjacent channel (Region 2)*

NOC The RF channel in the broadcasting-satellite service frequency Plan, or in the associated feeder-link frequency Plan, which is situated immediately beyond either of the adjacent channels.

ADD 1.7 *Feeder-link equivalent protection margin for Regions 1 and 3*

The feeder-link equivalent protection margin (M_u) is given by the formula:

$$M_u = -10 \log (10^{-M_1/10} + 10^{-M_2/10} + 10^{-M_3/10}) \text{ dB}$$

where:

M_1 is the value in dB of the protection margin for the same channel, i.e.:

$$M_1 = \left[\frac{\text{wanted power}}{\text{sum of the co-channel interfering powers}} \right] \text{(dB)} - \text{co-channel protection ratio (dB)}$$

M_2 and M_3 are the values in dB of the protection margin for the upper and lower adjacent channels respectively, i.e.:

$$M_2 = \left[\frac{\text{wanted power}}{\text{sum of the upper adjacent channel interfering powers}} \right] \text{(dB)} - \text{adjacent channel protection ratio (dB)}$$

$$M_3 = \left[\frac{\text{wanted power}}{\text{sum of the lower adjacent channel interfering powers}} \right] (\text{dB}) - \text{adjacent channel protection ratio (dB)}$$

All powers are evaluated at the receiver input. All protection ratios are given in Section 3.3 of this Annex.

MOD 1.8 *Overall carrier-to-interference ratio (Region 2)*

NOC The overall carrier-to-interference ratio is the ratio of the wanted carrier power to the sum of all interfering RF powers in a given channel including both feeder links and down-links. The overall carrier-to-interference ratio due to interference from the given channel is calculated as the reciprocal of the sum of the reciprocals of the feeder-link carrier-to-interference ratio and the down-link carrier-to-interference ratio referred to the satellite receiver input and earth station receiver input, respectively[1].

MOD 1.9 *Overall co-channel protection margin (Region 2)*

NOC The overall co-channel protection margin in a given channel is the difference in dB between the overall co-channel carrier-to-interference ratio and the co-channel protection ratio.

MOD [1] In Region 2 there are a total of five overall carrier-to-interference ratios used in the analysis of the Plan, namely, co-channel, upper and lower adjacent channels and upper and lower second adjacent channels. In Regions 1 and 3, three ratios are used, namely, co-channel and upper and lower adjacent channels; furthermore, it was decided to assess the relative contributions of the feeder links and down-links separately.

MOD 1.10 *Overall adjacent channel protection margin (Region 2)*

NOC The overall adjacent channel protection margin is the difference, in dB, between the overall adjacent channel carrier-to-interference ratio and the adjacent channel protection ratio.

MOD 1.11 *Overall second adjacent channel protection margin (Region 2)*

NOC The overall second adjacent channel protection margin is the difference in dB between the overall second adjacent channel carrier-to-interference ratio and the second adjacent channel protection ratio.

NOC 1.12 *Overall equivalent protection margin*

ADD *For Region 2*

NOC The overall equivalent protection margin M is given in dB by the expression:

$$M = -10 \log \left(\sum_{i=1}^{5} 10^{(-M_i/10)} \right) \quad \text{(dB)}$$

where:

M_1 = overall co-channel protection margin, in dB (as defined in Section 1.9);

M_2, M_3 = overall adjacent channel protection margins for the upper and lower adjacent channels respectively, in dB (as defined in Section 1.10);

M_4, M_5 = overall second adjacent channel protection margins for the upper and lower second adjacent channels respectively, in dB (as defined in Section 1.11).

The adjective "equivalent" indicates that the protection margins for all interference sources from the adjacent and second adjacent as well as co-channel interference sources have been included.

ADD *For Regions 1 and 3*[1]

The overall equivalent protection margin M is given in dB by the expression:

$$M = -10 \log \left(10^{-(M_u + R_{cu})/10} + 10^{-(M_d + R_{cd})/10} \right) - R_{co}$$

where:

M_u = equivalent protection margin for the feeder link (as defined in Section 1.7 of this Annex);

M_d = equivalent protection margin for the down-link (as defined in Section 3.4, Annex 5 to Appendix **30 (Orb-85)**);

R_{cu} = co-channel feeder-link protection ratio;

ADD [1] For Regions 1 and 3, this formula replaces the formula given in Section 1.14 of Annex 5 to Appendix **30 (Orb-85)**.

R_{cd} = co-channel down-link protection ratio;

R_{co} = co-channel overall protection ratio.

The values of the protection ratios are as follows:

R_{cu} = 40 dB

R_{cd} = 31 dB

R_{co} = 30 dB

The adjective "equivalent" indicates that the protection margins for all interference sources from the adjacent channels as well as co-channel interference sources have been included.

NOC

2. RADIO PROPAGATION FACTORS

MOD The propagation loss on an Earth-space path is equal to the free-space path loss plus the atmospheric absorption loss plus the rain attenuation exceeded for 1% of the worst month in Region 2. In Regions 1 and 3, the atmospheric absorption loss is not included.

NOC 2.1 *Atmospheric absorption*

ADD *For Region 2* (see Figure 2)

MOD The loss due to atmospheric absorption (i.e., clear-sky attenuation) is given by:

$$A_a = \frac{92.20}{\cos\theta}\left(0.020F_o + 0.008\,\rho F_w\right) \quad \text{(dB)} \quad \text{for } \theta < 5°$$

where:

$$F_o = \left\{24.88 \tan\theta + 0.339 \sqrt{1416.77 \tan^2\theta + 5.51}\right\}^{-1}$$

$$F_w = \left\{40.01 \tan\theta + 0.339 \sqrt{3663.79 \tan^2\theta + 5.51}\right\}^{-1}$$

and:

$$A_a = \frac{0.0478 + 0.0118\,\rho}{\sin\theta} \quad \text{(dB)} \qquad \text{for } \theta \geqslant 5°$$

where:

θ = the elevation angle (degrees),

ρ = the surface water vapour concentration, g/m^3, with
ρ = 10 g/m^3 for rain-climatic zones A to K and
ρ = 20 g/m^3 for rain-climatic zones M to P

ADD *For Regions 1 and 3* (see Figures 1 and 3)

ADD In the Regions 1 and 3 feeder-link Plan, the atmospheric absorption loss is not included for the calculation of margins.

NOC 2.2 *Rain attenuation*

MOD The propagation model for feeder links using circularly polarized signals is based on the value of rain attenuation for 1% of the worst month.

Figures 1, 2 and 3 give the rain climatic zones for Regions 1, 2 and 3.

Figure 4 presents a plot of rain attenuation of circularly polarized signals exceeded for 1% of the worst month at 17.5 GHz as a function of earth station latitude and elevation angle for each of the rain climatic zones in Region 2.

For calculation, the following data are needed:

$R_{0.01}$: point rainfall rate for the location exceeded for 0.01% of an average year (mm/h)

h_o: the height above mean sea level of the earth station (km)

θ: the elevation angle (degrees)

f: frequency (GHz)

ζ: latitude of earth station (degrees).

Mean frequencies will be used for calculations for the frequency bands, i.e. 17.7 GHz and 14.65 GHz for Regions 1 and 3, 17.5 GHz for Region 2.

Step 1: The mean zero-degree isotherm height h_F is:

$$h_F = 5.1 - 2.15 \log \left[1 + 10^{\frac{(|\zeta|-27)}{25}}\right] \quad \text{(km)}$$

Step 2: The rain height h_R is:

$$h_R = C \cdot h_F$$

where: $C = 0.6$ for $0° \leqslant |\zeta| < 20°$

$C = 0.6 + 0.02\,(|\zeta| - 20)$ for $20° \leqslant |\zeta| < 40°$

$C = 1$ for $|\zeta| \geqslant 40°$

Step 3: The slant-path length, L_s, below the rain height is:

$$L_s = \frac{2(h_R - h_o)}{\left[\sin^2\theta + 2\,\frac{(h_R - h_o)}{R_e}\right]^{1/2} + \sin\theta} \qquad \text{(km)}$$

where:

R_e is the effective radius of the Earth (8.500 km)

Step 4: The horizontal projection, L_G, of the slant-path is:

$$L_G = L_s \cos\theta \qquad \text{(km)}$$

Step 5: The rain path reduction factor $r_{0.01}$, for 0.01% of the time is:

$$r_{0.01} = \frac{90}{90 + 4\,L_G}$$

Step 6: The specific attenuation γ_R is determined from:

$$\gamma_R = k\,(R_{0.01})^{\alpha} \qquad \text{(dB/km)}$$

where:

$R_{0.01}$ is given in Table 5 for each rain climatic zone. The frequency dependent coefficients k and α are given in Table 6 and the rain climatic zones are given in Figures 1, 2 and 3 for Regions 1, 2 and 3.

TABLE 5

Rainfall intensity (R) for the rain climatic zones (exceeded for 0.01% of an average year)

Rain climatic zone	A	B	C	D	E	F	G	H	J	K	L	M	N	P
Rainfall intensity (mm/h)	8	12	15	19	22	28	30	32	35	42	60	63	95	145

TABLE 6

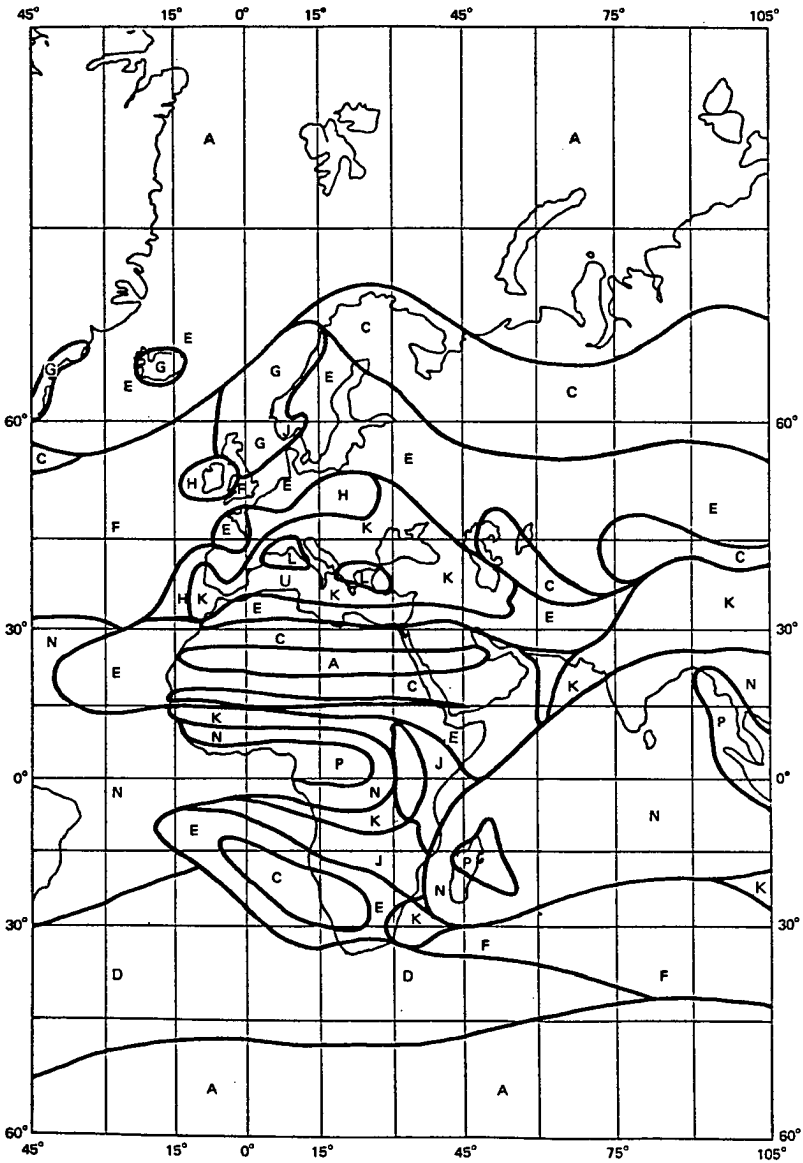
Frequency dependent coefficients

Frequency (GHz)	k	α	
14.65	0.0327	1.149	For Regions 1 and 3
17.5	0.0521	1.114	For Region 2
17.7	0.0531	1.110	For Regions 1 and 3

Step 7: The attenuation exceeded for 1% of the worst month is:

$$A_{1\%} = 0.223\ \gamma_R\ L_s\ r_{0.01}\ \text{(dB) for Regions 1 and 3}$$

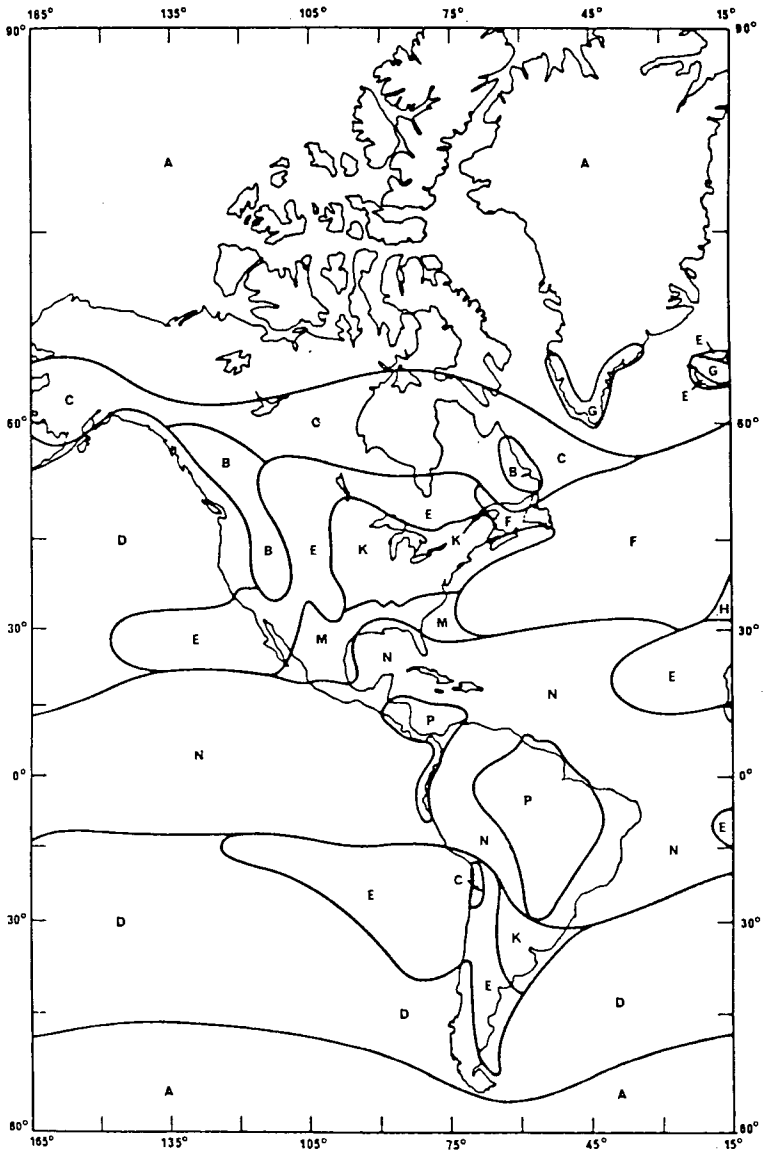
$$A_{1\%} = 0.21\ \gamma_R\ L_s\ r_{0.01}\ \text{(dB) for Region 2}$$



ADD

FIGURE 1

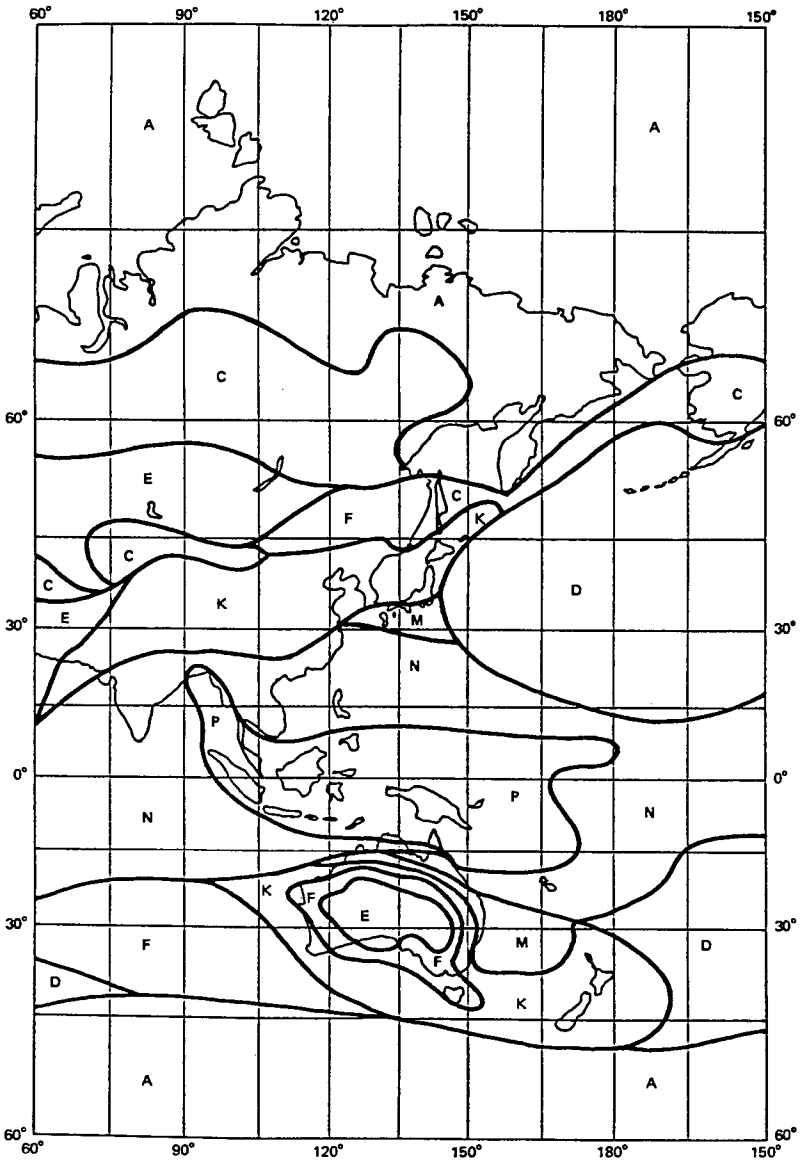
Rain climatic zones (Regions 1 and 3)



(MOD)

FIGURE 2

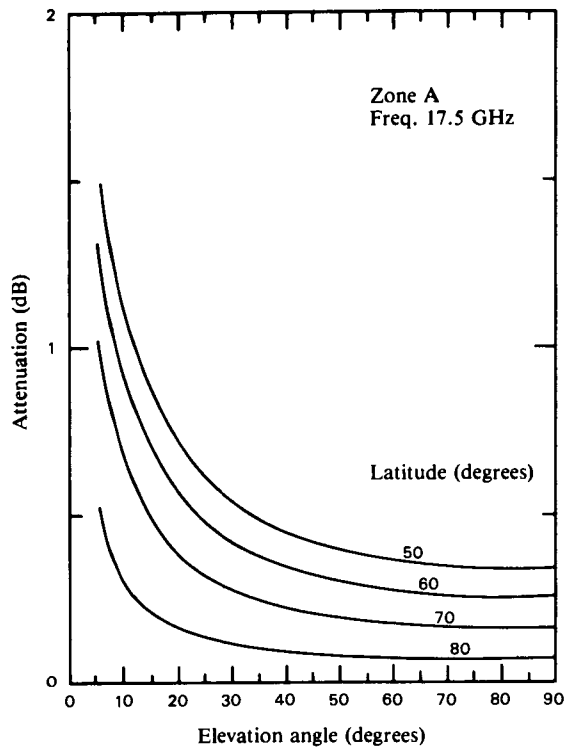
Rain climatic zones (Region 2)



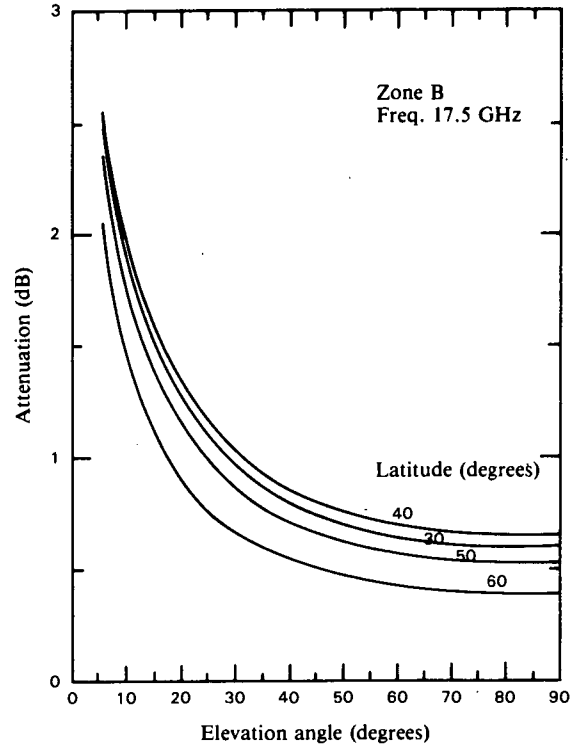
ADD

FIGURE 3

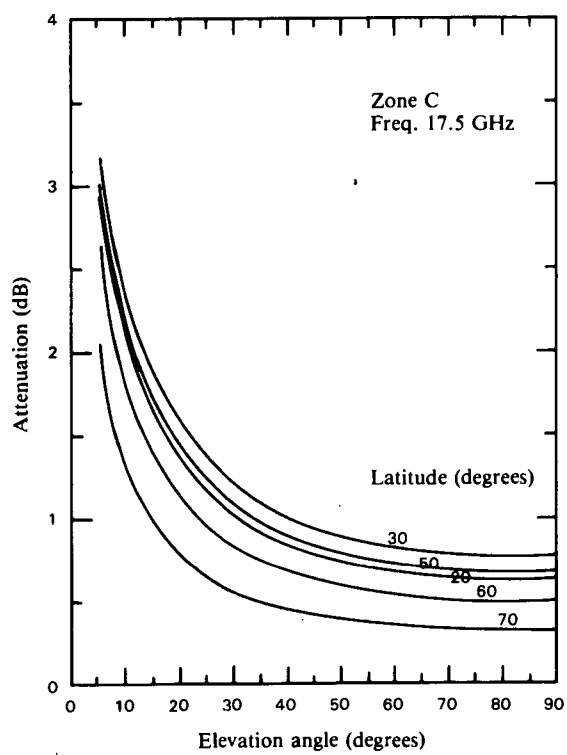
Rain climatic zones (Regions 1 and 3)



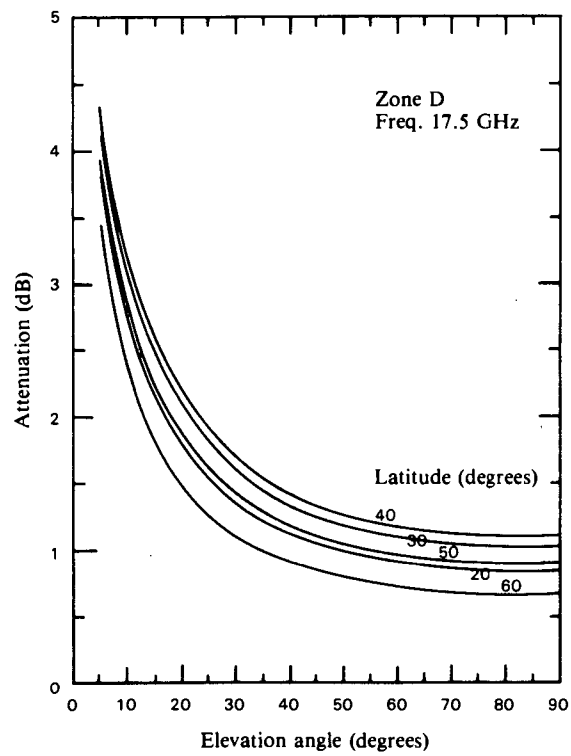
a) Rain climatic zone A



b) Rain climatic zone B



c) Rain climatic zone C



d) Rain climatic zone D

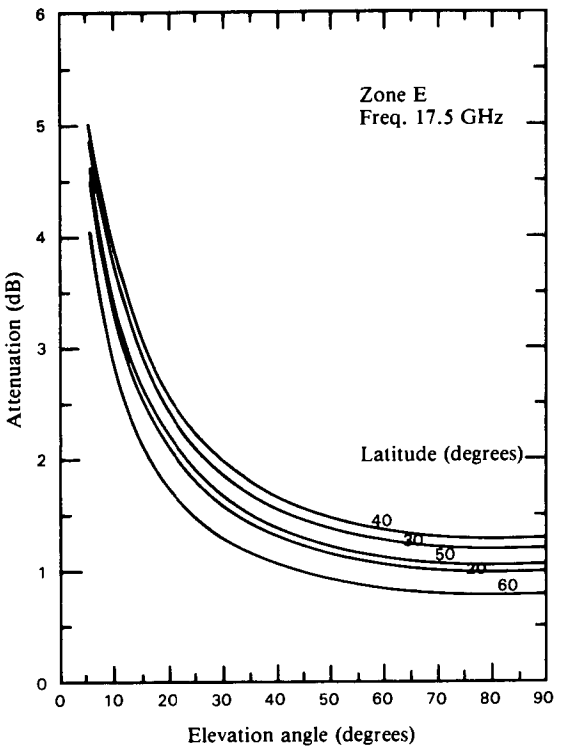
(MOD)

FIGURE 4

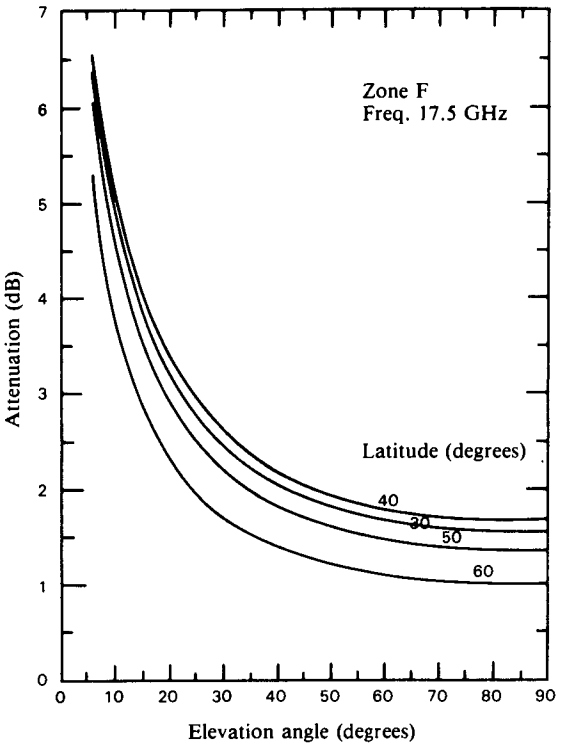
Rain attenuation values exceeded for 1% of the worst month (sea level) for Region 2 rain climatic zones

PAGE LAISSEE EN BLANC INTENTIONNELLEMENT

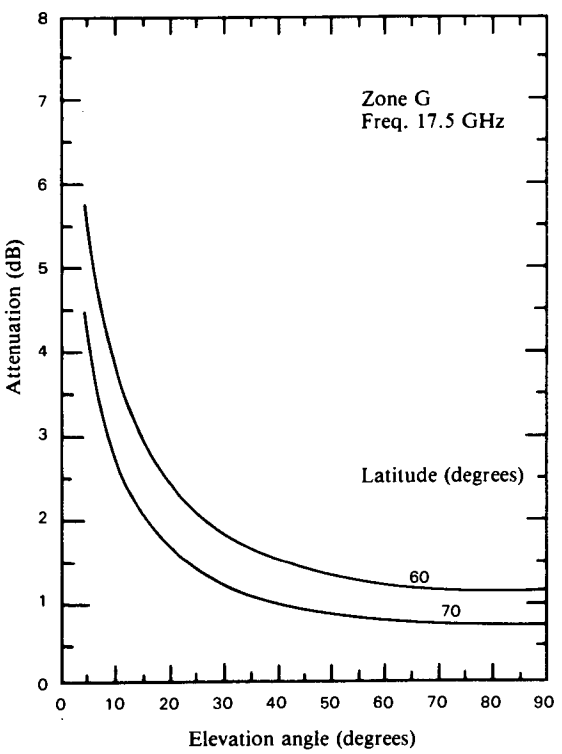
PAGE INTENTIONALLY LEFT BLANK



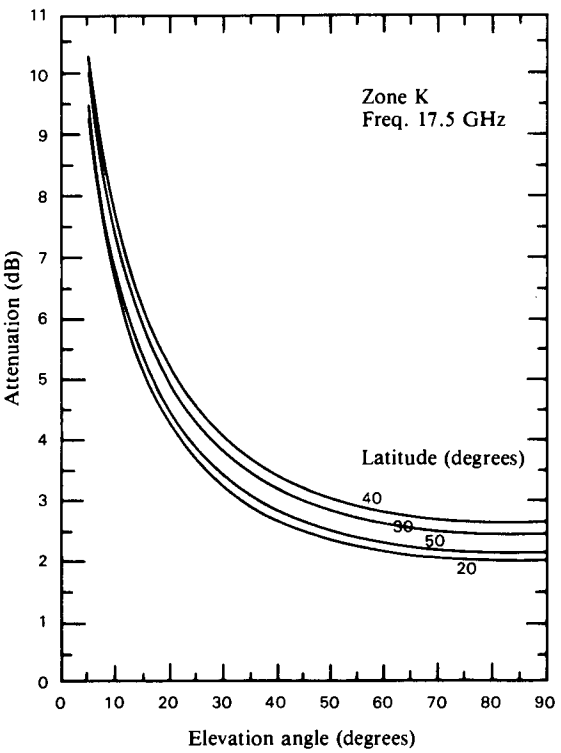
e) Rain climatic zone E



f) Rain climatic zone F



g) Rain climatic zone G



h) Rain climatic zone K

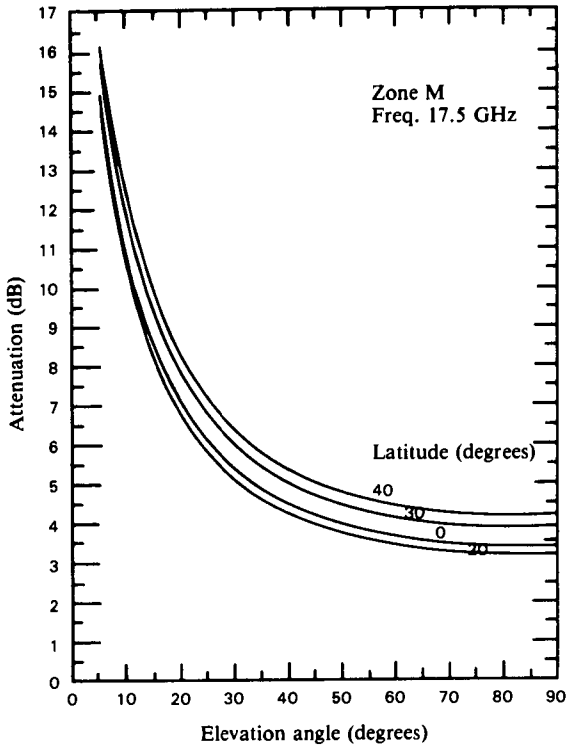
(MOD)

FIGURE 4 (*cont.*)

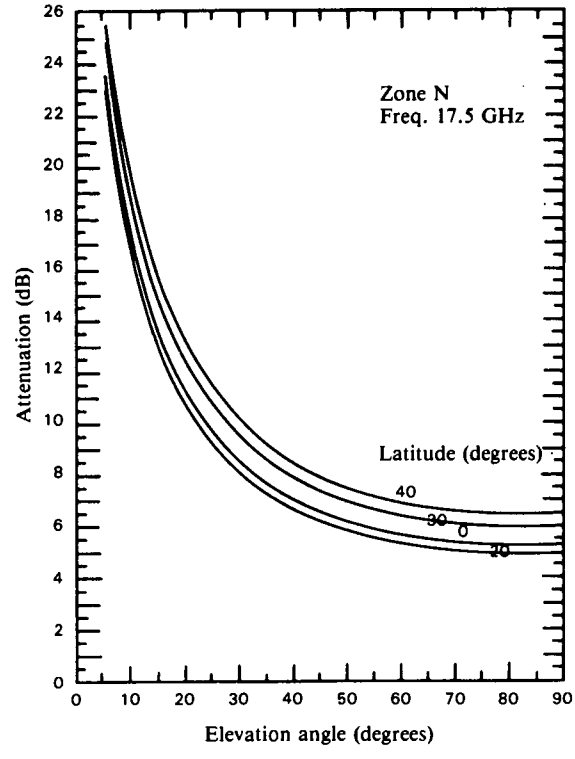
Rain attenuation values exceeded for 1% of the worst month (sea level) for Region 2 rain climatic zones

PAGE LAISSEE EN BLANC INTENTIONNELLEMENT

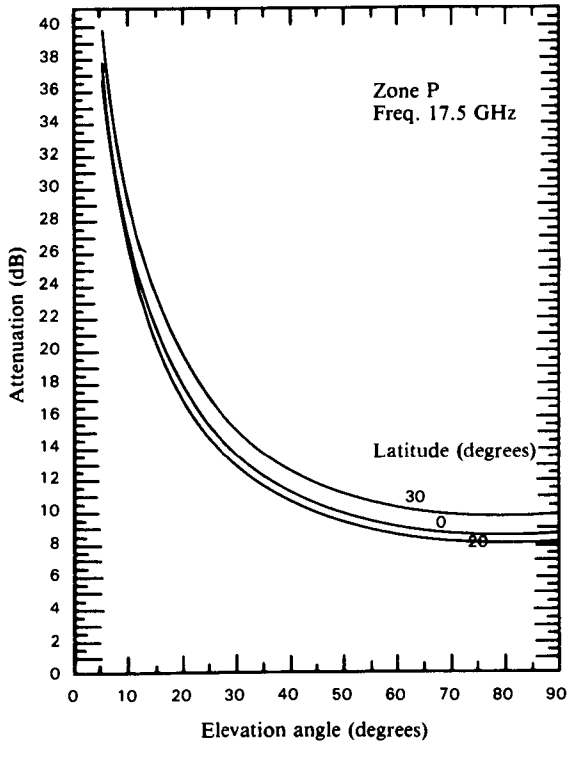
PAGE INTENTIONALLY LEFT BLANK



i) Rain climatic zone M



j) Rain climatic zone N



k) Rain climatic zone P

(MOD)

FIGURE 4 *(end)*

Rain attenuation values exceeded for 1% of the worst month (sea level) for Region 2 rain climatic zones

PAGE LAISSEE EN BLANC INTENTIONNELLEMENT

PAGE INTENTIONALLY LEFT BLANK

NOC 2.3 *Rain attenuation limit*

MOD In the analysis of the Plan for Region 2, a maximum rain attenuation on the feeder link of 13 dB was considered assuming that other means would be used at the implementation stage to compensate for larger rain attenuation on the feeder link.

ADD In the analysis of the Regions 1 and 3 Plan, no rain attenuation is included in the margins.

NOC 2.4 *Depolarization*

MOD Rain and ice can cause depolarization of radio frequency signals. The level of the co-polar component relative to the depolarized component is given by the cross-polarization discrimination (XPD) ratio. For the feeder link, the XPD ratio, in dB, not exceeded for 1% of the worst month, is given by:

$$XPD = 30 \log f - 40 \log (\cos \theta) - V \log A_p \text{ (dB) for } 5° \leqslant \theta \leqslant 60°$$

where: $V =$ 20 for 14.5 – 14.8 GHz

and: $V =$ 23 for 17.3 – 18.1 GHz

where: A_p: co-polar rain attenuation exceeded for 1% of the worst month

f: frequency (GHz)

θ: elevation angle (degrees)

For values of θ greater than 60°, use $\theta = 60°$ in the above equation.

NOC 2.5 *Procedure for calculating the carrier-to-interference ratio at a space station receiver input*

MOD In Region 2, the calculation of the feeder-link carrier-to-interference ratio (exceeded for 99% of the worst month) at a space station receiver input used to obtain the overall equivalent protection margin at a test point assumes a rain attenuation value not exceeded for 99% of the worst month on the wanted feeder-link path. For the interfering feeder-link signal path, clear sky propagation (i.e., including atmospheric absorption only) is assumed.

In Regions 1 and 3, the calculation of the feeder-link carrier-to-interference ratio at a space station receiver input used to obtain the feeder-link equivalent protection margin at a test point assumes free space conditions on the wanted feeder-link path and on the interfering feeder-link path.

MOD 3. BASIC TECHNICAL CHARACTERISTICS FOR REGIONS 1 AND 3

NOC 3.1 *Translation frequency and guard bands*

MOD *a) 17 GHz feeder links*

The feeder-link Plan generally uses a frequency translation of 5.6 GHz between the 17 GHz feeder-link channels and the 12 GHz down-link channels. Other values of the translation frequency may be used, provided that the corresponding channels have been assigned to the space station of the administration concerned.

With the value of frequency translation between the feeder-link frequency band (17.3 - 18.1 GHz in Regions 1 and 3) and the down-link frequency band (11.7 - 12.5 GHz in Region 1 and 11.7 - 12.2 GHz in Region 3), the guard bands present in the down-link Plan result in corresponding bandwidths of 11 MHz at the upper and 14 MHz at the lower feeder-link band edges. These feeder-link guard bands may be used for transmissions in the space operation service.

ADD *b) 14 GHz feeder links*

As the maximum available bandwidth for the feeder-link band 14.5 - 14.8 GHz is only 300 MHz against 800 and 500 MHz in the down-link Plan for Regions 1 and 3 respectively, several translation frequencies must be considered to allow any channel in the Plan to be used. Consequently, a particular feeder-link channel has been assigned to several BSS Plan channels simultaneously.

Generally, the translation frequencies from the feeder-link channels are:

a) 2797.82 MHz to down-link BSS channels 1 to 14

b) 2529.30 MHz to down-link BSS channels 15 to 28

c) 2260.78 MHz to down-link BSS channels 29 to 40

The guard bands are 11.80 MHz at the lower band edge and 11.86 MHz at the upper band edge.

NOC 3.2 *Carrier-to-noise ratio*

MOD Section 3.3 of Annex 5 to Appendix **30 (Orb-85)** provides guidance for planning and the basis for the evaluation of the carrier-to-noise ratios of the feeder-link and down-link Plans.

As guidance for planning, the reduction in quality in the down-link due to thermal noise in the feeder link is taken as equivalent to a degradation in the down-link carrier-to-noise ratio of approximately 0.5 dB not exceeded for 99% of the worst month.

For down links, as indicated in Appendix **30 (Orb-85)**, the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, adopted a *C/N* value of 14.5 dB for 99% of the worst month at the edge of the service area. The required feeder link *C/N* is 24 dB for 99% of the worst month, at the edge of the service area, to produce an overall *C/N* performance of 14 dB.

MOD 3.3 *Protection ratios*

For planning in Regions 1 and 3, the following protection ratios have been applied for the purpose of calculating the feeder-link equivalent protection margins:

- co-channel protection ratio = 40 dB;
- adjacent channel protection ratio = 21 dB.

The method for the calculation of the feeder-link equivalent protection margin is given in Section 1.7 of this Annex.

ADD 3.4 *Feeder-link e.i.r.p.*

The level of e.i.r.p. of each feeder link is specified in column 8 of the Plan.

The level of e.i.r.p. specified in the Plan can only be exceeded under certain conditions explained in Section 3.11 of this Annex (see also Article 5, paragraph 5.1.1 of this Appendix).

(MOD) 3.5 *Transmitting antenna*

(MOD) 3.5.1 *Antenna diameter*

MOD The feeder-link Plan is based on an antenna diameter of 5 metres for the band 17.3 - 18.1 GHz and 6 metres for the band 14.5 - 14.8 GHz.

The minimum antenna diameter permitted in the Plan is 2.5 metres. However, for antennas smaller than 5 metres for the 17.3 - 18.1 GHz band and 6 metres for the 14.5 - 14.8 GHz band, the off-axis e.i.r.p. shall not exceed the limits indicated in Figure A of Section 3.5.3 of this Annex.

MOD 3.5.2 *On-axis gain*

MOD The on-axis gain for the 5 metre antenna at 17.3 - 18.1 GHz and for the 6 metre antenna at 14.5 to 14.8 GHz is taken as 57 dBi.

MOD 3.5.3 *Off-axis e.i.r.p. of transmitting antennas*

MOD The co-polar and cross-polar off-axis e.i.r.p. for planning in Regions 1 and 3 are given in Figure A.

NOC 3.5.4 *Pointing accuracy*

MOD The Plan has been developed to accommodate a loss in gain of 1 dB due to earth station antenna mis-pointing.

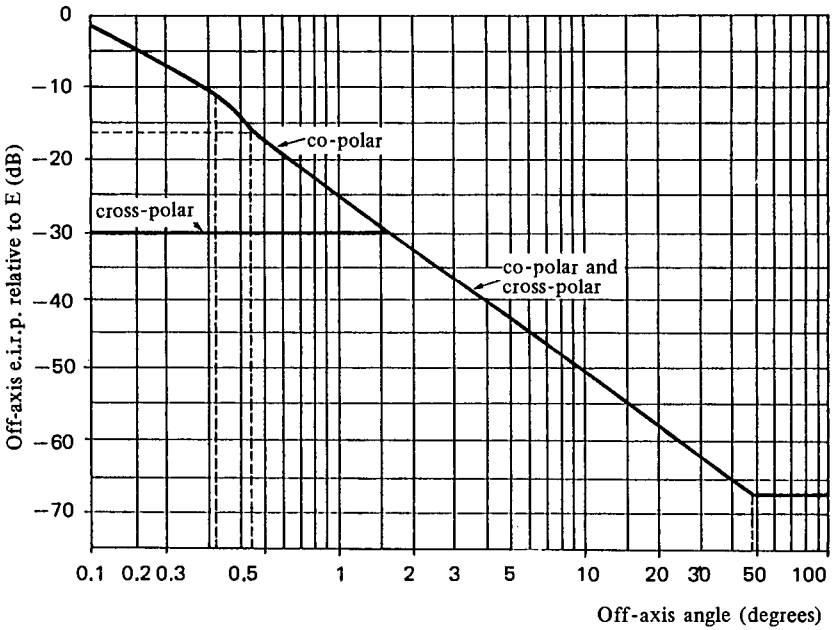
(MOD) 3.6 *Transmitter power*

MOD The maximum transmitter power delivered to the input of the antenna of the feeder-link earth station per 27 MHz television channel shall be such as to ensure that the e.i.r.p. envelope in Section 3.5.3 is not exceeded except under certain conditions specified in Section 3.11 of this Annex.

MOD 3.7 *Satellite receiving antenna*

(MOD) 3.7.1 *Cross-section of receiving antenna beam*

NOC Planning has been based on beams of elliptical or circular cross-section. When the assignments are implemented, or when the Plan is modified, administrations may use non-elliptical or shaped beams.



ADD

FIGURE A

Earth station e.i.r.p. at angles off the antenna axis

Co-polar component (dBW):

E (dBW)	for $0° < \theta \leq 0.1°$
$E - 21 - 20 \log \theta$ (dBW)	for $0.1° < \theta \leq 0.32°$
$E - 5.7 - 53.2\ \theta^2$ (dBW)	for $0.32° < \theta \leq 0.44°$
$E - 25 - 25 \log \theta$ (dBW)	for $0.44° < \theta \leq 48°$
$E - 67$ (dBW)	for $\theta > 48°$

Cross-polar component (dBW):

$E - 30$ (dBW)	for $0° \leq \theta \leq 1.6°$
$E - 25 - 25 \log \theta$ (dBW)	for $1.6° < \theta \leq 48°$
$E - 67$ (dBW)	for $\theta > 48°$

where:

E (dBW) is the earth station e.i.r.p. on the antenna axis;

and

θ = off-axis angle referred to the main lobe axis (degrees).

The value of E to be taken into account in the above formulae is specified in column 8 of the Plan.

If the cross-section of the receiving antenna beam is elliptical, the effective beamwidth φ_0 is a function of the angle of rotation q between the plane containing the satellite and the major axis of the beam cross-section and the plane in which the beamwidth is required.

The relationship between the maximum gain of an antenna and the half-power beamwidth can be derived from the expression:

$$G_m = 27\,843/ab$$

or

$$G_m(\text{dB}) = 44.44 - 10 \log a - 10 \log b$$

where:

a and b are the angles (in degrees) subtended at the satellite by the major and minor axes of the elliptical cross-section of the beam.

An antenna efficiency of 55% is assumed.

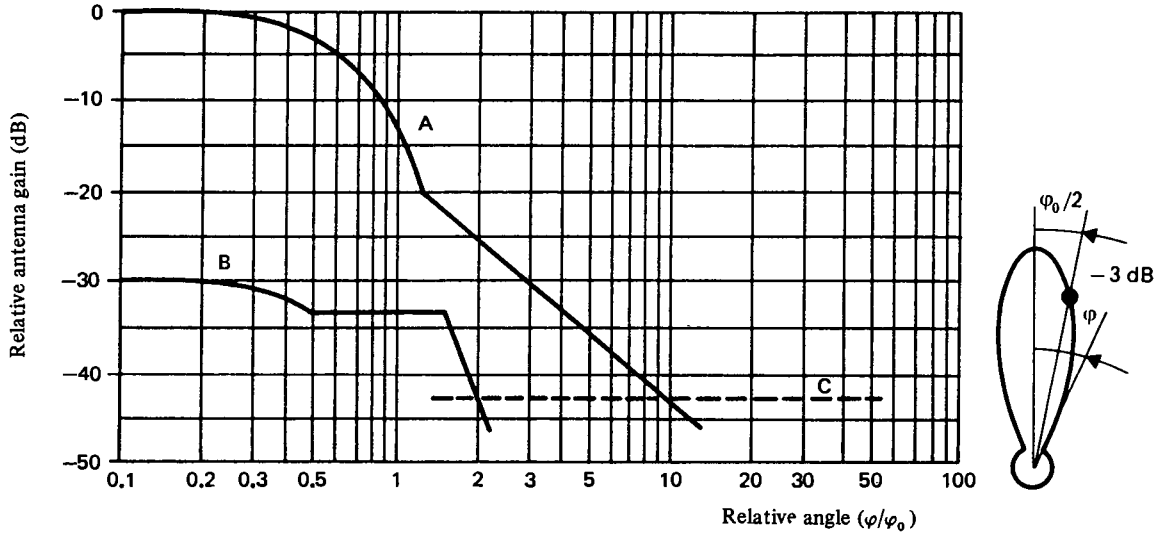
(MOD) 3.7.2 *Minimum beamwidth*

MOD A minimum value of 0.6° for the half-power beamwidth of the receiving antenna has been used for planning.

(MOD) 3.7.3 *Reference patterns*

MOD The reference patterns for the co-polar and cross-polar components of the satellite receiving antenna used in the Plan are given in Figure B.

In some cases, to reduce co-polar interference, the pattern shown in Figure C is used; this use is indicated in the Plan by note 1. This pattern is derived from an antenna producing an elliptical beam with fast roll-off in the main lobe. Three curves for different values of φ_0 are shown as examples.



ADD

FIGURE B

Satellite receive antenna reference pattern generally used in Regions 1 and 3

Curve A: Co-polar component

The co-polar reference pattern is given by the formula:

Co-polar relative gain (dB)

$$G = -12\left(\frac{\varphi}{\varphi_0}\right)^2 \qquad \text{for} \quad 0 \leqslant \frac{\varphi}{\varphi_0} \leqslant 1.30$$

$$G = -17.5 - 25 \log\left(\frac{\varphi}{\varphi_0}\right) \qquad \text{for} \quad \frac{\varphi}{\varphi_0} > 1.30$$

After intersection with curve C: as curve C (curve C equals minus the on-axis gain).

Curve B: Cross-polar component

The cross-polar reference pattern is given by the formula:

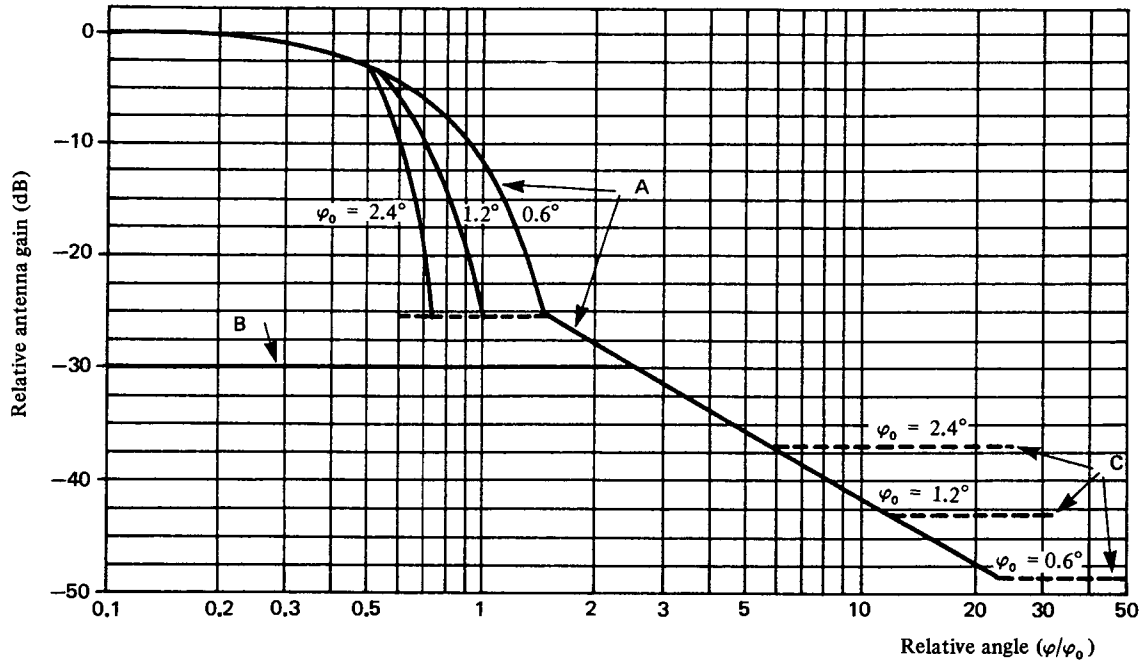
Cross-polar relative gain (dB)

$$G = -30 - 12\left(\frac{\varphi}{\varphi_0}\right)^2 \qquad \text{for} \quad 0 \leqslant \frac{\varphi}{\varphi_0} \leqslant 0.5$$

$$G = -33 \qquad \text{for} \quad 0.5 < \frac{\varphi}{\varphi_0} \leqslant 1.67$$

$$G = -40 - 40 \log\left(\frac{\varphi}{\varphi_0} - 1\right) \qquad \text{for} \quad \frac{\varphi}{\varphi_0} > 1.67$$

After intersection with curve C: as curve C (curve C equals minus the on-axis gain).



ADD

FIGURE C

Reference patterns for co-polar and cross-polar components for satellite receiving antennas with fast roll-off in the main beam for Regions 1 and 3

Curve A: Co-polar component (dB relative to main beam gain)

$-12\ (\varphi/\varphi_0)^2$ for $0 \leq \varphi/\varphi_0 \leq 0.5$

$-33.33\ \varphi_0^2\ (\varphi/\varphi_0 - x)^2$ for $0.5 < \varphi/\varphi_0 \leq \dfrac{0.87}{\varphi_0} + x$

-25.23 for $\dfrac{0.87}{\varphi_0} + x < \varphi/\varphi_0 \leq 1.413$

$-(22 + 20 \log (\varphi/\varphi_0))$ for $\varphi/\varphi_0 > 1.413$

After intersection with curve C: as curve C.

Curve B: Cross-polar component (dB relative to main beam gain)

-30 for $0 \leq \varphi/\varphi_0 < 2.51$

After intersection with curve A: as curve A.

Curve C: Minus the on-axis gain (Curves A and C represent examples for three antennas having different values of φ_0 as labelled in Figure C. The on-axis gains of these antennas are 37.43 and 49 dBi, respectively).

where:

φ = off-axis angle (degrees)

φ_0 = dimension of the minimum ellipse fitted around the feeder-link service area in the direction of interest (degrees)

$$x = 0.5 \left(1 - \frac{0.6}{\varphi_0}\right)$$

(MOD) 3.7.4 *Pointing accuracy*

MOD The deviation of the receiving antenna beam from its nominal pointing direction must not exceed 0.2° in any direction. Moreover, the angular rotation of the receiving beam about its axis must not exceed ±1°; this limit is not necessary for beams of circular cross-section using circular polarization.

(MOD) 3.8 *System noise temperature*

MOD The satellite system noise temperature values generally used in the Plan are 1800 K for 17 GHz and 1500 K for 14 GHz.

(MOD) 3.9 *Polarization*

MOD In Regions 1 and 3, circular polarization is used for the purpose of planning the feeder links.

For the definitions of the terms "direct and indirect polarization", see Section 3.2.3 of Annex 5 to Appendix **30 (Orb-85)**.

(MOD) 3.10 *Automatic gain control*

MOD The down-link Plan was based on constant satellite output power. However, the feeder-link Plan does not take account of the effect of automatic gain control on board satellites. Up to 15 dB of automatic gain control is permitted, subject to no increase in interference to other satellite systems.

(MOD) 3.11 *Power control*

MOD In Regions 1 and 3, a permitted increase which may be used to overcome rain fading for each assignment is included in the Plan.

In the calculation, in cases where satellites do not use common or adjacent channels cross-polarized to each other, the maximum permissible e.i.r.p. increase, which must not exceed 10 dB, corresponds to the amount of rain attenuation which occurs on the interfering feeder link.

On the other hand, in cases where satellites use common or adjacent channels cross-polarized, the maximum permissible e.i.r.p. increase is expressed as a function of the rain attenuation, but is in general less than the amount of rain attenuation due to rain-induced depolarization.

ADD 3.11.1 *Method for determination of the increase in e.i.r.p. during rain attenuation for an assignment over the Plan value*

Condition to be observed

The increase in e.i.r.p. of the assignment studied must not entail an impairment of more than 0.5 dB of the feeder-link equivalent protection margin of any other assignment to any other administration.

Calculation method

ADD 3.11.1.1 Compile a list of all assignments of other administrations (A, B, C, . . .) in the same orbital position and the two adjacent positions liable to suffer interference from the assignment studied.

ADD 3.11.1.2 Calculate the feeder-link equivalent protection margin of assignment A in free space conditions, taking account of all interference sources affecting A at the worst test points, namely:

- for assignment A: the point corresponding to the minimum C/N ratio;
- for each interference source affecting A: the point corresponding to the maximum interference power affecting A.

ADD 3.11.1.3 Introduce for the assignment studied the rain attenuation for 0.1% of the worst month and the corresponding rain depolarization value.

ADD 3.11.1.4 Recalculate the feeder-link equivalent protection margin of assignment A at the worst test points, namely:

- for assignment A: the test point used in Section 3.11.1.2 above;
- for the assignment studied: the test point corresponding to the maximum interference power affecting A.

At this stage, the e.i.r.p. of the assignment studied is that contained in the Plan.

ADD 3.11.1.5 Increase the e.i.r.p. of the assignment studied by 0.1 dB and recalculate the equivalent up-link margin of A as in Section 3.11.1.4 above.

ADD 3.11.1.6 Repeat the operation of Section 3.11.1.5 above until the equivalent up-link margin of assignment A is impaired by more than 0.5 dB in relation to the value found under Section 3.11.1.2 above, or until the e.i.r.p. increase exceeds 10 dB or the rain attenuation (see Section 3.11.1.3). Adopt the e.i.r.p. increase in the preceding iteration step.

ADD 3.11.1.7 Repeat the operations in Sections 3.11.1.2 to 3.11.1.6 above, considering the assignments B, C, . . .

ADD 3.11.1.8 Adopt the smallest of the increases in e.i.r.p. found under Section 3.11.1.6 above for the various assignments A, B, C, . . .

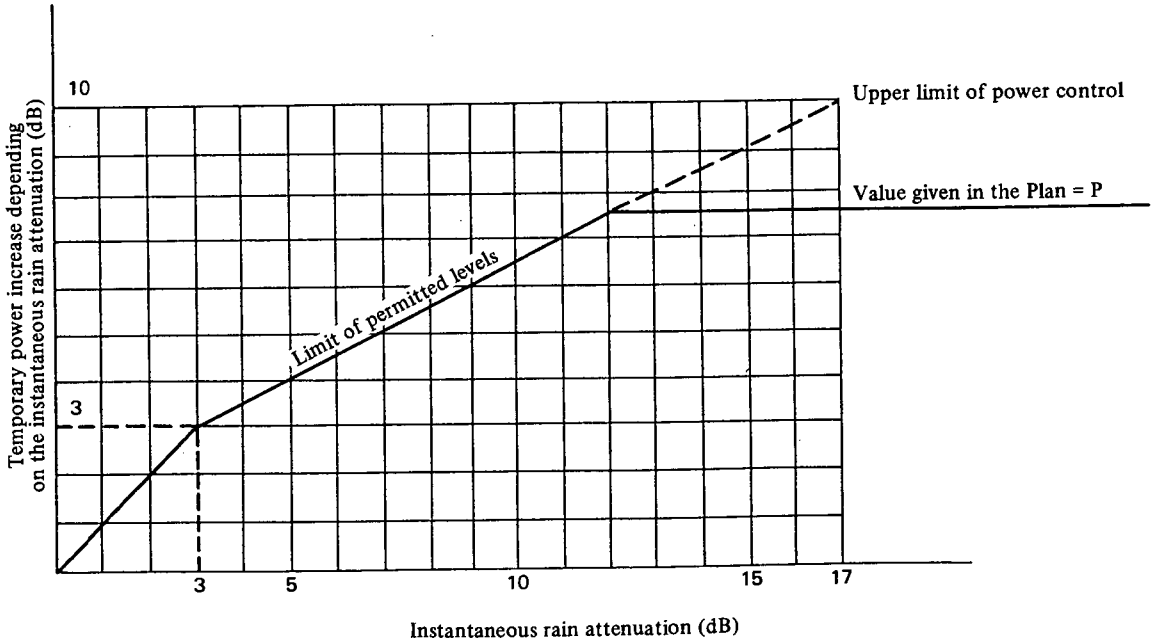
ADD 3.11.2 *Propagation model*

3.11.2.1 For the calculation of rain attenuation for 0.1% of the worst month, the model described in Section 2.2 of this Annex should be used. It shall be assumed that the 0.1% value is 3.3 times the 1% value in dB.

3.11.2.2 Rain depolarization shall be calculated on the basis of attenuation, using the method described in Section 2.4 of this Annex.

ADD 3.11.3 *Variation of power with rain attenuation*

The instantaneous increase in power to overcome rain attenuation must not exceed the bounds given by the characteristics shown in Figure 5.



ADD

FIGURE 5

Characteristic for up-link power control

P: The value of permitted increase given in the Plan, or calculated by the IFRB, which varies for each assignment. The upper limit of this value is 10 dB.

ADD 3.11.4 *Procedures*

ADD 3.11.4.1 An administration wishing to introduce power control may use a value not exceeding that given in Column 9 of the Plan or it may request, where this is possible, the use of a higher value for a given earth station location. In this latter case, it shall request the IFRB to calculate the maximum permissible value for that site. The administration shall provide the Board with the coordinates of the station, the proposed antenna characteristics, including the off-axis co-polar and cross-polar characteristics, and the rain climatic zone.

ADD 3.11.4.2 The IFRB shall calculate the permissible increase in power using the method described in Section 3.11.1.

ADD 3.11.4.3 The IFRB shall communicate the results of the calculations to the requesting administrations as well as to those administrations whose feeder-link equivalent protection margin is reduced.

In any case, the permitted increase in e.i.r.p. above that shown in Column 8 of the Plan shall not exceed 10 dB.

ADD 3.11.4.4 In the event of modifications to the Plan, the IFRB shall recalculate the value of power control for the assignment subject to the modification and insert the appropriate value for that assignment in Column 9 of the Plan. A modification to the Plan shall not require the adjustment of the values of permissible power increase of other assignments in the Plan.

(MOD) 3.12 *Site diversity*

(MOD) 3.13 *Depolarization compensation*

MOD The Plan is developed without the use of depolarization compensation. Depolarization compensation is permitted only to the extent that interference to other satellites does not increase by more than 0.5 dB[1] relative to that calculated in the feeder-link Plan.

ADD [1] This margin has to be shared between power control effects and depolarization compensation effects when both are involved (see Section 3.11).

ADD 3.14 *Amplitude-modulation to phase-modulation conversion*

The degradation caused by AM to PM conversion was taken into account when calculating the carrier-to-noise ratio of the feeder link. A value of 2.0 dB was allowed.

MOD 3.15 *Orbit positions*

The Plan is generally based on the use of regular arrangements of 6° from 37° W to 29° E and from 38° E to 160° W. The orbital positions are those given in the Plan plus the 116° E, 164° E, 176° E, 178° W, 172° W, 166° W positions.

The Regions 1 and 3 Plan is also based on the grouping of space stations in nominal orbital positions of ± 0.2° from the centre of the cluster.

Generally, the space stations are shown in the Plan in the centre of the cluster. However, in some cases, the space stations are shown at the edge of the cluster. Administrations may locate satellites within a cluster at any orbital position within that cluster, provided they obtain the agreement of other administrations having assignments to space stations in the same cluster.

ADD 4. BASIC TECHNICAL CHARACTERISTICS FOR REGION 2

(MOD) Text of Section 3 of Annex 3 to Appendix **30A**, but re-numbered 4.1 – 4.13.2.

ANNEX 4

MOD **Criteria for Sharing Between Services**

MOD 1. *Threshold values for determining when coordination is required between a transmitting space station in the fixed-satellite service and a receiving space station in the feeder-link Plans in the frequency bands 17.7 - 18.1 GHz (Regions 1 and 3) and 17.7 - 17.8 GHz (Region 2)*

With respect to paragraph 7.1, Article 7 of this Appendix, coordination of a transmitting space station in the fixed-satellite service with a broadcasting-satellite feeder link in the Regions 1 and 3 Plan or the

Region 2 Plan is required, for inter-satellite geocentric angular separations of less than 3° or greater than 150°, when the power flux-density arriving at the receiving space station of a broadcasting-satellite feeder-link station of another administration would cause an increase in the noise temperature of the feeder-link space station which exceeds a threshold value of $\Delta T_s/Ts$ corresponding to 4%. $\Delta T_s/Ts$ is calculated in accordance with Case II of the method given in Appendix **29**.

The above provision does not apply when the geocentric angular separation, between a transmitting space station in the fixed-satellite service and a receiving space station in the feeder-link Plan, exceeds 150° of arc and the free-space power flux-density of the transmitting space station in the fixed-satellite service does not exceed a value of -137 dB(W/m^2/MHz) on the Earth's surface at the equatorial Earth limb.

NOC 2. *Not used.*

MOD 3. *Method for the determination of the coordination area around a feeder-link transmitting earth station of the Region 2 and Regions 1 and 3 Plans with respect to receiving earth stations in the fixed-satellite service in the frequency band 17.7 - 18.1 GHz*

NOC 3.1 *Introduction*

MOD In the frequency band 17.7 - 17.8 GHz in Region 2 and 17.7 - 18.1 GHz in Regions 1 and 3, which is allocated to the fixed-satellite service, in both the Earth-to-space direction (for broadcasting-satellite service feeder links only), and the space-to-Earth direction, emissions from transmitting feeder-link earth stations might cause interference at receiving earth stations in the fixed-satellite service.

Electromagnetic coupling of an emission originating at a feeder-link earth station into a receiving earth station might occur through two propagation mechanisms or "modes":

Propagation mode (1): coupling along a great circle tropospheric interference horizon path;

Propagation mode (2): coupling through scatter from hydrometeors.

The determination of whether emissions from a feeder-link earth station might cause unacceptable interference in a receiving earth station is by means of coordination contours drawn around a feeder-link earth station on a map. When a receiving earth station is located within either or both coordination contours, i.e., within the coordination area, there is a possibility of unacceptable interference.

The procedure for the determination of the coordination area for a feeder-link earth station in relation to a receiving earth station in the fixed-satellite service is similar to that described in Appendix **28** but differs from it in the details described below.

NOC 3.2 – 3.7

ADD 3.8 In the case of Regions 1 and 3, the e.i.r.p. to be taken into account is derived by adding the values specified in columns 8 and 9 of the Plan.

PAGE LAISSEE EN BLANC INTENTIONNELLEMENT

PAGE INTENTIONALLY LEFT BLANK

ADD

APPENDIX 30B

Orb-88

Provisions and Associated Plan for the Fixed-Satellite Service in the Frequency Bands 4 500 - 4 800 MHz, 6 725 - 7 025 MHz, 10.70 - 10.95 GHz, 11.20 - 11.45 GHz and 12.75 - 13.25 GHz[1]

TABLE OF CONTENTS

[1] See also Resolution **108 (Orb-88)**.

Page

ARTICLE 1

Objective of the Provisions and Associated Plan

1.1 The objective of the procedures prescribed in this Appendix is to guarantee in practice, for all countries, equitable access to the geostationary-satellite orbit in the frequency bands of the fixed-satellite service covered by this Appendix.

1.2 The procedures prescribed in this Appendix shall in no way prevent the implementation of assignments in conformity with Part A of the Plan.

ARTICLE 2

Definitions

2.1 *Conference:* World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, First Session, Geneva, 1985; Second Session, Geneva, 1988.

2.2 *Plan:* The Plan for the fixed-satellite service in the frequency bands contained in this Appendix, consisting of two parts:

a) Part A, containing the national allotments;

b) Part B, containing the networks of existing systems.

2.3 *Allotment:* For the purpose of this Appendix, an allotment comprises:

- a nominal orbital position;
- a bandwidth of 800 MHz (up-link and down-link) in the frequency bands listed in Article 3 of this Appendix;

- a service area for national coverage;
- generalized parameters as defined in Annex 1 to this Appendix;
- a predetermined arc (PDA).

2.4 *Existing systems:* Those satellite systems, in the frequency bands covered by this Appendix:

a) which are recorded in the Master International Frequency Register; *or*

b) for which the coordination procedure has been initiated; *or*

c) for which the information relating to advance publication was received by the Board before 8 August 1985,

and which in all cases are listed in Part B of the Plan.

2.5 *Subregional systems:* For the purpose of the application of the provisions of this Appendix, a subregional system is a satellite system created by agreement among neighbouring countries Members of the ITU or their authorized telecommunications operating agencies and intended to provide domestic or subregional services within the geographical areas of the countries concerned.

2.6 *Additional use:* For the application of the provisions of this Appendix, additional uses shall be those of an administration:

a) which has a requirement whose characteristics differ from those used in the preparation of Part A of the Plan; any such requirement shall be limited to the national coverage, taking into account technical constraints, of the administration concerned, unless otherwise agreed. Additionally, such requirement can be met only if the allotment of the interested administration, or part of this allotment, has been converted into an assignment, or if the requirement cannot be met by the conversion of the allotment into an assignment.

b) which requires the use of all or part of its national allotment that has been suspended in accordance with paragraph 6.54 of Article 6;

c) which intends to participate in a subregional system using the procedures of Section III of Article 6, instead of using the procedures of Section II thereof.

ARTICLE 3

Frequency Bands

3.1 The provisions of this Appendix shall apply to the fixed-satellite service in the frequency bands between:

- 4 500 and 4 800 MHz (space-to-Earth);
- 6 725 and 7 025 MHz (Earth-to-space);
- 10.70 and 10.95 GHz (space-to-Earth);
- 11.20 and 11.45 GHz (space-to-Earth);
- 12.75 and 13.25 GHz (Earth-to-space).

ARTICLE 4

Execution of the Provisions and Associated Plan

4.1 The Members of the Union shall adopt, for their fixed-satellite service stations operating in the frequency bands referred to in this Appendix, the characteristics consistent with those specified in the Plan and its associated provisions.

4.2 The Members of the Union shall not change the characteristics, or bring into use assignments to fixed-satellite service stations, or stations in the other services to which these frequency bands are allocated, except as provided for in the Radio Regulations and the appropriate Articles and Annexes of this Appendix.

ARTICLE 5

The Plan and the Associated List of Assignments

5.1 The Plan consists of:

a) Part A containing the allotments;

b) Part B containing the networks of existing systems.

5.2 A List of Assignments as described in paragraph 5.5 will be associated with the Plan.

5.3 The predetermined arc (PDA) is a segment of the geostationary-satellite orbit (GSO) about a nominal orbital position intended to provide flexibility in the Plan.

a) The size of the PDA depends on the stage of development of the satellite system:

- for a system in the *pre-design stage*, the PDA is the fixed portion of the GSO defined by the intersection between a segment of ± 10° about the nominal orbital position established at the Conference and the corresponding service arc. After twenty years from the date of entry into force of this Appendix, the PDA for a system in the pre-design stage is the fixed portion of the GSO defined by the intersection between a segment of ± 20° about the nominal orbital position established at the Conference and the corresponding service arc, provided that the minimum elevation angle after the application of this procedure will not be less than the value indicated for each climatic zone in Annex 1 to this Appendix for all allotments affected;

- for a system in the *design stage*, the PDA is the fixed portion of the GSO defined by the intersection between a segment of ± 5° about the nominal orbital position as may be modified by the application of this Appendix and the PDA defined for the pre-design stage;

- for a system in the *operational stage*, the PDA will be considered as being zero.

b) The stage of development to be associated with allotments in Part A and assignments in the List derived from allotments in Part A, with existing systems in Part B, with subregional systems or additional uses, is given in Table 1.

TABLE 1

Stage of development	Part A allotments, subregional systems or additional uses	Part B
Pre-design	Part A allotments	–
Design	Assignments for which the IFRB has received complete information under paragraph 6.2 of Section I or paragraph 6.43 of Section II of Article 6	Networks for which the IFRB has received complete information to start the application of Section I of Article **11** of the Radio Regulations
Operational	Assignments for which the IFRB has received complete information under paragraph 6.58 of Section III of Article 6 or for notification under Article 8	Networks for which the IFRB has received complete information, in order to start the application of Section II of Article **11** or for notification under Article **13** of the Radio Regulations

c) An administration will not be considered to be affected if the nominal orbital position associated with its allotment in the Plan or with its assignments in the List is moved within the corresponding PDA while keeping an aggregate $C/I \geqslant 26$ dB.

5.4 The PDA concept may be applied only:

- to provide an allotment to a new Member of the ITU;
- in the process of conversion of an allotment into an assignment;
- to accommodate a subregional system;
- to resolve incompatibilities with existing systems (except for the implementation of additional uses);
- to resolve incompatibilities with the assignments in the List (except for the implementation of additional uses).

5.5 The List of Assignments to be associated with the Plan will contain:

a) assignments derived from allotments in Part A of the Plan;

b) assignments relating to existing systems in Part B of the Plan;

c) assignments resulting from the introduction of subregional systems;

d) assignments relating to additional uses.

5.6 Whenever a new assignment is entered in this List, the Board shall inform administrations in its weekly circular, indicating the characteristics of the assignment concerned.

ARTICLE 6

Procedures for Implementation of the Plan and Regulation of the Fixed-Satellite Service in the Planned Bands

Section I. Procedure for Conversion of an Allotment into an Assignment

6.1 When an administration intends to convert an allotment into an assignment employing all or part of its allotment in Part A of the Plan, it shall, not earlier than five years and not later than one year before the planned date of bringing the network into use, send to the IFRB the information specified in Annex 2.

6.2 Upon receipt of a complete notice of a frequency assignment related to that allotment, the Board shall examine it with respect to its conformity with Part A of the Plan.

6.3 A notice of an assignment is considered to be in conformity with Part A of the Plan if:

a) the service area is not greater than the service area in Part A of the Plan;

b) it meets the criteria of Annex 3A;

c) the orbital position corresponds to the nominal orbital position in the Plan.

6.4 A notice shall be returned to the notifying administration whenever the service area is not within a geographical area for which the notifying administration is responsible.

6.5 When the Board finds that the proposed assignment is in conformity with paragraph 6.3, the Board shall apply the provisions of Annex 3B (Macrosegmentation Concept).

6.6 When Annex 3B has been applied successfully and the Board has found that the proposed assignment is compatible with Part B of the Plan in accordance with Annex 4, the Board shall record the assignment in the List. The administration shall then notify the assignment in accordance with Article 8.

6.7 When the Board finds that the proposed assignment is in conformity with Part A of the Plan after examination using Annexes 3A and 3B but it is incompatible with Part B of the Plan, the provisions of paragraph 6.10 shall apply.

6.8 If a notice is not in conformity with Part A of the Plan, the provisions in Section IA shall apply.

6.9 If under paragraph 6.5 after the application of Annex 3B coordination is required, then the provisions of Section IA beginning at paragraph 6.18 shall apply.

6.10 For the purpose of resolving the incompatibilities mentioned in paragraph 6.7:

a) an administration responsible for an existing system or an additional use shall, depending on the stage of development of its system, take all technically and operationally possible measures to remove incompatibilities at the pre-design, design and operational stages in order to accommodate the requirements of the administration seeking to convert its allotment into an assignment;

b) an administration whose allotment is being converted into an assignment shall assist in the resolution of incompatibilities;

c) both administrations, with the assistance of the Board if requested, shall cooperate in reaching an equitable agreement, taking into account the respective stages of development of their systems and recognizing that a means must be found to convert the allotment into an assignment which is acceptable to both parties.

6.11 After resolution of any incompatibilities through the application of paragraph 6.10, the Board shall record the assignment in the List. The administration shall then notify the assignment in accordance with Article 8.

Section IA. Procedure for Conversion of an Allotment into an Assignment that Is not in Conformity With Part A of the Plan or that Does not Comply with Annex 3B

6.12 The Board shall use this Section to determine if the proposed assignment affects:

a) the allotments in the Plan;

b) the assignments which appear in the List;

c) the assignments with respect to which the Board has previously received information in accordance with this Article.

6.13 If the proposed assignment is not in conformity with Annex 3A, the Board shall return the notice to the notifying administration indicating that it may take the following action:

a) modify the characteristics of its proposed assignment in order to ensure its compatibility; *or*

b) select an alternative orbital position, preferably within its PDA; *or*

c) request the assistance of the Board in either course of action.

6.14 After the notice is returned to the administration following the application of paragraph 6.13, the administration may resubmit the notice and the Board shall apply again the provisions starting at paragraph 6.2, with the exception of paragraph 6.3 *c)* which is not applicable.

6.15 When the Board is requested to assist in the selection of an alternative orbital position for the proposed assignment, it shall endeavour to identify an orbital position which would ensure compatibility with the allotments in the Plan and the assignments in the List and shall communicate the results to the notifying administration.

6.16 If it is not possible to solve the problem mentioned in paragraph 6.13 after having considered the possibility of finding an alternative orbital position, the concept of PDA (Annex 5) shall be used by the notifying administration or by the Board, if its assistance is requested.

6.17 When paragraph 6.16 has been applied successfully, the provisions of paragraph 6.5 of Section I shall be applied.

6.18 If the provisions of Annex 3B are not met, the Board shall then identify affected administrations having assignments in the List by using the criteria of Annex 4.

6.19 If no administrations are affected under paragraph 6.18, the Board shall record the assignment in the List. The administration shall then notify the assignment in accordance with Article 8.

6.20 If administrations are affected under paragraph 6.18, the administration responsible for the proposed assignment shall seek the agreement of the affected administrations using the techniques described in Annex 6.

6.21 When agreement is reached, the administration responsible shall advise the Board which shall modify the orbital position and PDA in the Plan, if necessary, and shall record the assignment in the List with a special symbol. The administration shall then notify the assignment in accordance with Article 8.

6.22 The special symbol referred to in paragraph 6.21 shall represent an undertaking by the administration responsible for the proposed assignment that it will accommodate, if necessary, future conforming assignments made under paragraph 6.6.

6.23 When no agreement is reached under paragraph 6.20, the notice shall be returned.

Section IB. Procedure for Recording in the List of the Existing Systems Contained in Part B of the Plan

6.24 The Board shall use the method of Annex 4 to determine whether the proposed assignment affects:

a) the allotments in Part A;

b) the existing systems in Part B[1];

c) the assignments which appear in the List;

d) the assignments with respect to which the Board has previously received information in accordance with this Article.

6.25 Assignments for networks contained in Part B of the Plan for which notices for recording in the Master Register were received by the Board prior to 29 August 1988 and recorded subsequently in the MIFR will be entered in the List. However, for notices received after 29 August 1988, the assignments will be entered in the List if the notified characteristics are identical to those contained in Part B of the Plan.

6.26 If, under paragraph 6.24, no allotments or assignments are affected, the Board shall publish the results of its calculations in a special section of the weekly circular and shall enter the proposed assignment in the List. The administration shall then notify the assignment in accordance with Article 8.

---

[1] Administrations with networks in Part B shall continue to apply the provisions of Section II of Article 11 with respect to other networks listed in Part B.

6.27 If, under paragraph 6.24, allotments or assignments are affected[1], the Board shall return the notice to the notifying administration indicating that it may take the following action:

a) modify the characteristics of its proposed assignment in order to ensure its compatibility; *or*

b) select an alternative orbital position and proceed in accordance with paragraph 6.24; *or*

c) request the assistance of the Board in either course of action.

6.28 After the notice is returned to the administration following application of paragraph 6.24, the administration may resubmit the notice and the Board shall apply again paragraphs 6.24 to 6.27.

6.29 For existing systems in Part B of the Plan the provisions of No. **1056A** of the Radio Regulations shall be applied.

6.30 When the Board is requested to assist in the selection of an alternative orbital position for the proposed assignment, it shall endeavour to identify an orbital position which would ensure compatibility with the allotments in the Plan and the assignments in the List and shall communicate the results to the notifying administration.

6.31 If it is not possible to solve the problem of incompatibility mentioned in paragraph 6.27 after having considered the possibility of finding an alternative orbital position, the concept of PDA shall be used (see paragraph 5.3 of Article 5) by the notifying administration or by the Board, if its assistance is requested.

6.32 If paragraph 6.31 has been successfully applied, the Board shall use the method of Annex 4 as in paragraph 6.24.

---

[1] Incompatibility between assignments in Part B shall be disregarded whenever an agreement under the provisions of Section II of Article **11** was obtained.

6.33 If paragraphs 6.31 and 6.32 have been successfully applied, the Board shall publish the results of its calculations and the modified orbital positions in a special section of the weekly circular.

6.34 If, within sixty days of the weekly circular mentioned in paragraph 6.33 the Board receives no comments, it shall be deemed that there are no objections to the proposed relocations and the Board shall record the assignment in the List. The administration shall then notify the assignment in accordance with Article 8.

6.35 Comments under paragraph 6.34, if any, shall be limited to the case of an administration believing that the agreed protection criteria have not been met or to the case in which the administration envisages problems in recoordinating any satellite network under consideration. If such comments are received the Board shall initiate the appropriate action to resolve the problem.

6.36 In the event of an unsuccessful application of paragraphs 6.31 and 6.32, the provisions of paragraph 6.37 shall apply (with respect to incompatibilities with allotments and assignments derived from allotments).

6.37 If it is necessary for the purpose of resolving the incompatibilities mentioned in paragraph 6.32:

a) the administration responsible for an existing system shall, depending on the stage of development of its system, take all technically and operationally possible measures to remove incompatibilities;

b) an administration whose allotment or assignment is being affected shall assist in the resolution of incompatibilities;

c) both administrations, with the assistance of the Board if requested, shall cooperate in reaching an equitable agreement, taking into account the respective stages of development of their systems.

Section II. Procedure for the Introduction of a Subregional System

6.38 When a group of administrations intends to bring into use a subregional system it shall select one or more orbital positions for the system, preferably from the national allotments concerned, and send details of the assignment of the proposed network to the Board, not earlier than five years and not later than one year before the planned date of bringing into use. For this purpose, the administrations shall designate one among them to act on their behalf in the application of the provisions of this Appendix. The selected administration shall be known as the notifying administration.

6.39 All or part of the national allotments used by the subregional system shall be suspended for the period of operation of this subregional system unless it can be used in a way that does not affect allotments in the Plan or assignments made in accordance with the procedures associated with the Plan.

6.40 Suspended national allotments (see paragraph 6.39) shall continue to enjoy the same protection as that afforded to other allotments in the Plan which are not suspended, for use in the event of cessation of the subregional system.

6.41 When determining which administrations are affected by subregional systems, the mutual interference between the subregional system and its members' suspended national allotments shall not be taken into account for the period of the life of the subregional system.

6.42 In determining which administrations are affected, the interference caused by either the subregional system or the suspended allotments as specified in paragraph 6.39 shall be taken into account, but not both at the same time in view of their respective implementation schedules.

6.43 Upon receipt of a complete (Annex 2) notice relating to the proposed assignment, the Board shall use the method of Annex 4 to determine whether the proposed assignment affects:

a) the allotments in the Plan;

b) the assignments which appear in the List;

c) the assignments for which the Board has previously received complete information in accordance with this Article.

6.44 In the event of a favourable finding with regard to compatibility, the Board shall enter the proposed assignment in the List. The administration shall then notify the assignment in accordance with Article 8.

6.45 In the event of an unfavourable finding with regard to compatibility, the Board shall return the notice to the notifying administration, indicating that it may take the following action:

a) modify the characteristics of its proposed assignment in order to ensure its compatibility; *or*

b) select an alternative orbital position and proceed in accordance with paragraph 6.38; *or*

c) request the assistance of the Board in either course of action.

6.46 After the notice is returned to the administration following application of paragraph 6.43, the administration may resubmit the notice and the Board shall apply again paragraphs 6.43 to 6.45.

6.47 When the Board is requested to assist in the selection of an alternative orbital position for the proposed assignment, it shall endeavour to identify an orbital position which would ensure compatibility with the allotments in the Plan and the assignments in the List and shall communicate the results to the notifying administration.

6.48 If it is not possible to solve the problem of incompatibility mentioned in paragraph 6.45 after having considered the possibility of finding an alternative orbital position, the concept of PDA shall be used (see paragraph 5.3 of Article 5) by the notifying administration or by the Board, if its assistance is requested.

6.49 In the event of a successful application of paragraph 6.48, the Board shall publish the result of its calculations and the modified orbital locations in a special section of the weekly circular.

6.50 If, within sixty days from the date of the weekly circular mentioned in paragraph 6.49, the Board receives no comments, it shall be deemed that there are no objections to the proposed solution and the proposed assignment shall be recorded in the List. The administration shall then notify the assignment in accordance with Article 8. Comments, if any, shall be limited to the case of an administration believing that the agreed protection criteria have not been met. If it receives such comments, the Board shall initiate the appropriate action to resolve the matter.

6.51 In the event of an unsuccessful application of paragraphs 6.48, 6.49 and 6.50, the Board shall return the notice to the notifying administration.

6.52 If an administration withdraws from a subregional system, it shall inform the IFRB. The Board shall take account of this withdrawal when applying the provisions relating to the compatibility of new assignments.

6.53 If an administration which has withdrawn from a subregional system wishes to implement a national system, and is unable to satisfy the condition of paragraph 6.39 for the use of all or part of its allotment, it may proceed under the provisions of Section III of this Article relating to additional uses for the allotment or part of the allotment, as appropriate.

6.54 When a subregional system is terminated by the participating administrations, the notifying administration shall inform the Board as early as possible and the Board shall:

a) publish this information in a special section of its weekly circular;

b) cancel all frequency assignments in the List relating to that system;

c) modify Part A of the Plan to indicate that the corresponding national allotments are no longer suspended.

Section III. Supplementary Provisions Applicable to Additional Uses in the Planned Bands

6.55 These bands are used for the fixed-satellite service Plan and their use in accordance with this section should be avoided if possible. Administrations are urged to use other available bands.

6.56 An administration, or one acting on behalf of a group of administrations, may apply the procedure of this Section for an additional use as defined in Article 2, provided that the proposed assignments have a maximum period of validity of 15 years and will not, except if agreed to by the administrations affected, require any displacement of the orbital position of an allotment in Part A of the Plan or the orbital position of an assignment in the List, nor be incompatible with:

a) the allotments in the Plan;

b) the assignments in the List;

c) the assignments for which the Board has previously received information in accordance with this Article.

6.57 For this purpose it shall, not earlier than five years and not later than one year before the planned date of bringing the related assignment into use, send the information specified in Annex 2 to the IFRB.

6.58 Upon receipt of a complete notice, the Board shall examine it to ensure its compliance with paragraph 6.56 and in the event of non-compliance the notice shall be returned to the notifying administration.

6.59 If the Board finds that the notice complies with the provisions of paragragh 6.56 it shall enter the assignment in the List. The administration shall then notify the assignment in accordance with Article 8.

6.60 The provisions of this Section shall not be applied before one year from the date of entry into force of this Plan.

ARTICLE 7

Procedure for the Addition of a New Allotment to the Plan for a New Member of the Union

7.1 The administration of a country which has joined the Union as a new Member shall obtain a national allotment in Part A of the Plan by the following procedure.

7.2 The administration shall submit its request for an allotment to the Board, with the following information:

a) the geographical coordinates of not more than 10 test points for determining the minimal ellipse to cover its national territory;

b) the height above sea level of each of its test points and the rain zone or zones;

c) any special requirement, other than a fixed orbital position, which is to be taken into account to the extent practicable.

7.3 Upon receipt of the complete information (mentioned in paragraph 7.2 above), the Board shall find an appropriate orbital position, if necessary using the PDA concept, and shall enter the national allotment of the new Member of the Union in Part A of the Plan.

7.4 For this purpose the Board shall consult, and if necessary seek the agreement of, any administrations that may be affected.

ARTICLE 8

Procedure for Notification and Recording in the Master Register of Assignments in the Planned Bands for the Fixed-Satellite Service

8.1 Any assignment for which the relevant procedure of Article 6 has been successfully applied shall be notified to the Board in accordance with Article **13** of the Radio Regulations.

8.2 Upon reception by the Board of a complete notice under Article **13**, a PDA of zero degrees (operational stage) shall be associated with this assignment.

8.3 Such an assignment shall not be subject to the procedures for advance publication and coordination contained in Sections I and II of Article **11** of the Radio Regulations[1]. Consequently, the provisions of Article **13** of the Radio Regulations shall continue to be applicable except with regard to No. **1504** and related provisions (see Resolution **107**).

8.4 No provision of this Appendix shall be considered as modifying the requirements under Sections III and IV of Article **11** of the Radio Regulations relating to coordination between the fixed-satellite service and stations of terrestrial services sharing the planned bands on an equal primary basis.

---

[1] For existing systems in Part B of the Plan, see Section IB of Article 6.

ARTICLE 9

General Provisions

9.1 Part A of the Plan is limited to national systems providing a domestic service. Administrations may, however, in accordance with the provisions of Section II of Article 6, use all or part of their allotments to form a subregional system.

9.2 The existing systems listed in Part B of the Plan may continue in operation for a maximum period of 20 years from the date of entry into force of this Appendix.

ARTICLE 10

Plan for the Fixed-Satellite Service in the Frequency Bands 4 500 - 4 800 MHz, 6 725 - 7 025 MHz, 10.70 - 10.95 GHz, 11.20 - 11.45 GHz and 12.75 - 13.25 GHz[1]

A.1 COLUMN HEADINGS OF PART A OF THE PLAN

Col. 1 *Beam identification* (Column 1 contains the symbol designating the country or the geographical area taken from Table B1 of the Preface to the International Frequency List)

Col. 2 *Nominal orbital position*, in degrees and tenths of a degree

Col. 3 *Service arc* (western and eastern limits in degrees and tenths of a degree)[2]

---

[1] The Plan has been prepared with a view to assuring for each allotment an aggregate C/I ratio of at least 26 dB.

[2] The service arc indicated in column 3 of Part A of the Plan represents that segment of the geostationary-satellite orbit which is common to all individual service arcs of each test point for its minimum elevation angle as given in Annex 1, Section 1.3 of this Appendix.

Col. 4 *Predetermined arc* (western and eastern limits in degrees and tenths of a degree)

Col. 5 *Longitude of the boresight*, in degrees and tenths of a degree

Col. 6 *Latitude of the boresight*, in degrees and tenths of a degree

Col. 7 *Major axis of the elliptical cross-section half-power beam*, in degrees and tenths of a degree

Col. 8 *Minor axis of the elliptical cross-section half-power beam*, in degrees and tenths of a degree

Col. 9 *Orientation of the ellipse* determined as follows: in a plane normal to the beam axis, the direction of the major axis of the ellipse is defined by the angle measured anticlockwise from a line parallel to the equatorial plane to the major axis of the ellipse, to the nearest degree

Col. 10 Earth station *e.i.r.p.* density (dB(W/Hz))[1]

Col. 11 Satellite *e.i.r.p.* density (dB(W/Hz))[1]

Col. 12 *Remarks*

A.2 TEXT FOR SYMBOLS IN REMARKS COLUMN OF THE PLAN

1. Fast roll-off space station transmitting and receiving antenna.

2. This allotment will use an earth station receiving and transmitting antenna side-lobe pattern that will conform to $29 - 25 \log \theta$.

---

[1] The A, B, C, D parameters associated with these columns will be published in IFRB circular-letters.

3. This allotment will use an earth station receiving antenna side-lobe pattern that will conform to 29 - 25 log θ.

4. The Administration of Luxembourg (LUX) agreed to protect the national allotment SYR0000 (SYR) to a single entry (C/I) ratio of 30 dB against the interference from the beam LUXGDL62.

5. Owing to the mountainous areas within the country, the minimum elevation angle shall not be reduced below 20° when applying the predetermined arc concept.

Note by the General Secretariat (applicable when an asterisk (*) appears in column 12): It is to be noted that this beam is intended to be implemented as part of a multi-beam network, operating from a single orbital location. Within any multi-beam network, the beams are the responsibility of a single administration, hence interference between them has not been taken into account during the Conference. The number which appears in the alphanumeric code that follows the asterisk serves to identify the multi-beam network concerned.

1	2	3		4		5	6	7	8	9	10	11	12
ABW00000	−98.2	−119.4	−18.9	−108.2	−88.2	−69.1	12.4	1.6	1.6	90.0	−7.5	−41.4	
ADL00000	113.0	113.0	114.3	113.0	114.3	140.0	−66.7	1.6	1.6	90.0	−7.5	−41.3	*/MB1
AFG00000	48.0	42.3	95.8	42.3	58.0	66.4	33.9	2.2	1.6	15.0	−7.5	−39.4	
AFS00000	71.0	−25.8	84.2	61.0	81.0	27.2	−30.1	5.3	1.6	128.0	−5.7	−38.6	
AGL00000	−36.1	−37.2	74.1	−37.2	−26.1	15.9	−12.4	2.4	1.6	78.0	−7.5	−39.1	
ALB00000	2.6	−29.9	69.8	−7.4	12.6	20.0	41.1	1.6	1.6	90.0	−7.5	−41.4	
ALG00000	−33.5	−33.5	38.4	−33.5	−23.5	1.6	27.8	3.3	2.2	133.0	−6.5	−38.9	
ALS00000	−159.0	−169.8	−158.2	−169.0	−158.2	−158.6	57.5	6.3	1.6	1.0	−5.8	−38.8	*/MB2
AND00000	−41.0	−48.6	51.7	−48.6	−31.0	1.5	42.5	1.6	1.6	90.0	−7.5	−41.4	
ARG00000	−51.0	−58.4	−51.0	−58.4	−51.0	−62.0	−33.6	4.8	2.9	93.0	−0.4	−38.1	*/MB3
ARGINSUL	−51.0	−58.4	−51.0	−58.4	−51.0	−60.0	−57.5	3.6	1.6	154.0	−7.5	−38.5	*/MB3
ARS00000	52.0	20.1	60.0	42.0	60.0	45.7	23.1	3.7	2.6	153.0	−6.6	−39.3	
ASCSTHTC	−37.1	−38.5	−27.1	−38.5	−27.1	−11.8	−19.6	5.6	1.8	77.0	−5.9	−39.0	*/MB4
ATG00000	−77.7	−112.2	−11.4	−87.7	−67.7	−61.8	17.0	1.6	1.6	90.0	−7.5	−41.8	
ATN00000	−5.2	−50.1	1.9	−15.2	1.9	−65.6	15.1	1.6	1.6	90.0	−7.5	−38.9	*/MB5
AUS00001	144.1	122.4	148.1	134.1	148.1	134.3	−24.5	6.6	5.3	146.0	4.0	−38.2	*/MB6
AUS00002	144.1	122.4	148.1	134.1	148.1	163.6	−30.5	1.6	1.6	90.0	−7.5	−39.5	*/MB6
AUS00003	144.1	122.4	148.1	134.1	148.1	101.5	−11.1	1.6	1.6	90.0	−7.5	−40.5	*/MB6
AUS00004	144.1	122.4	148.1	134.1	148.1	159.0	−54.5	1.6	1.6	90.0	−7.5	−41.6	*/MB6
AUS00005	144.1	122.4	148.1	134.1	148.1	110.4	−66.3	1.6	1.6	90.0	−7.5	−41.3	*/MB6
AUT00000	−2.6	−18.6	46.4	−12.6	7.4	13.2	47.5	1.6	1.6	90.0	−7.5	−40.8	2
AZR00000	−7.9	−41.9	6.7	−17.9	2.1	−28.0	38.7	1.6	1.6	90.0	−7.5	−41.1	*/MB7
B 00001	−65.0	−70.0	−60.1	−70.0	−60.1	−62.6	−6.0	4.1	4.0	43.0	−0.4	−38.7	
B 00002	−61.1	−70.0	−60.1	−70.0	−60.1	−45.4	−6.3	4.6	4.1	152.0	0.2	−38.6	
B 00003	−68.7	−70.0	−60.1	−70.0	−60.1	−50.0	−20.9	4.3	3.0	60.0	−1.3	−38.5	

1	2	3		4		5	6	7	8	9	10	11	12
BAH00000	−74.3	−121.1	−32.2	−84.3	−64.3	−75.8	24.0	1.6	1.6	133.0	−7.5	−39.4	
BDI00000	−2.2	−30.5	90.4	−12.2	7.8	29.9	−3.4	1.6	1.6	90.0	−7.5	−41.6	
BEL00000	52.7	−53.6	62.0	42.7	62.0	5.2	50.6	1.6	1.6	90.0	−7.5	−41.2	
BEN00000	−30.6	−40.2	44.7	−40.2	−20.6	2.3	9.3	1.6	1.6	90.0	−7.5	−39.9	
BERCAYMS	−37.1	−38.5	−27.1	−38.5	−27.1	−68.6	22.5	3.7	2.3	41.0	−3.5	−38.2	*/MB4
BFA00000	10.2	−54.6	46.2	0.2	20.2	−1.4	12.2	1.7	1.6	24.0	−7.5	−39.5	
BGD00000	133.0	44.6	135.5	123.0	135.5	90.2	24.0	1.6	1.6	90.0	−7.5	−40.3	
BHR00000	20.4	−18.6	119.8	10.4	30.4	50.6	26.1	1.6	1.6	90.0	−7.5	−41.9	
BLZ00000	−90.8	−138.4	−38.7	−100.8	−80.8	−88.6	17.2	1.6	1.6	90.0	−7.5	−41.6	
BOL00000	−35.0	−97.3	−23.2	−45.0	−25.0	−64.4	−17.1	2.7	1.7	129.0	−5.4	−38.6	
BOT00000	19.9	−41.7	89.9	9.9	29.9	24.0	−21.8	1.6	1.6	90.0	−7.5	−40.0	
BRB00000	−29.8	−110.8	−8.4	−39.8	−19.8	−59.6	13.2	1.6	1.6	90.0	−7.5	−41.6	
BRM00000	110.8	57.6	131.0	100.8	120.8	97.0	18.9	3.2	1.6	88.0	−5.1	−38.7	
BRU00000	157.3	71.5	157.7	147.3	157.7	114.6	4.5	1.6	1.6	90.0	−7.5	−40.9	
BTN00000	63.0	34.3	146.6	53.0	73.0	90.4	27.0	1.6	1.6	90.0	−7.5	−41.5	
BUL00000	50.4	−20.6	71.5	40.4	60.4	25.6	42.8	1.6	1.6	90.0	−7.5	−40.8	
CAF00000	14.8	−24.8	57.6	4.8	24.8	21.5	6.5	2.7	1.7	14.0	−6.3	−39.1	
CAN0EAST	−107.3	−108.0	−90.1	−108.0	−97.3	−76.6	50.1	5.0	1.7	154.0	−4.9	−38.3	
CAN0CENT	−111.1	−115.1	−101.0	−115.1	−101.1	−96.1	51.4	4.3	2.0	155.0	−5.5	−38.4	
CAN0WEST	−114.9	−119.0	−113.7	−119.0	−113.7	−120.1	57.4	3.1	1.9	173.0	−7.5	−38.7	
CAR00000	−159.0	−169.8	−158.2	−169.0	−158.2	173.4	4.6	10.2	2.4	175.0	6.6	−35.6	*/MB2
CBG00000	96.1	61.2	144.2	86.1	106.1	105.1	12.9	1.6	1.6	90.0	−7.5	−40.4	
CHL00000	−74.9	−96.4	−53.6	−84.9	−64.9	−82.6	−32.8	8.1	6.1	155.0	1.4	−38.4	
CHN00001	101.4	90.4	139.4	91.4	111.4	103.7	35.0	8.1	4.3	2.0	2.0	−38.3	
CHN00002	135.5	75.0	151.3	125.5	145.5	114.8	16.4	4.9	2.4	65.0	−1.5	−38.7	

CLM00000	−70.9	−110.1	−39.9	−80.9	−60.9	−74.0	5.7	4.0	2.3	121.0	−3.0	−38.9	
CLN00000	121.5	28.1	131.9	111.5	131.5	80.1	7.7	1.6	1.6	90.0	−7.5	−41.2	
CME00000	21.4	−27.3	51.2	11.4	31.4	12.9	6.3	2.5	1.9	84.0	−6.2	−39.0	
CNR00000	12.2	−31.1	24.2	2.2	22.2	−15.9	28.5	1.6	1.6	90.0	−7.5	−41.3	*/MB8
COG00000	−16.0	−24.7	56.5	−24.7	−6.0	14.8	−0.6	2.0	1.6	63.0	−7.0	−38.8	
COM00000	94.5	−7.3	95.5	84.5	95.5	44.1	−12.2	1.6	1.6	90.0	−7.5	−41.0	
CPV00000	−85.7	−94.7	46.5	−94.7	−75.7	−24.1	16.0	1.6	1.6	90.0	−7.5	−41.3	
CTI00000	4.6	−15.0	27.1	−5.4	14.6	−5.9	7.8	1.6	1.6	90.0	−7.5	−40.0	
CTR00000	−96.0	−125.4	−44.0	−106.0	−86.0	−85.3	8.2	1.6	1.6	90.0	−7.5	−40.2	
CUB00000	−80.6	−123.5	−36.1	−90.6	−70.6	−79.5	21.0	2.0	1.6	172.0	−7.5	−39.3	
CVA00000	58.1	−38.1	63.1	48.1	63.1	12.5	41.9	1.6	1.6	90.0	−7.5	−41.3	
CYP00000	−1.8	−21.5	87.9	−11.8	8.2	33.2	35.1	1.6	1.6	90.0	−7.5	−41.6	
CYPSBA00	56.6	44.7	59.2	46.6	59.2	32.9	34.6	1.6	1.6	90.0	−7.5	−41.7	*/MB9
D 00000	26.4	−30.4	53.1	16.4	36.4	9.7	50.7	1.6	1.6	90.0	−7.5	−40.5	
DDR00000	37.0	−26.8	51.7	27.0	47.0	12.6	51.4	1.6	1.6	90.0	−7.5	−40.8	3
DJI00000	−18.3	−28.4	113.6	−28.3	−8.3	42.6	11.7	1.6	1.6	90.0	−7.5	−41.3	
DMA00000	−69.6	−112.1	−10.5	−79.6	−59.6	−61.3	15.3	1.6	1.6	90.0	−7.5	−41.8	
DNK00001	32.2	−40.8	62.2	22.2	42.2	11.6	56.0	1.6	1.6	90.0	−7.5	−40.9	
DNK00002	−49.0	−50.0	−43.1	−50.0	−43.1	12.5	56.3	1.6	1.6	90.0	−7.5	−40.6	*/MB10
DNK00FAR	−49.0	−50.0	−43.1	−50.0	−43.1	−7.2	61.7	1.6	1.6	90.0	−7.5	−41.1	*/MB10
DOM00000	−85.4	−120.3	−20.5	−95.4	−75.4	−70.4	18.7	1.6	1.6	90.0	−7.5	−41.7	
E 00002	12.2	−31.1	24.2	2.2	22.2	−3.0	39.9	2.1	1.6	8.0	−7.5	−39.3	*/MB8
EGY00000	68.5	−10.3	69.5	58.5	69.5	30.3	26.2	2.3	1.6	54.0	−7.5	−39.2	
EQA00000	−104.0	−104.0	−94.1	−104.0	−94.1	−83.1	−1.4	3.1	1.6	174.0	−5.7	−38.9	
ETH00000	57.5	−4.0	85.0	47.5	67.5	40.6	10.3	2.8	2.8	64.0	−7.3	−39.4	

4 500 – 4 800 MHz, 6 725 – 7 025 MHz

1	2	3		4		5	6	7	8	9	10	11	12
F 00000	0.9	−13.9	5.7	−9.1	5.7	3.1	45.9	2.1	1.6	168.0	−7.5	−39.0	*/MB11
FJI00000	148.8	128.2	−131.1	138.8	158.8	178.5	−17.2	1.6	1.6	90.0	−7.5	−41.5	
FLKSTGGL	−37.1	−38.5	−27.1	−38.5	−27.1	−46.8	−59.6	3.7	1.6	170.0	−7.5	−38.8	*/MB4
FNL00000	46.8	7.1	46.8	36.8	46.8	23.8	64.3	1.6	1.6	90.0	−7.5	−39.3	
G 00000	−37.1	−38.5	−27.1	−38.5	−27.1	−4.1	53.9	1.6	1.6	151.0	−7.5	−39.0	*/MB4
GAB00000	38.8	−29.2	52.0	28.8	48.8	11.7	−0.7	1.6	1.6	90.0	−7.5	−39.8	
GDL00000	0.9	−13.9	5.7	−9.1	5.7	−61.9	16.3	1.6	1.6	90.0	−7.5	−40.0	*/MB11
GDL00002	−115.9	−123.2	−81.2	−123.2	−105.9	−61.8	16.4	1.6	1.6	90.0	−7.5	−40.3	*/MB13
GHA00000	16.0	−41.7	39.3	6.0	26.0	−1.3	7.7	1.6	1.6	90.0	−7.5	−39.7	
GIB00000	56.6	44.7	59.2	46.6	59.2	−5.4	36.1	1.6	1.6	90.0	−7.5	−40.9	*/MB9
GMB00000	−34.0	−77.3	44.5	−44.0	−24.0	−16.4	13.4	1.6	1.6	90.0	−7.5	−42.1	
GNB00000	40.0	−76.5	45.7	30.0	45.7	−15.4	12.0	1.6	1.6	90.0	−7.5	−41.3	
GNE00000	−32.3	−32.8	53.8	−32.8	−22.3	10.5	1.7	1.6	1.6	90.0	−7.5	−40.9	
GRC00000	16.6	−8.9	56.8	6.6	26.6	24.7	38.3	1.7	1.6	160.0	−7.5	−39.3	
GRD00000	−32.8	−113.0	−10.2	−42.8	−22.8	−61.6	12.0	1.6	1.6	90.0	−7.5	−41.6	
GRL00000	−49.0	−50.0	−43.1	−50.0	−43.1	−42.9	68.6	2.3	1.6	174.0	−7.5	−38.6	*/MB10
GTM00000	−135.7	−139.3	−41.4	−139.3	−125.7	−90.5	15.5	1.6	1.6	90.0	−7.5	−40.5	
GUF00000	0.9	−13.9	5.7	−9.1	5.7	−53.2	4.3	1.6	1.6	90.0	−7.2	−40.0	*/MB11
GUF00002	−115.9	−123.2	−81.2	−123.2	−105.9	−53.3	4.3	1.6	1.6	90.0	−6.5	−39.4	*/MB13
GUI00000	27.5	−51.8	33.8	17.5	33.8	−10.9	10.2	1.6	1.6	90.0	−7.5	−39.8	
GUMMRA00	−159.0	−169.8	−158.2	−169.0	−158.2	145.4	16.7	1.7	1.6	79.0	−7.3	−38.3	*/MB2
GUY00000	−24.1	−100.1	−18.3	−34.1	−18.3	−59.2	4.7	1.6	1.6	90.0	−7.5	−39.4	
HKG00000	56.6	44.7	59.2	46.6	59.2	114.5	22.4	1.6	1.6	90.0	−7.5	−40.6	*/MB9
HND00000	−76.2	−123.8	−48.1	−86.2	−66.2	−86.1	15.4	1.6	1.6	90.0	−7.5	−40.0	
HNG00000	−6.6	−22.2	62.4	−16.6	3.4	19.4	47.4	1.6	1.6	90.0	−7.5	−41.0	2

HOL00000	–5.2	–50.1	1.9	–15.2	1.9	5.4	52.4	1.6	1.6	90.0	–7.5	–41.4	*/MB5
HTI00000	–92.0	–122.9	–23.1	–102.0	–82.0	–73.0	18.8	1.6	1.6	90.0	–7.5	–41.7	
HWA00000	–159.0	–169.8	–158.2	–169.0	–158.2	–157.6	20.7	1.6	1.6	90.0	–7.5	–40.2	*/MB2
HWL00000	–159.0	–169.8	–158.2	–169.0	–158.2	–176.6	0.1	1.6	1.6	90.0	–7.5	–41.8	*/MB2
I 00000	–28.1	–32.9	54.1	–32.9	–18.1	11.3	40.9	2.1	1.6	141.0	–7.5	–38.9	
IND00000	74.0	51.3	116.4	64.0	84.0	82.7	18.9	6.2	4.9	120.0	2.4	–38.5	
INS00000	115.4	101.1	135.0	105.4	125.4	117.6	–1.8	9.4	4.3	170.0	3.9	–38.6	
IRL00000	–31.0	–41.0	25.7	–41.0	–21.0	–8.2	53.2	1.6	1.6	90.0	–7.5	–41.1	
IRN00000	25.0	20.1	50.0	20.1	35.0	54.3	33.0	3.7	1.6	143.0	–7.5	–39.0	
IRQ00000	66.4	5.1	82.5	56.4	76.4	44.3	33.1	1.6	1.6	90.0	–7.5	–39.4	
ISL00000	–35.4	–53.0	14.8	–45.4	–25.4	–18.2	64.9	1.6	1.6	90.0	–7.5	–40.5	
ISR00000	73.0	–8.0	78.4	63.0	78.4	35.0	31.3	1.6	1.6	90.0	–7.5	–41.0	
J 00000	152.5	94.4	170.9	142.5	162.5	140.4	30.4	5.7	3.7	15.0	–0.2	–38.5	
JAR00000	–159.0	–169.8	–158.2	–169.0	–158.2	–160.0	–0.4	1.6	1.6	90.0	–7.5	–41.9	*/MB2
JMC00000	–108.6	–127.5	–27.8	–118.6	–98.6	–77.6	18.2	1.6	1.6	90.0	–7.5	–41.5	
JON00000	–159.0	–169.8	–158.2	–169.0	–158.2	–168.5	17.0	1.6	1.6	90.0	–7.5	–42.2	*/MB2
JOR00000	81.8	–28.8	102.9	71.8	91.8	36.7	31.3	1.6	1.6	90.0	–7.5	–40.9	
KEN00000	78.2	–10.4	86.3	68.2	86.3	38.4	0.8	2.1	1.6	95.0	–7.5	–39.3	
KER00000	113.0	113.0	114.3	113.0	114.3	69.3	–43.9	1.9	1.6	169.0	–7.5	–38.7	*/MB1
KIR00000	150.0	120.6	–134.6	140.0	160.0	173.0	1.0	1.6	1.6	90.0	–7.5	–41.8	
KOR00000	116.2	83.0	169.6	106.2	126.2	127.7	36.2	1.6	1.6	90.0	–7.5	–40.5	
KRE00000	145.0	110.1	150.0	135.0	150.0	127.8	39.8	1.6	1.6	90.0	–7.5	–39.6	
KWT00000	30.8	–20.2	115.3	20.8	40.8	47.7	29.1	1.6	1.6	90.0	–7.5	–41.9	1,2
LAO00000	142.0	56.6	149.9	132.0	149.9	104.1	18.1	1.6	1.6	90.0	–7.5	–39.1	
LBN00000	91.0	–31.6	103.2	81.0	101.0	35.8	33.8	1.6	1.6	90.0	–7.5	–41.3	

1	2	3		4		5	6	7	8	9	10	11	12
LBR00000	−41.8	−50.4	35.5	−50.4	−31.8	−8.9	6.5	1.6	1.6	90.0	−7.5	−40.4	
LBY00000	28.5	−19.2	54.9	18.5	38.5	19.0	25.9	3.0	2.7	165.0	−6.8	−39.2	
LIE00000	7.9	−30.0	15.0	−2.1	15.0	9.5	47.2	1.6	1.6	90.0	−7.5	−41.7	
LSO00000	−18.7	−40.1	96.9	−28.7	−8.7	28.4	−29.5	1.6	1.6	90.0	−7.5	−41.5	
LUX00000	19.2	−53.9	66.1	9.2	29.2	6.2	49.7	1.6	1.6	90.0	−7.5	−41.6	
MAC00000	117.0	64.7	162.4	107.0	127.0	113.6	22.2	1.6	1.6	90.0	−7.5	−41.8	
MAU00000	92.2	8.0	107.0	82.2	102.2	57.5	−20.2	1.6	1.6	90.0	−7.5	−41.4	
MCO00000	40.5	−41.8	56.6	30.5	50.5	7.4	43.7	1.6	1.6	90.0	−7.5	−41.3	
MDG00000	16.9	10.4	81.1	10.4	26.9	46.6	−18.7	2.6	1.6	66.0	−5.4	−38.6	
MDR00000	−7.9	−41.9	6.7	−17.9	2.1	−16.2	31.6	1.6	1.6	90.0	−7.5	−41.7	*/MB7
MDW00000	−159.0	−169.8	−158.2	−169.0	−158.2	−177.4	28.2	1.6	1.6	90.0	−7.5	−42.0	*/MB2
MEX00000	−113.0	−136.1	−61.0	−123.0	−103.0	−103.6	23.3	5.8	2.4	161.0	−2.6	−38.8	
MLA00000	78.5	76.4	143.2	76.4	88.5	108.2	4.7	3.2	1.6	0.0	−4.2	−38.4	
MLD00000	117.6	21.1	124.9	107.6	124.9	73.4	2.5	2.2	1.6	88.0	−7.5	−38.7	
MLI00000	−1.3	−59.9	43.3	−11.3	8.7	−3.9	17.6	3.3	2.5	21.0	−5.5	−39.2	
MLT00000	5.6	−39.8	68.5	−4.4	15.6	14.4	35.9	1.6	1.6	90.0	−7.5	−41.8	
MNG00000	113.6	60.4	148.9	103.6	123.6	103.8	46.8	3.6	1.6	3.0	−7.5	−38.9	
MOZ00000	88.6	−10.6	90.6	78.6	90.6	35.6	−17.2	3.1	1.6	98.0	−5.6	−38.3	
MRC00000	33.0	−50.5	37.5	23.0	37.5	−8.9	27.9	3.4	1.6	45.0	−7.5	−38.8	
MRL00000	−159.0	−169.8	−158.2	−169.0	−158.2	175.3	8.7	2.3	1.6	94.0	−6.5	−38.8	*/MB2
MTN00000	−22.8	−72.8	44.2	−32.8	−12.8	−10.3	19.8	2.5	2.4	76.0	−7.5	−39.4	
MWI00000	30.3	−25.0	93.7	20.3	40.3	34.1	−13.3	1.6	1.6	90.0	−7.5	−40.0	
MYT00000	0.9	−13.9	5.7	−9.1	5.7	45.2	−12.8	1.6	1.6	90.0	−7.5	−41.2	*/MB11
NCG00000	−84.4	−124.4	−45.9	−94.4	−74.4	−84.9	12.9	1.6	1.6	90.0	−7.5	−40.6	

NCL00000	113.0	113.0	114.3	113.0	114.3	165.8	−21.4	1.6	1.6	90.0	−7.5	−40.6	*/MB1
NGR00000	−38.5	−54.5	64.6	−48.5	−28.5	7.5	17.2	2.1	1.7	100.0	−7.5	−38.9	
NIG00000	42.5	−29.6	49.6	32.5	49.6	8.0	9.9	2.5	1.6	47.0	−5.6	−38.5	
NMB00000	13.4	−45.4	82.5	3.4	23.4	18.5	−21.0	2.7	2.6	155.0	−7.5	−39.5	
NOR00000	3.9	2.9	29.1	2.9	13.9	11.7	64.6	2.0	1.6	17.0	−7.5	−38.7	
NPL00000	123.3	30.3	137.6	113.3	133.3	84.4	28.0	1.6	1.6	90.0	−7.5	−40.8	
NRU00000	146.0	114.5	−140.7	136.0	156.0	166.9	−0.5	1.6	1.6	90.0	−7.5	−41.8	
NZL00001	152.0	150.9	175.0	150.9	162.0	170.9	−44.8	5.4	1.6	49.0	−5.3	−38.1	*/MB14
NZL00002	152.0	150.9	175.0	150.9	162.0	−165.4	−13.2	2.7	2.0	82.0	−5.2	−38.3	*/MB14
OCE00000	−115.9	−123.2	−81.2	−123.2	−105.9	−141.9	−16.1	3.5	2.4	139.0	−5.0	−38.9	*/MB13
OMA00000	104.0	−9.8	122.2	94.0	114.0	55.1	21.6	1.9	1.6	61.0	−7.5	−39.2	5
PAK00000	56.0	34.1	62.0	46.0	62.0	69.9	29.8	3.0	2.0	22.0	−7.2	−39.0	
PHL00000	89.6	83.0	159.8	83.0	99.6	121.3	11.4	3.3	1.6	101.0	−4.2	−38.4	
PLM00000	−159.0	−169.8	−158.2	−169.0	−158.2	−161.4	7.0	1.6	1.6	90.0	−7.5	−41.9	*/MB2
PNG00000	154.1	114.2	−176.5	144.1	164.1	148.4	−6.6	3.3	2.3	167.0	−4.1	−39.0	
PNR00000	−79.2	−120.0	−40.4	−89.2	−69.2	−80.2	8.5	1.6	1.6	90.0	−7.5	−40.4	
POL00000	14.2	−14.8	56.4	4.2	24.2	19.3	52.0	1.6	1.6	90.0	−7.5	−40.2	
POR00000	−7.9	−41.9	6.7	−17.9	2.1	−8.0	39.7	1.6	1.6	90.0	−7.5	−41.2	*/MB7
PRG00000	−81.5	−90.4	−23.2	−90.4	−71.5	−58.7	−23.1	1.6	1.6	90.0	−7.5	−39.1	
PRU00000	−89.9	−120.4	−38.2	−99.9	−79.9	−74.2	−8.4	3.6	2.4	111.0	−3.3	−38.7	
PTC00000	−62.0	−62.6	−58.5	−62.6	−58.5	−130.1	−25.1	1.6	1.6	90.0	−7.5	−41.2	
QAT00000	8.3	−16.9	120.0	−1.7	18.3	51.6	25.4	1.6	1.6	90.0	−7.5	−41.6	
REU00000	0.9	−13.9	5.7	−9.1	5.7	55.6	−21.1	1.6	1.6	90.0	−7.5	−40.7	*/MB11
REU00002	113.0	113.0	114.3	113.0	114.3	55.6	−21.1	1.6	1.6	90.0	−7.5	−40.6	*/MB1
ROU00000	31.0	−1.0	51.0	21.0	41.0	25.0	46.3	1.6	1.6	90.0	−7.5	−39.6	
RRW00000	6.8	−30.9	90.8	−3.2	16.8	29.7	−1.9	1.6	1.6	90.0	−7.5	−41.9	

1	2	3		4		5	6	7	8	9	10	11	12
S 00000	11.2	−7.0	47.1	1.2	21.2	16.7	60.9	1.6	1.6	90.0	−7.5	−40.2	
SCN00000	−88.8	−113.2	−12.6	−98.8	−78.8	−62.9	17.3	1.6	1.6	90.0	−7.5	−41.6	
SDN00001	1.4	−7.0	15.0	−7.0	11.4	29.3	10.3	3.0	1.9	131.0	−7.2	−39.0	*/MB15
SDN00002	1.4	−7.0	15.0	−7.0	11.4	29.4	16.7	2.6	2.4	171.0	−7.5	−39.3	*/MB15
SEN00000	−48.4	−64.4	34.3	−58.4	−38.4	−14.0	14.1	1.6	1.6	90.0	−7.5	−40.3	
SEY00000	96.5	3.1	107.7	86.5	106.5	55.4	−4.5	1.6	1.6	90.0	−7.5	−41.3	
SLM00000	147.5	120.4	−161.7	137.5	157.5	159.0	−9.1	1.6	1.6	90.0	−7.5	−39.5	
SLV00000	−130.5	−130.5	−47.5	−130.5	−120.5	−89.0	13.7	1.6	1.6	90.0	−7.5	−40.9	
SMA00000	−159.0	−169.8	−158.2	−169.0	−158.2	−170.7	−14.2	1.6	1.6	90.0	−7.5	−42.2	*/MB2
SMO00000	−125.5	137.5	−121.7	−135.5	−121.7	−172.1	−13.7	1.6	1.6	90.0	−7.5	−41.1	
SMR00000	23.0	−36.4	61.4	13.0	33.0	12.5	43.9	1.6	1.6	90.0	−7.5	−41.7	
SNG00000	98.1	60.6	147.1	88.1	108.1	103.9	1.3	1.6	1.6	90.0	−7.5	−41.6	
SOM00000	98.4	−20.0	102.7	88.4	102.7	46.0	6.3	3.1	1.6	72.0	−7.5	−38.8	
SPM00000	0.9	−13.9	5.7	−9.1	5.7	−56.4	47.0	1.6	1.6	90.0	−7.5	−40.9	*/MB11
SRL00000	−51.8	−63.8	40.0	−61.8	−41.8	−11.9	8.5	1.6	1.6	90.0	−7.5	−41.4	
STP00000	31.4	−45.4	59.4	21.4	41.4	7.0	1.0	1.6	1.6	90.0	−7.5	−41.7	
SUI00000	−9.2	−20.0	35.0	−19.2	0.8	8.2	46.5	1.6	1.6	90.0	−7.5	−41.3	2
SUR00000	−77.0	−97.0	−15.0	−87.0	−67.0	−55.6	3.9	1.6	1.6	90.0	−7.5	−40.7	
SWZ00000	29.0	−26.8	89.2	19.0	39.0	31.3	−26.4	1.6	1.6	90.0	−7.5	−42.0	
SYR00000	18.7	10.1	70.0	10.1	28.7	38.6	35.3	1.6	1.6	90.0	−7.5	−40.8	
TCD00000	−10.5	−36.5	67.5	−20.5	−0.5	18.4	15.6	3.5	1.6	97.0	−6.8	−39.0	
TCH00000	−12.7	−21.3	54.4	−21.3	−2.7	17.3	49.6	1.6	1.6	90.0	−7.5	−40.0	2
TGO00000	−21.1	−41.0	43.4	−31.1	−11.1	0.8	8.6	1.6	1.6	90.0	−7.5	−40.4	
THA00000	120.6	58.6	137.2	110.6	130.6	100.9	12.8	2.8	1.6	83.0	−5.6	−38.8	
TON00000	−128.0	135.7	−126.0	−138.0	−126.0	−175.2	−21.2	1.6	1.6	90.0	−7.5	−41.0	

TRD00000	−73.4	−112.3	−9.9	−83.4	−63.4	−61.1	10.8	1.6	1.6	90.0	−7.5	−41.8	
TUN00000	−4.1	−29.0	48.4	−14.1	5.9	9.4	33.5	1.6	1.6	90.0	−7.5	−40.3	
TUR00000	9.4	7.1	61.6	7.1	19.4	34.1	38.9	2.8	1.6	171.0	−7.5	−38.9	
TUV00000	158.0	127.3	−129.0	148.0	168.0	179.2	−8.5	1.6	1.6	90.0	−7.5	−41.8	
TZA00000	69.5	−21.3	91.4	59.5	79.5	35.4	−5.9	2.4	1.6	117.0	−7.5	−39.3	
UAE00000	70.4	−12.7	120.3	60.4	80.4	53.8	24.9	1.6	1.6	90.0	−7.5	−41.1	
UGA00000	32.0	−27.2	91.6	22.0	42.0	32.2	0.9	1.6	1.6	90.0	−7.5	−40.3	
URG00000	−86.1	−108.9	−3.5	−96.1	−76.1	−56.3	−33.7	1.6	1.6	90.0	−7.5	−40.7	
URS00001	61.0	56.7	65.4	56.7	65.4	57.6	48.3	7.5	3.5	178.0	−1.1	−38.3	
URS00002	88.1	87.7	98.0	87.7	98.0	94.8	48.6	7.5	3.5	175.0	1.5	−38.3	
URS00003	138.5	138.5	140.6	138.5	140.6	134.9	52.6	7.5	3.5	5.0	−1.1	−38.3	
USA00000	−101.0	−130.3	−63.5	−111.0	−91.0	−93.9	36.8	8.2	3.6	172.0	1.2	−38.4	*/MB16
USAVIPRT	−101.0	−130.3	−63.5	−111.0	−91.0	−64.5	17.8	1.6	1.6	90.0	−7.5	−41.4	*/MB16
VCT00000	−93.1	−112.3	−9.9	−103.1	−83.1	−61.1	13.2	1.6	1.6	90.0	−7.5	−41.5	
VEN00001	−82.7	−102.5	−24.7	−92.7	−72.7	−66.4	6.8	2.8	2.1	142.0	−4.9	−38.9	*/MB17
VEN00002	−82.7	−102.5	−24.7	−92.7	−72.7	−63.6	15.7	1.6	1.6	90.0	−7.5	−41.7	*/MB17
VTN00000	107.0	85.1	125.0	97.0	117.0	108.5	14.2	3.6	2.6	139.0	−2.9	−38.8	
VUT00000	150.7	127.4	−152.4	140.7	160.7	168.4	−17.2	1.6	1.6	90.0	−7.5	−40.3	
WAK00000	−159.0	−169.8	−158.2	−169.0	−158.2	166.5	19.2	1.6	1.6	90.0	−7.5	−41.9	*/MB2
WAL00000	113.0	113.0	114.3	113.0	114.3	−177.1	−13.8	1.6	1.6	90.0	−6.9	−39.8	*/MB1
YEM00000	27.0	−24.3	113.2	17.0	37.0	44.2	15.1	1.6	1.6	90.0	−7.5	−41.4	
YMS00000	108.0	−16.4	114.4	98.0	114.4	49.9	14.8	1.6	1.6	90.0	−7.5	−39.7	
YUG00000	43.1	−25.8	60.2	33.1	53.1	18.7	44.4	1.6	1.6	90.0	−7.5	−40.5	2
ZAI00000	51.0	−23.6	62.6	41.0	61.0	24.4	−4.6	3.9	3.5	92.0	−0.5	−38.4	
ZMB00000	39.6	−27.9	82.5	29.6	49.6	27.9	−12.8	2.4	1.6	26.0	−7.5	−39.6	
ZWE00000	65.6	−27.0	85.5	55.6	75.6	30.0	−18.9	1.6	1.6	90.0	−7.5	−39.9	

10.70 – 10.95, 11.20 – 11.45 GHz, 12.75 – 13.25 GHz

1	2	3		4		5	6	7	8	9	10	11	12
ABW00000	−98.2	−119.4	−18.9	−108.2	−88.2	−69.1	12.4	0.8	0.8	90.0	−5.5	−25.8	
ADL00000	113.0	113.0	114.3	113.0	114.3	140.0	−66.7	0.8	0.8	90.0	−9.3	−31.9	*/MB1
AFG00000	48.0	42.3	95.8	42.3	58.0	66.4	33.9	2.2	1.3	15.0	−3.2	−29.2	
AFS00000	71.0	−25.8	84.2	61.0	81.0	27.2	−30.1	5.3	1.4	128.0	4.2	−26.7	
AGL00000	−36.1	−37.2	74.1	−37.2	−26.1	15.9	−12.4	2.4	1.4	78.0	2.0	−25.9	
ALB00000	2.6	−29.9	69.8	−7.4	12.6	20.0	41.1	0.8	0.8	90.0	−7.7	−28.2	
ALG00000	−33.5	−33.5	38.4	−33.5	−23.5	1.6	27.8	3.3	2.2	133.0	4.3	−26.6	
ALS00000	−159.0	−169.8	−158.2	−169.0	−158.2	−158.6	57.5	6.3	1.5	1.0	2.5	−28.7	*/MB2
AND00000	−41.0	−48.6	51.7	−48.6	−31.0	1.5	42.5	0.8	0.8	90.0	−9.3	−30.0	
ARG00000	−51.0	−58.4	−51.0	−58.4	−51.0	−62.0	−33.6	4.8	2.9	93.0	10.3	−21.9	*/MB3
ARGINSUL	−51.0	−58.4	−51.0	−58.4	−51.0	−60.0	−57.5	3.6	1.3	154.0	−0.5	−28.6	*/MB3
ARS00000	52.0	20.1	60.0	42.0	60.0	45.7	23.1	3.7	2.6	153.0	1.7	−29.4	
ASCSTHTC	−37.1	−38.5	−27.1	−38.5	−27.1	−11.8	−19.6	5.6	1.8	77.0	3.0	−28.6	*/MB4
ATG00000	−77.7	−112.2	−11.4	−87.7	−67.7	−61.8	17.0	0.8	0.8	90.0	−6.3	−27.1	
ATN00000	−5.2	−50.1	1.9	−15.2	1.9	−65.6	15.1	1.3	1.0	58.0	−0.2	−22.3	*/MB5
AUS00001	144.1	122.4	148.1	134.1	148.1	134.3	−24.5	6.6	5.3	146.0	14.3	−22.1	*/MB6
AUS00002	144.1	122.4	148.1	134.1	148.1	163.6	−30.5	1.6	1.0	15.0	−2.0	−26.5	*/MB6
AUS00003	144.1	122.4	148.1	134.1	148.1	101.5	−11.1	1.1	1.0	15.0	−6.0	−28.5	*/MB6
AUS00004	144.1	122.4	148.1	134.1	148.1	159.0	−54.5	0.8	0.8	90.0	−9.3	−32.3	*/MB6
AUS00005	144.1	122.4	148.1	134.1	148.1	110.4	−66.3	0.8	0.8	90.0	−9.3	−31.8	*/MB6
AUT00000	−2.6	−18.6	46.4	−12.6	7.4	13.2	47.5	0.8	0.8	90.0	−7.2	−27.2	2
AZR00000	−7.9	−41.9	6.7	−17.9	2.1	−28.0	38.7	0.8	0.8	90.0	−7.8	−27.9	*/MB7
B 00001	−65.0	−70.0	−60.1	−70.0	−60.1	−62.6	−6.0	4.1	4.0	43.0	10.7	−22.4	
B 00002	−61.1	−70.0	−60.1	−70.0	−60.1	−45.4	−6.3	4.6	4.1	152.0	11.3	−22.4	
B 00003	−68.7	−70.0	−60.1	−70.0	−60.1	−50.0	−20.9	4.3	3.0	60.0	9.8	−22.2	

BAH00000	−74.3	−121.1	−32.2	−84.3	−64.3	−75.8	24.0	1.6	1.0	133.0	0.1	−24.5	
BDI00000	−2.2	−30.5	90.4	−12.2	7.8	29.9	−3.4	0.8	0.8	90.0	−9.3	−29.9	
BEL00000	52.7	−53.6	62.0	42.7	62.0	5.2	50.6	0.8	0.8	90.0	−9.3	−30.2	
BEN00000	−30.6	−40.2	44.7	−40.2	−20.6	2.3	9.3	1.2	1.0	89.0	−1.2	−23.0	
BERCAYMS	−37.1	−38.5	−27.1	−38.5	−27.1	−68.6	22.5	3.7	2.3	41.0	8.3	−21.9	*/MB4
BFA00000	10.2	−54.6	46.2	0.2	20.2	−1.4	12.2	1.7	1.0	24.0	0.3	−25.0	
BGD00000	133.0	44.6	135.5	123.0	135.5	90.2	24.0	0.8	0.8	90.0	−3.0	−21.9	
BHR00000	20.4	−18.6	119.8	10.4	30.4	50.6	26.1	0.8	0.8	90.0	−9.3	−32.2	
BLZ00000	−90.8	−138.4	−38.7	−100.8	−80.8	−88.6	17.2	0.8	0.8	90.0	−5.6	−26.6	
BOL00000	−35.0	−97.3	−23.2	−45.0	−25.0	−64.4	−17.1	2.7	1.7	129.0	5.2	−22.5	
BOT00000	19.9	−41.7	89.9	9.9	29.9	24.0	−21.8	1.5	1.5	94.0	−5.1	−30.0	
BRB00000	−29.8	−110.8	−8.4	−39.8	−19.8	−59.6	13.2	0.8	0.8	90.0	−6.1	−26.4	
BRM00000	110.8	57.6	131.0	100.8	120.8	97.0	18.9	3.2	1.6	88.0	5.5	−22.5	
BRU00000	157.3	71.5	157.7	147.3	157.7	114.6	4.5	0.8	0.8	90.0	−6.0	−24.9	
BTN00000	63.0	34.3	146.6	53.0	73.0	90.4	27.0	0.8	0.8	90.0	−9.3	−29.3	
BUL00000	50.4	−20.6	71.5	40.4	60.4	25.6	42.8	0.8	0.8	90.0	−6.9	−27.0	
CAF00000	14.8	−24.8	57.6	4.8	24.8	21.5	6.5	2.7	1.7	14.0	4.7	−22.8	
CAN0EAST	−107.3	−108.0	−90.1	−108.0	−97.3	−76.6	50.1	5.0	1.7	154.0	7.1	−25.0	
CAN0CENT	−111.1	−115.1	−101.0	−115.1	−101.1	−96.1	51.4	4.3	2.0	155.0	4.8	−26.7	
CAN0WEST	−114.9	−119.0	−113.7	−119.0	−113.7	−120.1	57.4	3.1	1.9	173.0	0.3	−28.7	
CAR00000	−159.0	−169.8	−158.2	−169.0	−158.2	173.4	4.6	10.2	2.4	175.0	13.9	−21.0	*/MB2
CBG00000	96.1	61.2	144.2	86.1	106.1	105.1	12.9	1.2	1.0	35.0	−1.6	−23.2	
CHL00000	−74.9	−96.4	−53.6	−84.9	−64.9	−82.6	−32.8	8.1	6.1	155.0	9.9	−28.4	
CHN00001	101.4	90.4	139.4	91.4	111.4	103.7	35.0	8.1	4.3	2.0	14.5	−23.2	
CHN00002	135.5	75.0	151.3	125.5	145.5	114.8	16.4	4.9	2.4	65.0	9.1	−22.5	

10.70 – 10.95, 11.20 – 11.45 GHz, 12.75 – 13.25 GHz

1	2	3		4		5	6	7	8	9	10	11	12
CLM00000	–70.9	–110.1	–39.9	–80.9	–60.9	–74.0	5.7	4.0	2.3	121.0	8.0	–22.6	
CLN00000	121.5	28.1	131.9	111.5	131.5	80.1	7.7	0.8	0.8	90.0	–5.6	–24.8	
CME00000	21.4	–27.3	51.2	11.4	31.4	12.9	6.3	2.5	1.9	84.0	4.8	–22.7	
CNR00000	12.2	–31.1	24.2	2.2	22.2	–15.9	28.5	0.8	0.8	90.0	–9.3	–29.2	*/MB8
COG00000	–16.0	–24.7	56.5	–24.7	–6.0	14.8	–0.6	2.0	1.1	63.0	1.6	–22.7	
COM00000	94.5	–7.3	95.5	84.5	95.5	44.1	–12.2	0.8	0.8	90.0	–5.8	–24.7	
CPV00000	–85.7	–94.7	46.5	–94.7	–75.7	–24.1	16.0	0.8	0.8	90.0	–9.3	–30.4	
CTI00000	4.6	–15.0	27.1	–5.4	14.6	–5.9	7.8	1.4	1.2	66.0	0.0	–23.1	
CTR00000	–96.0	–125.4	–44.0	–106.0	–86.0	–85.3	8.2	1.3	1.0	64.0	–1.2	–23.2	
CUB00000	–80.6	–123.5	–36.1	–90.6	–70.6	–79.5	21.0	2.0	1.0	172.0	1.0	–24.6	
CVA00000	58.1	–38.1	63.1	48.1	63.1	12.5	41.9	0.8	0.8	90.0	–8.4	–28.8	
CYP00000	–1.8	–21.5	87.9	–11.8	8.2	33.2	35.1	0.8	0.8	90.0	–9.3	–29.8	
CYPSBA00	56.6	44.7	59.2	46.6	59.2	32.9	34.6	0.8	0.8	90.0	–9.3	–30.2	*/MB9
D 00000	26.4	–30.4	53.1	16.4	36.4	9.7	50.7	1.1	1.0	41.0	–6.8	–28.7	
DDR00000	37.0	–26.8	51.7	27.0	47.0	12.6	51.4	0.8	0.8	90.0	–8.4	–28.2	
DJI00000	–18.3	–28.4	113.6	–28.3	–8.3	42.6	11.7	0.8	0.8	90.0	–9.3	–30.5	
DMA00000	–69.6	–112.1	–10.5	–79.6	–59.6	–61.3	15.3	0.8	0.8	90.0	–6.4	–27.3	
DNK00001	32.2	–40.8	62.2	22.2	42.2	11.6	56.0	0.8	0.8	90.0	–9.3	–29.0	
DNK00002	–49.0	–50.0	–43.1	–50.0	–43.1	12.5	56.3	0.8	0.8	90.0	–7.3	–27.7	*/MB10
DNK00FAR	–49.0	–50.0	–43.1	–50.0	–43.1	–7.2	61.7	0.8	0.8	90.0	–9.3	–29.5	*/MB10
DOM00000	–85.4	–120.3	–20.5	–95.4	–75.4	–70.4	18.7	0.8	0.8	90.0	–6.3	–27.1	
E 00002	12.2	–31.1	24.2	2.2	22.2	–3.0	39.9	2.1	1.2	8.0	–1.8	–27.8	*/MB8
EGY00000	68.5	–10.3	69.5	58.5	69.5	30.3	26.2	2.3	1.5	54.0	–1.8	–28.8	
EQA00000	–104.0	–104.0	–94.1	–104.0	–94.1	–83.1	–1.4	3.1	1.4	174.0	4.7	–22.7	
ETH00000	57.5	–4.0	85.0	47.5	67.5	40.6	10.3	2.8	2.8	64.0	2.0	–28.6	

F 00000	0.9	−13.9	5.7	−9.1	5.7	3.1	45.9	2.1	1.1	168.0	−0.2	−26.3	*/MB11
FJI00000	148.8	128.2	−131.1	138.8	158.8	178.5	−17.2	0.8	0.8	90.0	−6.1	−26.2	
FLKSTGGL	−37.1	−38.5	−27.1	−38.5	−27.1	−46.8	−59.6	3.7	1.4	170.0	0.0	−28.7	*/MB4
FNL00000	46.8	7.1	46.8	36.8	46.8	23.8	64.3	1.5	1.0	23.0	−5.3	−28.6	
G 00000	−37.1	−38.5	−27.1	−38.5	−27.1	−4.1	53.9	1.6	1.0	151.0	−3.8	−27.8	*/MB4
GAB00000	38.8	−29.2	52.0	28.8	48.8	11.7	−0.7	1.4	1.1	79.0	−0.6	−23.0	
GDL00000	0.9	−13.9	5.7	−9.1	5.7	−61.9	16.3	0.8	0.8	90.0	−4.2	−23.1	*/MB11
GDL00002	−115.9	−123.2	−81.2	−123.2	−105.9	−61.8	16.4	0.8	0.8	90.0	−3.7	−22.7	*/MB13
GHA00000	16.0	−41.7	39.3	6.0	26.0	−1.3	7.7	1.5	1.1	90.0	−0.1	−23.0	
GIB00000	56.6	44.7	59.2	46.6	59.2	−5.4	36.1	0.8	0.8	90.0	−5.9	−27.0	*/MB9
GMB00000	−34.0	−77.3	44.5	−44.0	−24.0	−16.4	13.4	0.8	0.8	90.0	−9.3	−31.0	
GNB00000	40.0	−76.5	45.7	30.0	45.7	−15.4	12.0	0.8	0.8	90.0	−8.3	−28.8	
GNE00000	−32.3	−32.8	53.8	−32.8	−22.3	10.5	1.7	0.8	0.8	90.0	−5.9	−24.9	
GRC00000	16.6	−8.9	56.8	6.6	26.6	24.7	38.3	1.7	1.0	160.0	−1.8	−26.6	
GRD00000	−32.8	−113.0	−10.2	−42.8	−22.8	−61.6	12.0	0.8	0.8	90.0	−6.2	−26.5	
GRL00000	−49.0	−50.0	−43.1	−50.0	−43.1	−42.9	68.6	2.3	1.0	174.0	−2.4	−27.8	*/MB10
GTM00000	−135.7	−139.3	−41.4	−139.3	−125.7	−90.5	15.5	0.8	0.8	90.0	−3.3	−22.2	
GUF00000	0.9	−13.9	5.7	−9.1	5.7	−53.2	4.3	0.8	0.8	90.0	−4.6	−23.6	*/MB11
GUF00002	−115.9	−123.2	−81.2	−123.2	−105.9	−53.3	4.3	0.8	0.8	90.0	−4.4	−23.4	*/MB13
GUI00000	27.5	−51.8	33.8	17.5	33.8	−10.9	10.2	1.3	1.1	104.0	−0.6	−22.9	
GUMMRA00	−159.0	−169.8	−158.2	−169.0	−158.2	145.4	16.7	1.7	1.0	79.0	0.9	−22.2	*/MB2
GUY00000	−24.1	−100.1	−18.3	−34.1	−18.3	−59.2	4.7	1.4	1.0	94.0	−0.5	−22.8	
HKG00000	56.6	44.7	59.2	46.6	59.2	114.5	22.4	0.8	0.8	90.0	−5.6	−24.5	*/MB9
HND00000	−76.2	−123.8	−48.1	−86.2	−66.2	−86.1	15.4	1.4	1.0	26.0	−0.9	−23.1	

10.70 – 10.95, 11.20 – 11.45 GHz, 12.75 – 13.25 GHz

1	2	3		4		5	6	7	8	9	10	11	12
HNG00000	–6.6	–22.2	62.4	–16.6	3.4	19.4	47.4	0.8	0.8	90.0	–7.9	–28.1	2
HOL00000	–5.2	–50.1	1.9	–15.2	1.9	5.4	52.4	0.8	0.8	90.0	–9.3	–30.8	*/MB5
HTI00000	–92.0	–122.9	–23.1	–102.0	–82.0	–73.0	18.8	0.8	0.8	90.0	–6.2	–26.9	
HWA00000	–159.0	–169.8	–158.2	–169.0	–158.2	–157.6	20.7	1.2	1.0	157.0	–1.3	–23.1	*/MB2
HWL00000	–159.0	–169.8	–158.2	–169.0	–158.2	–176.6	0.1	0.8	0.8	90.0	–6.4	–27.4	*/MB2
I 00000	–28.1	–32.9	54.1	–32.9	–18.1	11.3	40.9	2.1	1.0	141.0	–0.7	–26.4	
IND00000	74.0	51.3	116.4	64.0	84.0	82.7	18.9	6.2	4.9	120.0	13.5	–22.2	
INS00000	115.4	101.1	135.0	105.4	125.4	117.6	–1.8	9.4	4.3	170.0	14.6	–22.4	
IRL00000	–31.0	–41.0	25.7	–41.0	–21.0	–8.2	53.2	0.8	0.8	90.0	–9.3	–29.3	
IRN00000	25.0	20.1	50.0	20.1	35.0	54.3	33.0	3.7	1.5	143.0	2.0	–27.5	
IRQ00000	66.4	5.1	82.5	56.4	76.4	44.3	33.1	1.6	1.3	178.0	–3.1	–28.0	
ISL00000	–35.4	–53.0	14.8	–45.4	–25.4	–18.2	64.9	0.8	0.8	90.0	–7.6	–27.4	
ISR00000	73.0	–8.0	78.4	63.0	78.4	35.0	31.3	0.8	0.8	90.0	–5.5	–26.3	
J 00000	152.5	94.4	170.9	142.5	162.5	140.4	30.4	5.7	3.7	15.0	12.0	–22.8	
JAR00000	–159.0	–169.8	–158.2	–169.0	–158.2	–160.0	–0.4	0.8	0.8	90.0	–6.6	–27.5	*/MB2
JMC00000	–108.6	–127.5	–27.8	–118.6	–98.6	–77.6	18.2	0.8	0.8	90.0	–6.0	–25.9	
JON00000	–159.0	–169.8	–158.2	–169.0	–158.2	–168.5	17.0	0.8	0.8	90.0	–9.3	–32.5	*/MB2
JOR00000	81.8	–28.8	102.9	71.8	91.8	36.7	31.3	0.8	0.8	90.0	–8.8	–28.5	
KEN00000	78.2	–10.4	86.3	68.2	86.3	38.4	0.8	2.1	1.3	95.0	–1.2	–27.6	
KER00000	113.0	113.0	114.3	113.0	114.3	69.3	–43.9	1.9	1.6	169.0	–1.3	–27.8	*/MB1
KIR00000	150.0	120.6	–134.6	140.0	160.0	173.0	1.0	0.8	0.8	90.0	–6.3	–27.1	
KOR00000	116.2	83.0	169.6	106.2	126.2	127.7	36.2	1.3	1.0	4.0	–3.4	–26.7	
KRE00000	145.0	110.1	150.0	135.0	150.0	127.8	39.8	1.4	1.0	14.0	–0.3	–23.3	
KWT00000	30.8	–20.2	115.3	20.8	40.8	47.7	29.1	0.8	0.8	90.0	–9.3	–31.6	1,2
LAO00000	142.0	56.6	149.9	132.0	149.9	104.1	18.1	1.5	1.0	101.0	0.2	–22.6	
LBN00000	91.0	–31.6	103.2	81.0	101.0	35.8	33.8	0.8	0.8	90.0	–9.3	–30.5	

LBR00000	−41.8	−50.4	35.5	−50.4	−31.8	−8.9	6.5	0.8	0.8	90.0	−3.1	−22.1	
LBY00000	28.5	−19.2	54.9	18.5	38.5	19.0	25.9	3.0	2.7	165.0	3.1	−27.8	
LIE00000	7.9	−30.0	15.0	−2.1	15.0	9.5	47.2	0.8	0.8	90.0	−9.3	−31.2	
LSO00000	−18.7	−40.1	96.9	−28.7	−8.7	28.4	−29.5	0.8	0.8	90.0	−9.3	−31.1	
LUX00000	19.2	−53.9	66.1	9.2	29.2	6.2	49.7	0.8	0.8	90.0	−9.3	−31.6	
MAC00000	117.0	64.7	162.4	107.0	127.0	113.6	22.2	0.8	0.8	90.0	−6.3	−27.1	
MAU00000	92.2	8.0	107.0	82.2	102.2	57.5	−20.2	0.8	0.8	90.0	−6.0	−25.6	
MCO00000	40.5	−41.8	56.6	30.5	50.5	7.4	43.7	0.8	0.8	90.0	−7.1	−27.8	
MDG00000	16.9	10.4	81.1	10.4	26.9	46.6	−18.7	2.6	1.0	66.0	2.5	−22.5	
MDR00000	−7.9	−41.9	6.7	−17.9	2.1	−16.2	31.6	0.8	0.8	90.0	−9.3	−30.5	*/MB7
MDW00000	−159.0	−169.8	−158.2	−169.0	−158.2	−177.4	28.2	0.8	0.8	90.0	−9.3	−32.2	*/MB2
MEX00000	−113.0	−136.1	−61.0	−123.0	−103.0	−103.6	23.3	5.8	2.4	161.0	10.0	−23.7	
MLA00000	78.5	76.4	143.2	76.4	88.5	108.2	4.7	3.2	1.4	0.0	5.0	−22.3	
MLD00000	117.6	21.1	124.9	107.6	124.9	73.4	2.5	2.2	0.8	88.0	1.0	−22.4	
MLI00000	−1.3	−59.9	43.3	−11.3	8.7	−3.9	17.6	3.3	2.5	21.0	7.2	−24.8	
MLT00000	5.6	−39.8	68.5	−4.4	15.6	14.4	35.9	0.8	0.8	90.0	−9.3	−30.4	
MNG00000	113.6	60.4	148.9	103.6	123.6	103.8	46.8	3.6	1.1	3.0	0.6	−27.6	
MOZ00000	88.6	−10.6	90.6	78.6	90.6	35.6	−17.2	3.1	1.1	98.0	4.1	−22.0	
MRC00000	33.0	−50.5	37.5	23.0	37.5	−8.9	27.9	3.4	1.0	45.0	0.4	−27.0	
MRL00000	−159.0	−169.8	−158.2	−169.0	−158.2	175.3	8.7	2.3	1.4	94.0	3.6	−22.6	*/MB2
MTN00000	−22.8	−72.8	44.2	−32.8	−12.8	−10.3	19.8	2.5	2.4	76.0	1.0	−28.4	
MWI00000	30.3	−25.0	93.7	20.3	40.3	34.1	−13.3	1.6	1.0	101.0	−5.8	−29.3	
MYT00000	0.9	−13.9	5.7	−9.1	5.7	45.2	−12.8	0.8	0.8	90.0	−5.9	−24.9	*/MB11
NCG00000	−84.4	−124.4	−45.9	−94.4	−74.4	−84.9	12.9	1.1	1.0	16.0	−1.9	−23.1	
NCL00000	113.0	113.0	114.3	113.0	114.3	165.8	−21.4	0.8	0.8	90.0	−5.0	−23.9	*/MB1

10.70 – 10.95, 11.20 – 11.45 GHz, 12.75 – 13.25 GHz

1	2	3		4		5	6	7	8	9	10	11	12
NGR00000	−38.5	−54.5	64.6	−48.5	−28.5	7.5	17.2	2.1	1.7	100.0	0.3	−27.3	
NIG00000	42.5	−29.6	49.6	32.5	49.6	8.0	9.9	2.5	1.6	47.0	4.3	−22.4	
NMB00000	13.4	−45.4	82.5	3.4	23.4	18.5	−21.0	2.7	2.6	155.0	0.2	−29.6	
NOR00000	3.9	2.9	29.1	2.9	13.9	11.7	64.6	2.0	1.0	17.0	−2.9	−27.7	
NPL00000	123.3	30.3	137.6	113.3	133.3	84.4	28.0	0.8	0.8	90.0	−6.3	−26.6	
NRU00000	146.0	114.5	−140.7	136.0	156.0	166.9	−0.5	0.8	0.8	90.0	−6.3	−27.2	
NZL00001	152.0	150.9	175.0	150.9	162.0	170.9	−44.8	5.4	1.0	49.0	2.9	−26.5	*/MB14
NZL00002	152.0	150.9	175.0	150.9	162.0	−165.4	−13.2	2.7	2.0	82.0	6.3	−22.0	*/MB14
OCE00000	−115.9	−123.2	−81.2	−123.2	−105.9	−141.9	−16.1	3.5	2.4	139.0	7.7	−24.2	*/MB13
OMA00000	104.0	−9.8	122.2	94.0	114.0	55.1	21.6	1.9	1.0	61.0	−5.1	−29.3	5
PAK00000	56.0	34.1	62.0	46.0	62.0	69.9	29.8	3.0	2.0	22.0	4.6	−25.7	
PHL00000	89.6	83.0	159.8	83.0	99.6	121.3	11.4	3.3	1.5	101.0	5.7	−22.3	
PLM00000	−159.0	−169.8	−158.2	−169.0	−158.2	−161.4	7.0	0.8	0.8	90.0	−6.7	−27.6	*/MB2
PNG00000	154.1	114.2	−176.5	144.1	164.1	148.4	−6.6	3.3	2.3	167.0	6.9	−22.7	
PNR00000	−79.2	−120.0	−40.4	−89.2	−69.2	−80.2	8.5	1.2	1.0	177.0	−1.5	−23.2	
POL00000	14.2	−14.8	56.4	4.2	24.2	19.3	52.0	1.3	1.0	166.0	−6.1	−28.7	
POR00000	−7.9	−41.9	6.7	−17.9	2.1	−8.0	39.7	0.8	0.8	90.0	−8.1	−28.1	*/MB7
PRG00000	−81.5	−90.4	−23.2	−90.4	−71.5	−58.7	−23.1	1.5	1.3	116.0	1.0	−22.8	
PRU00000	−89.9	−120.4	−38.2	−99.9	−79.9	−74.2	−8.4	3.6	2.4	111.0	7.8	−22.5	
PTC00000	−62.0	−62.6	−58.5	−62.6	−58.5	−130.1	−25.1	0.8	0.8	90.0	−9.3	−31.5	
QAT00000	8.3	−16.9	120.0	−1.7	18.3	51.6	25.4	0.8	0.8	90.0	−9.3	−31.5	
REU00000	0.9	−13.9	5.7	−9.1	5.7	55.6	−21.1	0.8	0.8	90.0	−5.6	−24.6	*/MB11
REU00002	113.0	113.0	114.3	113.0	114.3	55.6	−21.1	0.8	0.8	90.0	−5.5	−24.5	*/MB1
ROU00000	31.0	−1.0	51.0	21.0	41.0	25.0	46.3	1.5	1.0	178.0	−4.3	−28.0	
RRW00000	6.8	−30.9	90.8	−3.2	16.8	29.7	−1.9	0.8	0.8	90.0	−9.3	−30.8	

S 00000	11.2	−7.0	47.1	1.2	21.2	16.7	60.9	1.1	1.0	30.0	−6.4	−28.6	
SCN00000	−88.8	−113.2	−12.6	−98.8	−78.8	−62.9	17.3	0.8	0.8	90.0	−6.2	−26.5	
SDN00001	1.4	−7.0	15.0	−7.0	11.4	29.3	10.3	3.0	1.9	131.0	4.7	−25.5	*/MB15
SDN00002	1.4	−7.0	15.0	−7.0	11.4	29.4	16.7	2.6	2.4	171.0	0.5	−28.9	*/MB15
SEN00000	−48.4	−64.4	34.3	−58.4	−38.4	−14.0	14.1	1.1	1.0	148.0	−1.4	−23.8	
SEY00000	96.5	3.1	107.7	86.5	106.5	55.4	−4.5	0.8	0.8	90.0	−6.0	−25.2	
SLM00000	147.5	120.4	−161.7	137.5	157.5	159.0	−9.1	1.5	1.0	147.0	−0.3	−23.0	
SLV00000	−130.5	−130.5	−47.5	−130.5	−120.5	−89.0	13.7	0.8	0.8	90.0	−5.9	−24.9	
SMA00000	−159.0	−169.8	−158.2	−169.0	−158.2	−170.7	−14.2	0.8	0.8	90.0	−9.3	−32.5	*/MB2
SMO00000	−125.5	137.5	−121.7	−135.5	−121.7	−172.1	−13.7	0.8	0.8	90.0	−5.7	−24.6	
SMR00000	23.0	−36.4	61.4	13.0	33.0	12.5	43.9	0.8	0.8	90.0	−9.3	−30.3	
SNG00000	98.1	60.6	147.1	88.1	108.1	103.9	1.3	0.8	0.8	90.0	−6.4	−25.4	
SOM00000	98.4	−20.0	102.7	88.4	102.7	46.0	6.3	3.1	1.0	72.0	0.1	−26.9	
SPM00000	0.9	−13.9	5.7	−9.1	5.7	−56.4	47.0	0.8	0.8	90.0	−6.3	−27.3	*/MB11
SRL00000	−51.8	−63.8	40.0	−61.8	−41.8	−11.9	8.5	0.8	0.8	90.0	−6.0	−25.4	
STP00000	31.4	−45.4	59.4	21.4	41.4	7.0	1.0	0.8	0.8	90.0	−6.2	−27.0	
SUI00000	−9.2	−20.0	35.0	−19.2	0.8	8.2	46.5	0.8	0.8	90.0	−9.3	−29.4	2
SUR00000	−77.0	−97.0	−15.0	−87.0	−67.0	−55.6	3.9	1.0	0.9	37.0	−2.7	−23.2	
SWZ00000	29.0	−26.8	89.2	19.0	39.0	31.3	−26.4	0.8	0.8	90.0	−9.3	−30.9	
SYR00000	18.7	10.1	70.0	10.1	28.7	38.6	35.3	1.1	1.0	32.0	−6.2	−28.3	4
TCD00000	−10.5	−36.5	67.5	−20.5	−0.5	18.4	15.6	3.5	1.6	97.0	5.9	−24.1	
TCH00000	−12.7	−21.3	54.4	−21.3	−2.7	17.3	49.6	1.3	1.0	166.0	−4.2	−27.4	2
TGO00000	−21.1	−41.0	43.4	−31.1	−11.1	0.8	8.6	1.1	1.0	116.0	−1.8	−23.2	
THA00000	120.6	58.6	137.2	110.6	130.6	100.9	12.8	2.8	1.6	83.0	4.9	−22.6	
TON00000	−128.0	135.7	−126.0	−138.0	−126.0	−175.2	−21.2	0.8	0.8	90.0	−5.8	−24.7	

10.70 – 10.95, 11.20 – 11.45 GHz, 12.75 – 13.25 GHz

1	2	3		4		5	6	7	8	9	10	11	12
TRD00000	−73.4	−112.3	−9.9	−83.4	−63.4	−61.1	10.8	0.8	0.8	90.0	−6.3	−27.3	
TUN00000	−4.1	−29.0	48.4	−14.1	5.9	9.4	33.5	1.3	1.0	104.0	−5.0	−28.2	
TUR00000	9.4	7.1	61.6	7.1	19.4	34.1	38.9	2.8	1.0	171.0	0.9	−26.0	
TUV00000	158.0	127.3	−129.0	148.0	168.0	179.2	−8.5	0.8	0.8	90.0	−6.2	−27.1	
TZA00000	69.5	−21.3	91.4	59.5	79.5	35.4	−5.9	2.4	1.4	117.0	−0.4	−27.8	
UAE00000	70.4	−12.7	120.3	60.4	80.4	53.8	24.9	1.1	1.0	12.0	−8.8	−30.4	
UGA00000	32.0	−27.2	91.6	22.0	42.0	32.2	0.9	1.5	1.0	70.0	−5.4	−28.9	
URG00000	−86.1	−108.9	−3.5	−96.1	−76.1	−56.3	−33.7	1.1	1.0	58.0	−5.6	−27.7	
URS00001	61.0	56.7	65.4	56.7	65.4	57.6	48.3	7.5	3.5	178.0	8.8	−26.2	
URS00002	88.1	87.7	98.0	87.7	98.0	94.8	48.6	7.5	3.5	175.0	12.4	−26.2	
URS00003	138.5	138.5	140.6	138.5	140.6	134.9	52.6	7.5	3.5	5.0	8.7	−26.2	
USA00000	−101.0	−130.3	−63.5	−111.0	−91.0	−93.9	36.8	8.2	3.6	172.0	13.7	−23.2	*/MB16
USAVIPRT	−101.0	−130.3	−63.5	−111.0	−91.0	−64.5	17.8	0.8	0.8	90.0	−6.0	−25.5	*/MB16
VCT00000	−93.1	−112.3	−9.9	−103.1	−83.1	−61.1	13.2	0.8	0.8	90.0	−6.1	−26.2	
VEN00001	−82.7	−102.5	−24.7	−92.7	−72.7	−66.4	6.8	2.8	2.1	142.0	5.8	−22.7	*/MB17
VEN00002	−82.7	−102.5	−24.7	−92.7	−72.7	−63.6	15.7	0.8	0.8	90.0	−6.2	−27.0	*/MB17
VTN00000	107.0	85.1	125.0	97.0	117.0	108.5	14.2	3.6	2.6	139.0	8.2	−22.6	
VUT00000	150.7	127.4	−152.4	140.7	160.7	168.4	−17.2	1.2	1.0	122.0	−1.5	−23.1	
WAK00000	−159.0	−169.8	−158.2	−169.0	−158.2	166.5	19.2	0.8	0.8	90.0	−9.3	−32.0	*/MB2
WAL00000	113.0	113.0	114.3	113.0	114.3	−177.1	−13.8	0.8	0.8	90.0	−5.1	−24.1	*/MB1
YEM00000	27.0	−24.3	113.2	17.0	37.0	44.2	15.1	1.0	1.0	103.0	−8.9	−30.2	
YMS00000	108.0	−16.4	114.4	98.0	114.4	49.9	14.8	1.4	1.0	53.0	−4.8	−28.0	
YUG00000	43.1	−25.8	60.2	33.1	53.1	18.7	44.4	1.1	1.0	161.0	−4.7	−27.3	
ZAI00000	51.0	−23.6	62.6	41.0	61.0	24.4	−4.6	3.9	3.5	92.0	9.9	−22.3	
ZMB00000	39.6	−27.9	82.5	29.6	49.6	27.9	−12.8	2.4	1.6	26.0	−2.1	−29.2	
ZWE00000	65.6	−27.0	85.5	55.6	75.6	30.0	−18.9	1.5	1.1	140.0	−5.1	−28.9	

B. COLUMN HEADINGS OF PART B OF THE PLAN

Col. 1 *Beam identification*

Col. 2 *Administration*

Col. 3 *Space station name*

Col. 4 *Orbital position*, in degrees and hundredths of a degree East longitude

Col. 5 *Western limit of visible arc*, in degrees and tenths of a degree East longitude (if no visible arc is given, this value is that of the orbital position)

Col. 6 *Eastern limit of visible arc*, in degrees and tenths of a degree East longitude (if no visible arc is given, this value is that of the orbital position)

Col. 7 *Western limit of service arc*, in degrees and tenths of a degree East longitude

Col. 8 *Eastern limit of service arc*, in degrees and tenths of a degree East longitude

Col. 9 *Predetermined arc* (western and eastern limits in degrees and tenths of a degree)

Col. 10 *Use of 4 GHz band*
(0 = no, 1 = yes)

Col. 11 *Use of 6 GHz band*
(0 = no, 1 = yes)

Col. 12 *Use of 10 - 11 GHz band*
(0 = no, 1 = yes)

Col. 13 *Use of 13 GHz band*
(0 = no, 1 = yes)

Col. 14 *Satellite antenna boresight longitude*, in degrees and tenths of a degree East longitude

Col. 15 *Satellite antenna boresight latitude*, in degrees and tenths of a degree North latitude

Col. 16 *Satellite antenna major axis beamwidth* (this is the half-power beamwidth, expressed in degrees and tenths of a degree)

Col. 17 *Satellite antenna minor axis beamwidth* (this is the half-power beamwidth, expressed in degrees and tenths of a degree)

Col. 18 *Satellite antenna major axis orientation*, in degrees and tenths of a degree anticlockwise with respect to the equatorial plane

Col. 19 *Names of other beams on the same satellite*[1]

Col. 20 *Power density* fed to transmitting earth station antenna in dB(W/Hz) averaged over the necessary bandwidth (if the network does not operate in any of the up-link frequency bands of the Plan, no value is entered)

---

[1] *Note by the General Secretariat (applicable when an asterisk (*) appears in column 19):* It is to be noted that this beam is intended to be implemented as part of a multi-beam network, operating from a single orbital location. Within any multi-beam network, the beams are the responsibility of a single administration, hence interference between them has not been taken into account during the Conference. The number which appears in the alphanumeric code that follows the asterisk serves to identify the multi-beam network concerned.

Col. 21 *Transmitting earth station antenna gain*, in dBi (if the network does not operate in either of the up-link frequency bands of the Plan, no value is entered)

Col. 22 *Earth station antenna side-lobe characteristic* (this is the value X to be used in the equation: $G(h) = X - 25 \log (h)$ dBi (if no value is given, it is set to 32.0 dBi))

Col. 23 *Satellite antenna gain*, in dBi (the value shown applies to both the transmitting and the receiving antennas)

Col. 24 *Satellite antenna pattern* (1 = Figure 1 of Annex 1; 2 = Figure 2 of Annex 1)

Col. 25 *Satellite receiving system noise temperature*, in kelvins (if the network does not operate in either of the up-link frequency bands of the Plan, no value is entered)

Col. 26 *Power density* fed to transmitting space station antenna, in dB(W/Hz) averaged over the necessary bandwidth (if the network does not operate in any of the down-link frequency bands of the Plan, no value is entered)

Col. 27 *Receiving earth station antenna gain*, in dBi (if the network does not operate in either of the down-link frequency bands of the Plan, no value is entered)

Col. 28 *Earth station receiving system noise temperature*, in kelvins (if the network does not operate in either of the down-link frequency bands of the Plan, no value is entered)

PAGE LAISSEE EN BLANC INTENTIONNELLEMENT

PAGE INTENTIONALLY LEFT BLANK

1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
CANMSAT0	CAN	MSAT	−106.50	−107.5	−105.4	−107.5	−105.4	−107.5	−105.4	0	0	0	1	−95.9	42.9	8.6	3.9	164		−42.0	50.7	29.0	30.0	1	725			
F EU1B1	F	EUTELSAT-1	10.00	−25.0	21.0	9.9	12.1	10.0	10.0	0	0	1	0	8.2	38.6	7.6	4.5	0				32.0	28.0	1		−68.5	63.5	200
F E12B1	F	EUTELSAT-1-2	13.00	−25.0	21.0	9.9	13.1	13.0	13.0	0	0	1	0	8.7	38.5	7.6	4.5	0				32.0	28.0	1		−68.5	63.5	200
F E13B1	F	EUTELSAT-1-3	7.00	−25.0	21.0	3.0	16.5	7.0	7.0	0	0	1	0	7.3	38.6	7.6	4.5	0				32.0	28.0	1		−68.5	63.5	200
F E14B1	F	EUTELSAT-1-4	16.00	−25.0	21.0	3.0	16.5	16.0	16.0	0	0	1	0	8.6	38.3	7.6	4.5	0				32.0	28.0	1		−68.5	63.5	200
F LSAT1	F	LSAT	−19.00	−19.1	−18.9	−19.1	−18.9	−19.0	−19.0	0	0	0	1	−4.0	50.8	1.5	1.5	90	*/MB20	−49.0	56.0	32.0	41.0	1	1000			
F LSAT2	F	LSAT	−19.00	−19.1	−18.9	−19.1	−18.9	−19.0	−19.0	0	0	0	1	5.0	47.4	1.5	1.5	90	*/MB20	−49.0	56.0	32.0	41.0	1	1000			
F LSAT3	F	LSAT	−19.00	−19.1	−18.9	−19.1	−18.9	−19.0	−19.0	0	0	0	1	14.0	44.5	1.5	1.5	90	*/MB20	−49.0	56.0	32.0	41.0	1	1000			
F LSAT4	F	LSAT	−19.00	−19.1	−18.9	−19.1	−18.9	−19.0	−19.0	0	0	0	1	15.7	62.6	1.5	1.5	90	*/MB20	−49.0	56.0	32.0	41.0	1	1000			
F LSAT5	F	LSAT	−19.00	−19.1	−18.9	−19.1	−18.9	−19.0	−19.0	0	0	0	1	−5.2	40.0	1.5	1.5	90	*/MB20	−49.0	56.0	32.0	41.0	1	1000			
INSAT-2A	IND	INSAT-IIA	83.00	20.0	140.0	70.0	95.0	83.0	83.0	1	1	0	0	81.8	23.2	5.6	4.0	54		−42.0	42.8	29.0	31.0	2	1580	−64.5	37.8	288
INSAT-2B	IND	INSAT-IIB	93.50	20.0	140.0	70.0	95.0	93.5	93.5	1	1	0	0	82.4	23.2	5.7	3.8	51		−42.0	42.8	29.0	31.0	2	1580	−64.5	37.8	288
INSAT-2C	IND	INSAT-IIC	74.00	20.0	140.0	70.0	95.0	74.0	74.0	1	1	0	0	81.3	23.3	5.3	4.1	62		−42.0	42.8	29.0	31.0	2	1580	−64.5	37.8	288
EIREB100	IRL	EIRESAT-1	−31.00	−100.0	40.0	−31.1	−30.9	−31.0	−31.0	0	0	1	1	−78.4	39.1	6.1	1.5	46	*/MB21	−49.5	42.9	29.0	39.0	2	1266	−59.8	41.4	346
EIREB200	IRL	EIRESAT-1	−31.00	−100.0	40.0	−31.1	−30.9	−31.0	−31.0	0	0	1	1	0.3	46.8	3.6	1.7	145	*/MB21	−49.5	42.9	29.0	36.7	2	1266	−59.8	41.4	346
LUXGDL41	LUX	GDL-4	−20.00	−34.0	49.0	−25.0	37.0	−20.0	−20.0	0	1	0	0	3.3	46.9	2.5	2.0	150		−52.0	54.5	29.0	36.5	2	800			
LUXGDL42	LUX	GDL-4	−20.00	−34.0	49.0	−25.0	37.0	−20.0	−20.0	0	0	1	0	2.0	46.5	3.8	2.2	172				29.0	37.5	2		−58.5	38.2	300
LUXGDL51	LUX	GDL-5	−24.40	−34.0	49.0	−25.0	37.0	−24.4	−24.4	0	1	0	0	3.2	47.2	3.1	1.6	26		−52.0	54.5	29.0	36.5	2	800			
LUXGDL52	LUX	GDL-5	−24.40	−34.0	49.0	−25.0	37.0	−24.4	−24.4	0	0	1	0	3.0	47.5	3.7	2.4	11				29.0	37.5	2		−59.5	38.2	300
LUXGDL61	LUX	GDL-6	19.20	−34.0	49.0	−25.0	37.0	19.2	19.2	0	1	0	0	3.6	45.9	3.1	1.6	30		−52.0	54.5	29.0	36.5	2	800			
LUXGDL62	LUX	GDL-6	19.20	−34.0	49.0	−25.0	37.0	19.2	19.2	0	0	1	1	4.3	47.7	4.1	2.1	21		−54.0	62.0	29.0	37.5	2	800	−58.5	38.2	300
PAKSAT01	PAK	PAKSAT I	38.00	38.0	38.0	38.0	38.0	33.0	43.0	0	0	1	0	69.3	29.8	3.2	2.1	30				32.0	40.0	1		−67.0	37.5	250
PAKSAT02	PAK	PAKSAT II	41.00	41.0	41.0	41.0	41.0	36.0	46.0	0	0	1	0	69.3	29.8	3.2	2.1	30				29.0	40.0	1		−67.0	37.5	250
PNGP1B01	PNG	PACSTAR-1	167.45			165.0	−175.0	167.5	167.5	0	1	0	0	157.0	−4.0	16.0	7.5	153	*/MB22	−55.0	51.7	29.0	26.0	2	630			
PNGP1B02	PNG	PACSTAR-1	167.45			165.0	−175.0	167.5	167.5	0	1	0	0	−162.0	18.0	2.8	2.8	90	*/MB22	−55.0	51.7	29.0	26.0	2	630			
PNGP2B01	PNG	PACSTAR-2	−175.00			159.9	−175.0	−175.0	−175.0	0	1	0	0	170.0	−6.0	16.0	7.5	172	*/MB23	−55.0	51.7	29.0	26.0	2	630			
PNGP2B02	PNG	PACSTAR-2	−175.00			159.9	−175.0	−175.0	−175.0	0	1	0	0	−155.0	24.0	2.8	2.8	90	*/MB23	−55.0	51.7	29.0	26.0	2	630			
URSEEDRN	URS	ESDRN	−160.00	−161.0	82.0	−161.0	−159.0	−160.0	−160.0	0	0	1	0	140.5	53.2	1.0	1.0	90				32.0	43.0	1		−70.0	62.0	160
URSCSDR1	URS	CSDRN	95.00	−15.0	96.0	94.0	96.0	95.0	95.0	0	0	1	0	40.6	56.2	1.0	1.0	90	*/MB24			32.0	43.0	1		−70.0	62.0	160
URSCSDR2	URS	CSDRN	95.00	−161.0	82.0	94.0	96.0	95.0	95.0	0	0	1	0	140.5	53.2	1.0	1.0	90	*/MB24			32.0	43.0	1		−70.0	62.0	160
URSWWDRN	URS	WSDRN	−16.00	−15.0	96.0	−15.0	−17.0	−16.0	−16.0	0	0	1	0	40.6	56.2	1.0	1.0	90	*/MB25			32.0	43.0	1		−70.0	62.0	160
URSCSRB1	URS	CSSRD-2	77.00	54.0	173.0	76.9	77.1	77.0	77.0	0	0	1	0	113.5	52.1	1.1	1.1	90	*/MB26			32.0	39.0	1		−70.0	62.0	160
URSCSRB2	URS	CSSRD-2	77.00	−15.0	96.0	76.9	77.1	77.0	77.0	0	0	1	0	40.8	55.7	1.1	1.1	90	*/MB26			32.0	39.0	1		−70.0	62.0	160
URSVVRB1	URS	VSSRD-2	167.00	54.0	173.0	166.9	167.1	167.0	167.0	0	0	1	0	113.5	52.1	1.1	1.1	90				32.0	39.0	1		−70.0	62.0	160
URSZZRB1	URS	ZSSRD-2	−16.00	−15.0	96.0	−16.1	−15.9	−16.0	−16.0	0	0	1	0	40.8	55.7	1.1	1.1	90	*/MB25			32.0	39.0	1		−70.0	62.0	160
URSSTAD1	URS	STATSIONAR-D1	−26.50	−28.5	−24.5	−28.5	−24.5	−26.5	−26.5	1	0	0	0	−26.5	0.0	17.3	17.3	90				40.4	25.0	1		−64.8	31.0	400
URSSTAD2	URS	STATSIONAR-D2	−170.00	−172.0	−168.0	−172.0	−168.0	−170.0	−170.0	1	0	0	0	−170.0	0.0	17.3	17.3	90				40.4	25.0	1		−64.8	31.0	400
URSSTAD3	URS	STATSIONAR-D3	35.00	33.0	37.0	33.0	37.0	35.0	35.0	1	0	0	0	35.0	0.0	17.3	17.3	90				40.4	25.0	1		−64.8	31.0	400
URSSTAD4	URS	STATSIONAR-D4	45.00	43.0	47.0	43.0	47.0	45.0	45.0	1	0	0	0	45.0	0.0	17.3	17.3	90				40.4	25.0	1		−64.8	31.0	400
URSSTAD5	URS	STATSIONAR-D5	85.40	83.0	87.0	83.0	87.0	85.4	85.4	1	0	0	0	85.0	0.0	17.3	17.3	90				40.4	25.0	1		−64.8	31.0	400
URSSTAD6	URS	STATSIONAR-D6	128.00	126.0	130.0	126.0	130.0	128.0	128.0	1	0	0	0	128.0	0.0	17.3	17.3	90				40.4	25.0	1		−64.8	31.0	400
URSFOT-1	URS	FOTON-1	−13.50			−16.0	−12.5	−16.0	−12.5	1	0	0	0	−13.5	0.0	17.3	17.3	90				29.0	25.0	1		−72.2	49.0	500
URSFOT-2	URS	FOTON-2	80.00			79.0	82.5	80.0	80.0	1	0	0	0	80.0	0.0	17.3	17.3	90				29.0	25.0	1		−72.2	49.0	500
URSFOT-3	URS	FOTON-3	−168.00			−170.0	−167.0	−170.0	−167.0	1	0	0	0	−168.0	0.0	17.3	17.3	90				29.0	25.0	1		−72.2	49.0	500
USA13DB1	USA	USASAT-13D	−56.00			−59.0	−51.0	−56.0	−56.0	0	0	1	0	−3.0	47.0	3.7	1.0	143				29.0	39.0	2		−69.3	48.7	170
USA13EB1	USA	USASAT-13E	−58.00			−59.0	−51.0	−58.0	−58.0	0	0	1	0	−3.1	46.9	3.7	1.0	142				29.0	39.0	2		−69.3	48.7	170
USA13HB1	USA	USASAT-13H	−57.00	−69.0	−20.0	−69.0	−40.0	−62.0	−52.0	0	1	0	0	−61.5	−2.9	16.9	7.6	103	*/MB27	−48.4	49.5	29.0	25.9	2	800			
USA13HB2	USA	USASAT-13H	−57.00	−69.0	−20.0	−69.0	−57.0	−62.0	−52.0	0	1	0	0	−6.4	40.1	2.4	1.3	127	*/MB27	−48.4	49.5	29.0	25.9	2	800			
USA13HB3	USA	USASAT-13H	−57.00	−69.0	−20.0	−69.0	−57.0	−62.0	−52.0	0	0	1	0	−69.4	24.5	6.3	4.3	119	*/MB28			29.0	33.0	2		−67.4	53.0	200
USA13HB4	USA	USASAT-13H	−57.00	−69.0	−20.0	−69.0	−57.0	−62.0	−52.0	0	0	1	0	−59.4	−10.6	13.2	9.3	104	*/MB28			29.0	27.0	2		−60.4	53.0	200
USA13IB1	USA	USASAT-13I	−45.00	−69.0	−20.0	−69.0	−40.0	−45.0	−45.0	0	1	0	0	−59.6	−1.1	16.2	7.4	100	*/MB29	−48.4	49.5	29.0	25.9	2	800			
USA13IB2	USA	USASAT-13I	−45.00	−69.0	−20.0	−69.0	−40.0	−45.0	−45.0	0	1	0	0	−5.2	40.4	2.3	1.9	144	*/MB29	−48.4	49.5	29.0	25.9	2	800			
USA13IB3	USA	USASAT-13I	−45.00	−69.0	−20.0	−69.0	−40.0	−45.0	−45.0	0	0	1	0	−68.3	23.9	6.0	4.1	99	*/MB30			29.0	33.0	2		−64.4	53.0	200
USA13IB4	USA	USASAT-13I	−45.00	−69.0	−20.0	−69.0	−40.0	−45.0	−45.0	0	0	1	0	−56.2	−10.7	13.4	8.5	109	*/MB30			29.0	27.0	2		−57.4	53.0	200

PAGE LAISSEE EN BLANC INTENTIONNELLEMENT

PAGE INTENTIONALLY LEFT BLANK

ARTICLE 11

Period of Validity of the Provisions and Associated Plan

11.1 These provisions and associated Plan have been prepared in order to guarantee in practice for all countries equitable access to the geostationary-satellite orbit and the frequency bands contained in Article 3, to meet the requirements of the fixed-satellite service for a period of at least 20 years from the date of entry into force of this Appendix.

11.2 These provisions and associated Plan shall, in any event, remain in force until their revision by a competent world administrative radio conference, convened in accordance with the relevant provisions of the Convention in force.

ANNEX 1 *)

Parameters Used in Characterizing the Fixed-Satellite Service Plan

Section A. Technical Data Used in Establishing the Allotment Plan and the Associated Provisions

1. *Basic technical characteristics*

The allotments in the Plan are based on a reference satellite network with the following assumptions:

1.1 *Type of modulation*

The Plan is independent of modulation characteristics and accessing techniques.

*) *Note by the General Secretariat:* Subsequent to WARC ORB-88, certain errors have been discovered in the technical information for fast roll-off antenna patterns as contained in Appendices 30A and 30B. This technical information as corrected by the IFRB derives from other relevant Conference decisions and is given in the provisional IFRB Rule of Procedure No. H38, published in IFRB Circular-letter No. 790 of 12 July 1989. Copies of the latter may be obtained directly from the IFRB.

1.2 *Carrier-to-noise ratio*

The carrier-to-noise ratio (C/N) is as follows:

a) the up-link carrier-to-noise ratio is equal to 23 dB under rain fading conditions with a minimum earth station transmitter power density of −60 dB(W/Hz) averaged over the necessary bandwidth of the modulated carrier;

b) the down-link carrier-to-noise ratio is equal to 17 dB under rain fading conditions;

c) the total carrier-to-noise ratio is equal to 16 dB under rain fading conditions;

d) for the 6/4 GHz bands, the above C/Ns are exceeded for 99.95% of the year (*Note:* The rain attenuation margin is limited to a maximum of 8 dB);

e) for the 13/10-11 GHz bands, the above C/Ns are exceeded for 99.9% of the year (*Note:* The rain attenuation margin is limited to a maximum of 8 dB);

f) the rain attenuation model used is that described in CCIR Report 564-3 (1986).

1.3 *Earth station antenna elevation angle*

The minimum elevation angle for each test point defining the service area is based on the following:

10 degrees for climatic zones A to G;

20 degrees for climatic zones H to L;

30 degrees for climatic zones M and N;

40 degrees for climatic zone P.

Administrations may select lower elevation angles for their service areas. For countries at high latitudes or with dispersed territories, in the absence of such a request, if the above values for minimum elevation angle are unobtainable, then the highest elevation angle leading to a non-zero service arc applies. In mountainous areas, the elevation angles are specified by the administrations concerned.

1.4 *Interference criteria*

The Plan has been prepared with a view to assuring for each allotment an aggregate carrier-to-interference ratio under free-space conditions of 26 dB or higher.

1.5 *Polarization*

Polarization isolation between satellite networks was not used in the development of the Allotment Plan.

1.6 *Earth station characteristics*

1.6.1 The diameters of the earth station antennas are:

7 m for the 6/4 GHz band;

3 m for the 13/10-11 GHz band.

1.6.2 The earth station receiving system noise temperature referred to the output of the receiving antenna is:

140 K for the 4 GHz band;

200 K for the 10-11 GHz band.

1.6.3 The earth station antenna efficiency is 70%.

1.6.4 The earth station antenna reference pattern is shown in Table 1 below. If so desired by an administration, the improved side-lobe pattern of $29 - 25 \log \varphi$ may be used.

1.6.5 In cases where the C/I ratio of 26 dB cannot be obtained, it would be appropriate for the countries concerned to agree on the use of antennas with an improved side-lobe pattern of $29 - 25 \log \varphi$ or on other suitable means so as to obtain the above ratio (see Table 1 below).

1.7 *Space station characteristics*

1.7.1 The Allotment Plan is based on the use of space station antennas with beams of elliptical or circular cross-section.

1.7.2 The antenna radiation characteristics are as shown in Figure 1. The fast roll-off characteristics shown in Figure 2 may be used when so specified by administrations.

TABLE 1

$G_{max} = 10 \log [\eta(\pi D/\lambda)^2]$		
$G(\varphi) = G_{max} - 2.5 \times 10^{-3} \left(\frac{D}{\lambda}\varphi\right)^2$		for $0 < \varphi < \varphi_m$
$G(\varphi) = G_1$		for $\varphi_m \leq \varphi < \varphi_r$
$G(\varphi) = 32 - 25 \log \varphi$ $G(\varphi) = -10$		for $\varphi_r \leq \varphi < 48°$ for $48° \leq \varphi \leq 180°$
or	$G(\varphi) = 29 - 25 \log \varphi$ $G(\varphi) = -10$	for $\varphi_r \leq \varphi < 36.3°$ for $36.3° \leq \varphi < 180°$

where:

D = antenna diameter λ = wavelength	expressed in the same unit

φ = off-axis angle of the antenna, in degrees

G_1 = gain of the first side lobe =	$2 + 15 \log \frac{D}{\lambda}$ for $32 - 25 \log \varphi$ or $-1 + 15 \log \frac{D}{\lambda}$ for $29 - 25 \log \varphi$

$$\varphi_m = \frac{20\lambda}{D}\sqrt{G_{max} - G_1} \quad \text{(degrees)}$$

$$\varphi_r = 15.85\left(\frac{D}{\lambda}\right)^{-0.6} \quad \text{(degrees)}$$

η = antenna efficiency

1.7.3 The space station receiving system noise temperature referred to the output of the receiving antenna is:

1000 K for the 6 GHz band;

1500 K for the 13 GHz band.

1.7.4 The minimum beamwidth size, in terms of the half-power beamwidth, is 1.6 degrees for the 6/4 GHz band and 0.8 degrees for the 13/10-11 GHz band.

1.7.5 The space station antenna efficiency is 55%.

1.7.6 The deviation of the space station antenna beam from its nominal pointing direction is limited to 0.1 degrees in any direction. The rotation accuracy of elliptical beams is ± 1.0 degree.

1.8 *Bandwidth*

The Allotment Plan is based on the carrier power averaged over the necessary bandwidth of the modulated carrier and referred to a 1 MHz bandwidth.

Section B. Generalized Parameters Used for Determining when the Assignments of a Proposed Satellite Network Are in Conformity With the Plan

1. *Introduction*

1.1 The *A*, *B*, *C*, *D* generalized parameters specify the interference-producing capability (variables *A* and *C*) and the interference sensitivity (variables *B* and *D*) of a satellite network.

1.2 Since many different combinations of implementation parameters (such as antenna characteristics and transmitter powers) can result in a similar set of parametric values, it can be applied irrespective of the modulation characteristics and specific frequency used.

2. *Calculation of the A, B, C, D generalized parameters*

2.1 The following equations (see Section 2.3 below) describe the *A*, *B*, C, *D* generalized parameters where:

A = up-link off-axis e.i.r.p. density averaged over the necessary bandwidth of the modulated carrier;

B = up-link off-axis receiver sensitivity to interfering e.i.r.p. density averaged over the necessary bandwidth of the modulated carrier;

C = down-link off-axis e.i.r.p. density averaged over the necessary bandwidth of the modulated carrier;

D = down-link off-axis receiver sensitivity to interfering e.i.r.p. density averaged over the necessary bandwidth of the modulated carrier.

2.2 In the following equations, if measured data for the antenna gains are not available, the reference antenna radiation patterns chosen under Sections 1.6.4 and 1.7.2 of Annex 1, Section A should be used.

2.3 The generalized parameters A, B, C and D are calculated as follows:

$$A = p_1 \cdot g_1(\theta)$$

$$B = \frac{1}{p_1 \cdot g_1 \cdot \Delta g_2(\varphi)}$$

$$C = \frac{p_3 \cdot g_3}{\Delta g_3(\varphi)}$$

$$D = \frac{g_4(\theta)}{p_3 \cdot g_3 \cdot g_4}$$

where:

(In the following, all ratios are numerical power ratios and the antenna gains are referred to an isotropic antenna.)

p_1 : the power density, averaged over the necessary bandwidth of the modulated carrier, fed into the transmitting earth station antenna (W/Hz);

g_1 : the maximum gain of the earth station transmitting antenna;

$g_1(\theta)$: the earth station transmitting antenna radiation pattern;

g_2 : the maximum gain of the space station receiving antenna;

$g_2(\varphi)$: the gain in the space station receiving antenna in the direction of the earth station;

$\Delta g_2(\varphi) = \dfrac{g_2}{g_2(\varphi)}$: discrimination of the space station receiving antenna in the direction of the earth station;

p_3 : the power density, averaged over the necessary bandwidth of the modulated carrier, fed into the space station transmitting antenna (W/Hz);

g_3 : the maximum space station transmitting antenna gain;

$g_3(\varphi)$: the space station transmitting antenna gain in the direction of the earth station;

$\Delta g_3(\varphi) = \dfrac{g_3}{g_3(\varphi)}$: discrimination of the space station transmitting antenna in the direction of the desired earth station;

g_4 : the maximum gain of the earth station receiving antenna;

$g_4(\theta)$: the earth station receiving antenna radiation pattern.

Note: The parameters p_1, $p_1 \cdot g_1$, $p_3 \cdot g_3$ and $p_3 \cdot g_3 \cdot g_4$ will be calculated by the Board and will be published in an IFRB circular-letter. These calculations will be made using Figure 1, Figure 2 and Table 1, as appropriate.

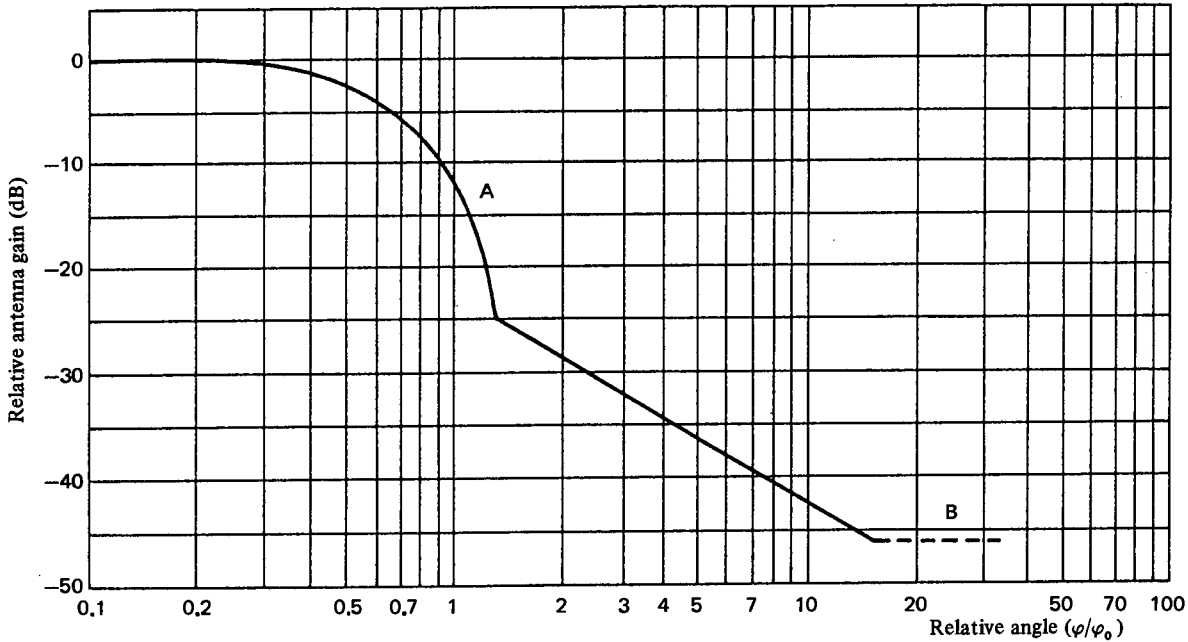


FIGURE 1

Reference patterns for satellite antennas

G_{max} = 44.45 − 10 log ($\varphi_{01} \cdot \varphi_{02}$) dBi

Curve A: dB relative to main beam gain

$-12\ (\varphi/\varphi_0)^2$ for $0 \leqslant (\varphi/\varphi_0) \leqslant 1.45$

$-(22 + 20 \log (\varphi/\varphi_0))$ for $(\varphi/\varphi_0) > 1.45$

after intersection with curve B: curve B.

Curve B: Minus the on-axis gain (curve B in this figure illustrates the particular case of an antenna with an on-axis gain of 46 dBi).

φ_{01}, φ_{02}: Major and minor axis half-power beamwidth, respectively, of elliptical beam (degrees).

φ_0: Cross-sectional half-power beamwidth in the direction of interest (degrees).

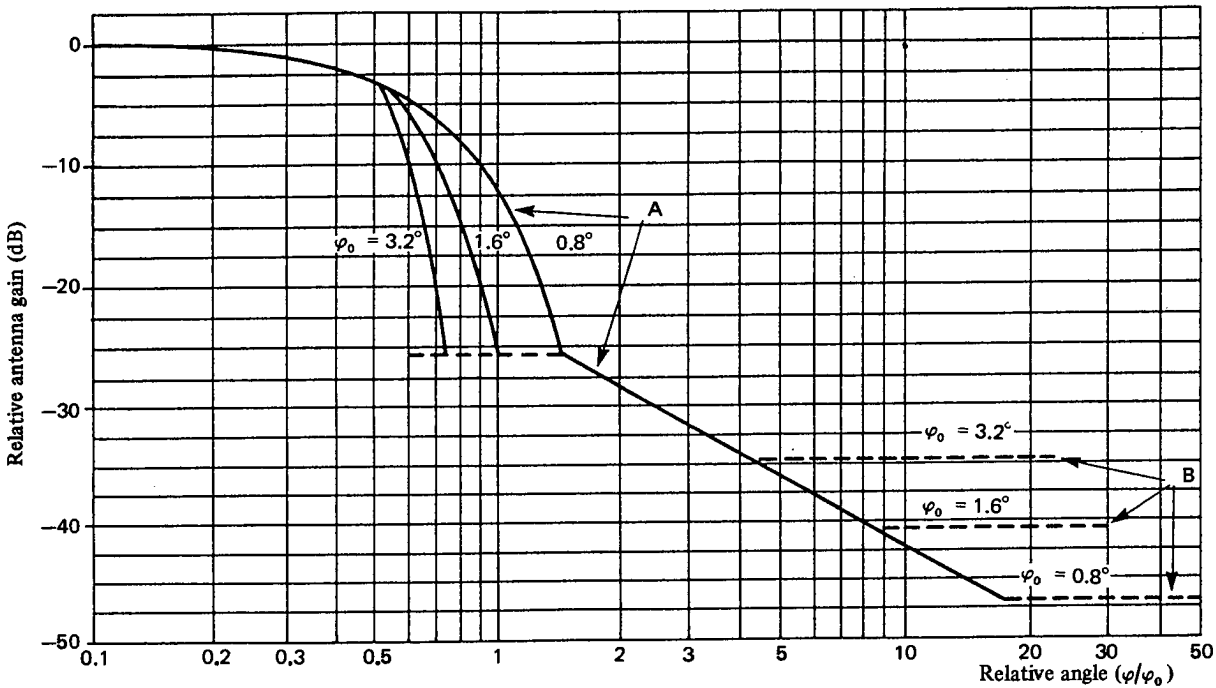


FIGURE 2

Reference patterns for satellite antennas with fast roll-off in the main beam

Curve A: dB relative to main beam gain

$-12\ (\varphi/\varphi_0)^2$ for $0 \leqslant (\varphi/\varphi_0) \leqslant 0.5$

$-18.75\ \varphi_0^2\ (\varphi/\varphi_0 - x)^2$ for $0.5 < (\varphi/\varphi_0) \leqslant \left(\frac{1.16}{\varphi_0} + x\right)$

-25.23 for $\left(\frac{1.16}{\varphi_0} + x\right) < (\varphi/\varphi_0) \leqslant 1.45$

$-(22 + 20 \log (\varphi/\varphi_0))$ for $(\varphi/\varphi_0) > 1.45$

after intersection with curve B: curve B

Curve B: minus the on-axis gain (curves A and B represent examples of three antennas having different values of φ_0 as labelled in Figure 2. The on-axis gains of these antennas are approximately 34, 40, and 46 dBi, respectively).

where:

φ = off-axis angle (degrees)

φ_0 = cross-sectional half-power beamwidth in the direction of interest (degrees)

$x = 0.5\left(1 - \frac{0.8}{\varphi_0}\right)$, for the 13/10-11 GHz bands

$x = 0.5\left(1 - \frac{1.6}{\varphi_0}\right)$, for the 6/4 GHz bands

ANNEX 2

Basic Data to be Furnished in Notices Relating to Stations in the Fixed-Satellite Service Entering the Design Stage Using Frequency Bands of the Plan

1. *Space station characteristics*

The following information shall be supplied for both the transmitting and receiving space stations.

1.1 *Country and identification of the allotment* (for a network not derived from the Allotment Plan, give the name of the network).

1.2 *Preferred or nominal orbital position* (xxx.xx degrees east or west from the Greenwich meridian. In addition, in the case of a network not derived from the Allotment Plan, give the service arc).

1.3 *Frequency bands*

1.4 *Dates* proposed for bringing into use.

1.5 *Identity of the space station*

1.6 *Service area* as defined by the allotment in the Plan. Alternatively, the service area may be defined by a number of geographical points.

1.7 *Power characteristics of the transmission*

a) Maximum value of power density, in dB(W/Hz), averaged over the necessary bandwidth of the modulated carrier, supplied to the input of the antenna. (This value will be used for calculation of the C and D parameters. See Annex 1, Section B.)

b) Maximum carrier power density, in dB(W/Hz), averaged over the worst 4 kHz band, supplied to the antenna input.

c) Frequency below which signals whose peak-to-average ratio is less than 5 dB will be located.

1.8 *Space station transmitting and receiving antenna characteristics*

a) gain of the antenna in the direction of maximum radiation referred to an isotropic antenna (dBi);

b) boresight coordinates (xx.xx degrees north or south, yyy.yy degrees east or west from the Greenwich meridian);

c) pointing accuracy (degrees);

d) shape of the beam (elliptical, circular, or other);

e) for circular beams indicate the following:

- half-power beamwidth in degrees;
- radiation pattern;

f) for elliptical beams indicate the following:

- radiation pattern;
- rotational accuracy in degrees;
- major axis orientation in degrees anticlockwise from the Equator;
- major axis beamwidth (degrees) at the half-power points;
- minor axis beamwidth (degrees) at the half-power points;

g) for beams of other than circular or elliptical shape, indicate the following:

- gain contours plotted on a map of the Earth's surface, preferably in a radial projection from the satellite on to a plane perpendicular to the axis from the centre of the Earth to the satellite. The gain contours shall be drawn as isolines of the isotropic gain, at least for −2, −4, −6, −10 and −20 dB and at 10 dB intervals thereafter, as necessary, relative to the maximum antenna gain, when

any of these contours is located either totally or partially anywhere within the limit of visibility of the Earth from the given geostationary satellite. The antenna gain contours shall include the effect of the planned pointing accuracy and rotational accuracy of the antenna;

– whenever practicable, a numerical equation providing the necessary information to allow the gain contours to be plotted.

1.9 *Space station receiving system noise temperature* (kelvins)

1.10 *Station-keeping accuracy* (degrees)

2. *Earth station characteristics*

The following information shall be supplied for both the transmit and receive earth stations.

2.1 *Identity of the space station with which communication is to be established*

2.2 *Power characteristics of the transmission*

a) Maximum value of power density, in dB(W/Hz), averaged over the necessary bandwidth of the modulated carrier, supplied to the input of the antenna. (This value will be used for calculation of the A and B parameters. See Annex 1, Section B.)

b) Maximum carrier power density, in dB(W/Hz), averaged over the worst 4 kHz band, supplied to the antenna input.

c) Frequency below which signals whose peak-to-average ratio is less than 5 dB will be located.

2.3 *Earth station antenna characteristics*

a) antenna gain in the direction of maximum radiation referred to an isotropic antenna (dBi);

b) half-power beamwidth in degrees (describe in detail if not symmetrical);

c) the radiation diagram(s) of the antenna (taking as a reference the direction of maximum radiation).

2.4 *Earth station receiving system noise temperature* (kelvins)

3. *Coordination/agreement*, if any

4. *Not used*

5. *Subregional systems*

Indicate the type of system and participating administrations. If applicable, indicate the part of the national allotment proposed to be used to form the subregional system, and the notifying administration.

6. *Required protection ratio*

Indicate the minimum acceptable aggregate carrier-to-interference ratio, if less than 26 dB. The carrier-to-interference ratio is to be expressed in terms of the power averaged over the necessary bandwidth of the modulated wanted and interfering signals.

7. *Other information*, if any.

ANNEX 3A

Criteria for Determining when Proposed Assignments are Considered as Being in Conformity with the Plan

In this method, the generalized parameters are calculated (see Annex 1, Section B), and the results are compared with the corresponding reference set:

- If the calculated *A*, *B*, *C* and *D* values are less than or equal to the relevant reference set, then the use of the assignment is considered to be in conformity with the Plan.
- If the calculated values of *A* or *C* are greater than the relevant reference set, the use of the assignment is considered not to be in conformity with the Plan.
- If the calculated values of *B* or *D* are greater than the relevant reference set, the assignment is protected only to the level of the relevant reference set.

ANNEX 3B

Macrosegmentation Concept

In this method, an administration shall not be required to coordinate if, in addition to meeting the conditions of Annex 3A, the proposed frequency assignments are ordered in such a way that the upper 60% of each allotment band is used for high-density carriers and the lower 40% for low-density carriers.

For the purposes of this annex, the term "high-density carriers" shall be used for those carriers whose ratio of power spectral density peak (averaged over the worst 4 kHz) to average (defined over the necessary bandwidth of the modulated carrier) is greater than 5 dB; and the term "low-density carriers" shall be used for those for which this ratio is less than 5 dB.

ANNEX 4

Limits for Determining whether an Allotment or an Assignment Made in Accordance with the Provisions of Appendix 30B is Considered to Be Affected

An allotment shall be considered as being affected by another administration if, at its nominal orbital position within the predetermined arc, the calculated single-entry carrier-to-interference ratio is less than or equal to 30 dB, or the calculated value, based on the Plan, due to that other administration (whichever is the lower), at any test point within the service area of the interfered-with satellite network. The single-entry carrier-to-interference ratio is calculated using the method in Appendix 1 to this Annex.

An assignment shall be considered affected by a signal whose peak-to-average ratio (k) exceeds 5 dB in that portion of the spectrum which has been defined for low-density carrier usage, as identified in Annex 3B, if the single-entry carrier-to-interference ratio, calculated on the basis of power density averaged over the necessary bandwidth of the desired carrier, falls below:

$$25 + k\,(\text{dB})$$

Even if the single-entry carrier-to-interference ratio is above 30 dB (or the calculated value based on the Plan due to that other administration, whichever value is lower), an allotment or an assignment shall be considered affected if the overall aggregate C/I, as calculated using Appendix 1 to this Annex, falls below 26 dB or the calculated value for the assignment, based on the Plan, whichever is lower.

APPENDIX 1 TO ANNEX 4

Method for determination of the single-entry and aggregate carrier-to-interference ratio averaged over the necessary bandwidth of the modulated carrier

1. *Single-entry*

This section describes the method for calculating the single-entry interference potential.

The method is based on the single-entry carrier-to-interference ratio (C/I) which a given allotment or assignment made in accordance with the provisions of Appendix **30B** might experience due to emission from the proposed modification. The single-entry C/I due to a single interfering satellite network is given by:

$$(C/I)_t = \left(\frac{p_1' \; g_1'(\theta) \; g_2(\rho) \; 1_{su}}{p_1 \; g_1 \; g_2(\varphi) \; 1_{su'}} + \frac{p_3' \; g_3'(\eta) \; g_4(\xi) \; 1_{sd}}{p_3 \; g_3(\varphi) \; g_4 \; 1_{sd'}} \right)^{-1}$$

or

$$(C/I)_t = \left(A'(\theta) \cdot B(\rho) \cdot \Delta g_2(\varphi) \; \frac{1_{su}}{1_{su'}} + C'(\eta) \cdot D(\xi) \cdot \Delta g_3(\varphi) \; \frac{1_{sd}}{1_{sd'}} \right)^{-1}$$

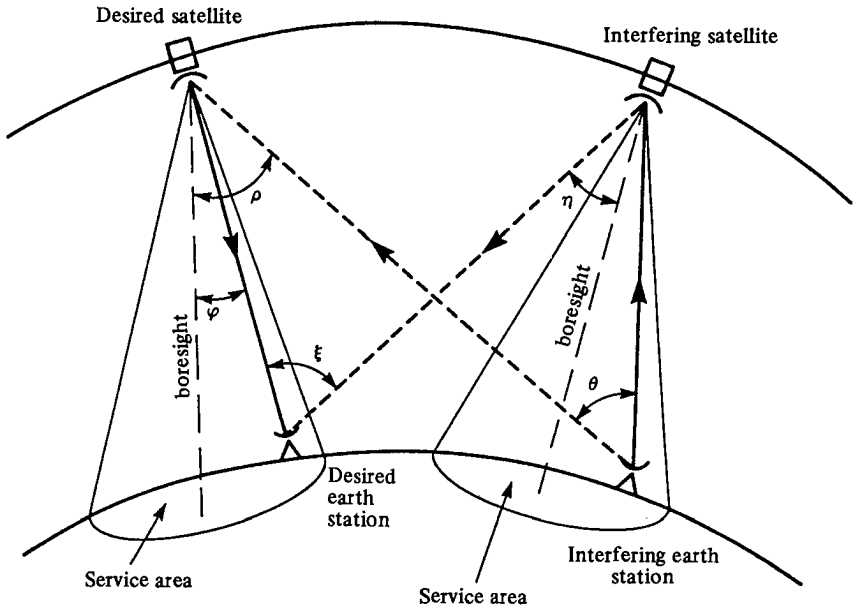


FIGURE 1

where:

θ, φ, ρ, η, ξ are angles as defined in Figure 1, above.

In the following, all ratios are numerical power ratios.

p_1 : the power density, averaged over the necessary bandwidth of the modulated carrier, fed into the desired earth station transmitting antenna (W/Hz)

g_1 : the maximum gain of the desired transmitting earth station antenna

1_{su} : the free-space path loss of the desired up-path signal

$1_{su'}$: the free-space path loss of the interfering up-path signal

$g_2(\varphi)$: the gain of the desired space station receiving antenna in the direction of the desired earth station

$\Delta g_2(\varphi) = \dfrac{g_2}{g_2(\varphi)}$: discrimination of the desired space station receiving antenna in the direction of the desired earth station

g_2 : the maximum gain of the desired space station receiving antenna

p_1' : the power density, averaged over the necessary bandwidth of the modulated carrier, fed into the interfering earth station transmitting antenna (W/Hz)

$g_1'(\theta)$: the interfering earth station antenna gain in the direction of the desired satellite

1_{sd} : the free-space path loss of the desired down-path signal

$1_{sd'}$: the free-space path loss of the interfering down-path signal

$g_2(\rho)$: the gain of the desired space station receiving antenna in the direction of the interfering earth station

p_3 : the power density, averaged over the necessary bandwidth of the modulated carrier, fed into the desired space station transmitting antenna (W/Hz)

$g_3(\varphi)$: the desired space station transmitting antenna gain in the direction of the desired earth station

$\Delta g_3(\varphi) = \dfrac{g_3}{g_3(\varphi)}$: discrimination of the desired space station transmitting antenna in the direction of the desired earth station

g_3 : the maximum gain of the desired space station transmitting antenna

g_4 : the maximum gain of the desired receiving earth station antenna

p_3' : the power density, averaged over the necessary bandwidth of the modulated carrier, fed into the interfering space station transmitting antenna (W/Hz)

$g_3'(\eta)$: the interfering space station transmitting antenna gain in the direction of the desired earth station

$g_4(\xi)$: the desired earth station receiving antenna gain in the direction of the interfering satellite

A', C' : value of A, C of the interfering network in the direction of the desired network

B, D : value of B, D of the desired network in the direction of the interfering network

A, B, C, D are defined in Annex 1, Section B.

2. *Aggregate carrier-to-interference ratio*

The aggregate carrier-to-interference ratio, is given by:

$$(C/I)_{agg} = \left(\Sigma_j \frac{1}{(c/i)_{ij}} \right)^{-1}$$

$$j = 1, 2, 3 \ldots n$$

where n is the total number of networks within the arc of the geostationary orbit visible to the desired network.

ANNEX 5

Application of the PDA (Predetermined Arc) Concept

1. The following method will be used in the application of the PDA Concept, which is based on the criteria set out in Section 1.1 below.

1.1 For the purposes of this Annex, an administration will be considered as being affected by another administration if, at its nominal orbital position within the predetermined arc, the calculated single-entry carrier-to-interference ratio is less than or equal to 30 dB, or the calculated value, based on the Plan, due to that other administration (whichever is lower), at any test point within the service area of the interfered-with satellite network. The single-entry C/I ratio is calculated by the method in Appendix 1, Annex 4.

Even if the single-entry C/I ratio is above 30 dB, or the calculated value, based on the Plan, due to that other administration (whichever is lower), an administration shall be considered as being affected if the overall aggregate C/I ratio, calculated by the method in Appendix 1, falls below 26 dB[1], or the value for the assignment (whichever is lower).

1.2 The PDA Concept shall be applied in the following steps:

a) the order of all satellites and also the position of satellites in the "design" or "operational" stages shall be fixed so as to minimize the impact on these systems. Next, the nominal positions of "pre-design" systems shall be adjusted so as to compensate for the degraded C/I ratio. The adjustments of nominal positions shall be limited to the range of their respective predetermined arcs;

---

[1] For allotments with an aggregate C/I ratio less than 26 dB, the calculated C/I ratio based on the Plan will be used. However, if through the use of the PDA Concept, this value is improved in the latter application of this procedure, the improved value will be used until it reaches 26 dB.

b) if compatibility is not obtained through 1.2 *a)*, the ordering of allotments of satellites in the "pre-design" stage shall be subject to change within their predetermined arcs, as defined in Article 5;

c) if the C/I objectives are not achieved, the affected administration may at this stage opt to select other measures than repositioning, as described in 1.2 *d)* below;

d) if compatibility is not achieved under 1.2 *b)*, and if the measures of 1.2 *c)* are unsuccessful, the allotment(s)/assignment(s) subject to repositioning shall include the systems in the "design" stage, for their predetermined arc as defined in Article 5.

1.3 Administrations for which the criteria of Section 1.1 are not met shall be identified for the purposes of this Annex.

ANNEX 6

Technical Means which May Be Used to Avoid Incompatibilities Between Systems in the Fixed-Satellite Service at Their Implementation Stage

1. Improved frequency modulated TV carrier dispersal techniques with up to 4 - 5 MHz peak-to-peak deviation.

2. Frequency separation between signals with high peak spectral density and narrow-band signals (bandwidth segmentation).

3. The use of transmitting and receiving antennas with special beams providing minimum gain in the direction to neighbouring satellites.

4. Shaped beams for transmitting satellite antennas.

5. Transmission (modulation) and reception techniques allowing for the C/I ratios less than 26 dB.

FINAL PROTOCOL*

At the time of signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Geneva, 1988), the undersigned delegates take note of the following statements made by signatory delegations.

No. 1

Original: English

For the Hungarian People's Republic:

The Delegation of the Hungarian People's Republic to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988) reserves for its Government the right to take any action it may consider necessary to safeguard its interest should any Member of the Union fail to comply with the provisions of this Conference, or should reservations by other countries jeopardize its telecommunication services.

No. 2

Original: English

For the Republic of Afghanistan:

The Delegation of the Republic of Afghanistan to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988) reserves the right for its Government to take any action it deems necessary to safeguard its interests, should any Member in any way fail to comply with the provisions of the Final Acts of this Conference, or should the consequences of reservations by other countries jeopardize its interests, in particular proper functioning of its telecommunication services.

**Note by the General Secretariat:* The texts of the Final Protocol are shown in the chronological order of their deposit. In the Table of Contents these texts are grouped in the alphabetical order of country names.

No. 3

Original: English

For the Federal Republic of Nigeria:

After noting the declaration already deposited in signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Delegation of Nigeria reserves its Government's right to take any measures it considers necessary to protect its interests should some Members of the ITU fail to comply with the requirements of the Nairobi Convention of the ITU (1982) or with the Annexes or Protocols attached to these Final Acts or if declarations by other countries were to threaten the proper operation of its telecommunication services.

No. 4

Original: English

For the Republic of Kenya:

The Delegation of the Republic of Kenya herewith declares the following on behalf of its Government and in accordance with the powers conferred on it:

1. That it reserves the right of its Government to take any action it may consider necessary to safeguard and protect its interests should any Member fail to comply as required with the provisions contained in the Final Acts and the Annexes thereto as adopted by this Conference.

2. That the Government of the Republic of Kenya does not accept responsibility for consequences arising out of the reservations made by Members of the Union.

No. 5

Original: French

For the People's Republic of Angola:

In signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Delegation of the People's Republic of Angola reserves for its Government the right to take any action it may consider necessary to protect its interests should non-compliance with the Final Acts and the Annexes thereto or reservations entered by other Members of the International Telecommunication Union jeopardize the proper operation of its radio services.

No. 6

Original: Spanish

For Ecuador:

The Delegation of Ecuador, in signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988) does not consider itself bound with respect to the assignment of orbital positions to other countries in the segments of the geostationary orbit corresponding to its territory, by the signing of the Final Acts, nor by the Resolutions, Agreements or Decisions of this Conference. The Government of Ecuador reserves the right, moreover, to adopt such measures as it considers appropriate to safeguard its interests, in accordance with its own legislation and with international law, should any of the declarations made by other States affect the telecommunication services of Ecuador or the exercise of its sovereign rights. Within the Legal Sub-Committee of the United Nations Committee on Outer Space, Ecuador will continue advocating the need to guarantee access to the geostationary orbit by means of Regulations and technical planning, taking into account the interests of all countries, and in particular the needs of developing countries and the legitimate rights of ecuatorial countries.

No. 7

Original: English

For Trinidad and Tobago:

In signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Delegation of the Republic of Trinidad and Tobago reserves the right of its Government:

a) not to accept any decision of this Conference which might affect its sovereign rights;

b) to take the measures necessary to protect its interests should they be affected by the failure of other Members to comply with the provisions contained in these Acts;

c) not to accept any reservation entered by other countries if they are detrimental to the national interest of Trinidad and Tobago.

No. 8

Original: English

For Thailand:

In signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Delegation of Thailand reserves the right of its Government to take any action that it deems necessary to safeguard its interests should any Member or Members of the International Telecommunication Union fail, in any way, to comply with the Final Acts of this Conference and the Annexes thereto, or should any of the declarations by other Members jeopardize its telecommunication services or threaten its national sovereignty.

No. 9

Original: French

For the Islamic Republic of Mauritania:

The Delegation of the Islamic Republic of Mauritania to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988) reserves for its Government the right to take any action it may deem necessary to safeguard its interests should any Member fail to comply with the provisions of the Final Acts of this Conference or should reservations entered by other countries jeopardize the proper operation of its telecommunication services.

No. 10

Original: French

For the Gabonese Republic:

The Delegation of the Gabonese Republic to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), noting that the Allotment Plan does not take into account all the requirements it expressed during the Conference, reserves for its Government the right to take any necessary action to safeguard its interests.

No. 11

Original: Spanish

For Chile:

1. The Delegation of Chile declares that the contents of the Final Acts and of any other document of any nature issued by this Conference (WARC Orb-88) shall in no way affect Chile's territorial sovereignty, including over its Antarctic territory.

2. The Delegation of Chile further reserves for its Government the right to take any action it may deem necessary to safeguard its interests should any other Members of the Union fail to comply with the provisions of the Radio Regulations or the Annexes thereto, as amended by this Conference, or should reservations entered by other Members directly or indirectly jeopardize the operation of its telecommunication services or its sovereignty.

3. The Chilean Delegation also reserves for its country the right to take appropriate measures should its frequencies be affected as a result of transfers or changes.

No. 12

Original: English

For Papua New Guinea:

In signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Delegation of Papua New Guinea declares that its Government reserves the right to take any measures it may deem necessary to safeguard its interests if other countries or administrations fail to observe the provisions contained in the Final Acts adopted by this Conference.

No. 13

Original: English

For the Kingdom of Saudi Arabia, the State of Bahrain, the United Arab Emirates, the State of Kuwait, the Sultanate of Oman and the State of Qatar:

The above-mentioned Delegations declare that their Governments reserve the right to take such action as they may consider to protect their interests, should any Members of the Union fail in any way to comply with the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), or with the provisions and Associated Plan attached thereto, or should reservations by other countries jeopardize their telecommunication services.

No. 14

Original: English

For the Republic of Indonesia:

The Delegation of the Republic of Indonesia to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988):

1. Reserves the rights of its Government to take any action and preservation measures to safeguard its national interests should the Final Acts drawn up in this Conference be in contravention with the Constitution, Laws and Rights of the Republic of Indonesia which exist and may result from any principles of international law. In this regard the Government of the Republic of Indonesia will recognize the legitimate interests of other countries with a view to enhancing international cooperation in the peaceful uses of outer space for the benefit of mankind.

2. Further reserves the rights of its Government to take any action and preservation measures to safeguard its national interests should Members of the Union fail to comply with the requirements in the Final Acts of the Conference or should reservations by other Members jeopardize its rights under the Final Acts.

No. 15

Original: French

For the Republic of Senegal:

In signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Delegation of the Republic of Senegal declares that its signature does not signify recognition of the existing satellite networks listed in Part B of the Plan and having extra-national coverage.

The Delegation of the Republic of Senegal considers that the above-mentioned satellite networks are included in the Plan for information only, so that they can be taken into account for planning purposes in order to resolve any incompatibilities with national allotments, in accordance with the decisions of the First Session of the Conference.

Accordingly, these networks do not enjoy recognition and they will have to be removed from the Radio Regulations, together with the whole of Part B in which they are listed, upon expiry of the 20-year period after the date of entry into force of these Final Acts, in accordance with the decisions of the Second Session.

No. 16

Original: English

For the Republic of Afghanistan, the People's Democratic Republic of Algeria, the Kingdom of Saudi Arabia, the State of Bahrain, the United Arab Emirates, the Islamic Republic of Iran, the Republic of Iraq, the Hashemite Kingdom of Jordan, the State of Kuwait, the Socialist People's Libyan Arab Jamahiriya, the Kingdom of Morocco, the Islamic Republic of Mauritania, the Sultanate of Oman, the Islamic Republic of Pakistan, the State of Qatar, the Syrian Arab Republic and Tunisia:

The Delegations of the above-mentioned countries to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), declare that the signature and possible approval by their respective Governments or competent authorities of the Final Acts of this Conference are not valid with respect to the Zionist Entity appearing in Annex 1 of the Convention under the name of the so-called Israel and in no way whatsoever imply its recognition.

No. 17

Original: French

For the Kingdom of Morocco:

1. The Delegation of Morocco to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988) reserves for the Government of its country the right to take any action it may deem necessary to safeguard its interests should any Member fail to comply with the relevant provisions of this Agreement and its Annexes.

2. Signature of the Final Acts of this Conference does not in any way imply recognition of Spanish sovereignty over the towns of Sebta (Ceuta) and Mellilia (Melilla) or over the Jaâfarine (Chafarinas) Islands.

The above territories form an integral part of the territory of the Kingdom of Morocco.

No. 18

Original: French

For the Socialist Republic of Romania:

In signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Delegation of the Socialist Republic of Romania declares that it reserves for its Government the right to take any action it may deem necessary to provide proper operating conditions for its telecommunication media, while respecting the principles of equitable access to the geostationary orbit and the frequency bands discussed at this Conference.

No. 19

Original: Spanish

For the Republic of Venezuela:

The Delegation of the Republic of Venezuela declares that it reserves for its government the right of take any action it may deem necessary to safeguard its national interests should they be jeopardized by the decisions of this Conference or by the reservations entered by representatives of other Member States of the ITU.

No. 20

Original: Spanish

For the Eastern Republic of Uruguay:

The Delegation of the Eastern Republic of Uruguay reserves for its Government the right to take any action it may deem necessary to safeguard its interests should any Member fail in any way to comply with the provisions of the Final Acts and the Annexes thereto approved by this Conference or should reservations entered by other Members jeopardize the proper operation of its telecommunication services.

No. 21

Original: French

For Tunisia:

In signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Tunisian Delegation reserves for its Government the right to take any action it may deem necessary, pursuant to national legislation and international law, to safeguard its interests and to ensure the proper operation of its telecommunication and broadcasting-satellite services should its interests be jeopardized by reservations entered by other countries.

No. 22

Original: Spanish

For Peru:

The Delegation of Peru reserves for its Government the right to take any action it may deem necessary, in accordance with its domestic legislation and international law, to safeguard its national interests should reservations entered by the representatives of other States jeopardize Peru's telecommunication services and its full sovereign rights or should the application or interpretation of any of the Resolutions or Agreements of the Conference so require.

No. 23

Original: English

For the Republic of Iraq:

The Delegation of the Republic of Iraq reserves the right of its Government to take any action it deems necessary to safeguard its national interests in the light of any implications and consequences that may result from:

1. Resolution **520**: Future Change in Article **8** for the Broadcasting-Satellite Service (Sound) in the Frequency Range 500 MHz to 3 000 MHz. This Delegation considers that the future consequences of this Resolution will give rise to severe economic and technical constraints and will jeopardize telecommunication services and limit their growth and development, thereby running counter to the ITU Convention.

2. The inclusion of existing systems in the FSS Plan and continuation of these systems beyond their useful life, as provided for in the procedures associated with the Plan. These systems were identified throughout the Conference as the main source of deterioration to the FSS Plan in the planned bands identified for allotment planning.

No. 24

Original: French

For the Togolese Republic:

The Delegation of the Togolese Republic to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), in signing the Final Acts of the Conference, reserves for its Government the right to take any action it may deem necessary to safeguard its interests should any Member fail in any way to comply with the provisions of the ITU Convention or of the Radio Regulations or should reservations entered by other Administrations jeopardize the proper operation and development of its telecommunication services.

No. 25

Original: French

For the Socialist Republic of Viet Nam:

In signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Delegation of Viet Nam makes the following comments:

1. A number of the necessary technical parameters are not published in the Allotment Plan adopted by the Conference. It is to be hoped that they will be added, as agreed by the Conference.

2. The Delegation of Viet Nam takes note of the calculations and allocations for space-to-Earth feeder links for Viet Nam's broadcasting services made by the World Broadcasting-Satellite Administrative Radio Conference (WARC-77). However, the results produced by the WARC-77 calculation have not satisfied Viet Nam's requirements and therefore are not in line with the results of this Conference. The Delegation of Viet Nam wishes that the WARC-77 results for Viet Nam should be modified as soon as possible in accordance with the Radio Regulations.

3. WARC Orb-88 is a purely technical Conference where political questions have no place. It is regrettable that one Delegation raised a matter relating to Viet Nam's territorial sovereignty at this Conference. The Delegation of Viet Nam wishes to reiterate Statement No. 48 set out in the Final Protocol to the International Telecommunication Convention (Nairobi, 1982).

No. 26

Original: English

For the Socialist People's Libyan Arab Jamahiriya:

The Socialist People's Libyan Arab Jamahiriya reserves its right to accept or refuse to accept the consequences of any reservations made by other countries.

Also it reserves its right to take any measures it deems necessary to safeguard its interests and telecommunication services should any Member fail in any way to observe the provisions of the International Telecommunication Convention or of its related regulations.

No. 27

Original: English

For the Republic of Liberia:

The Delegation of the Republic of Liberia, headed by the Honourable Julius F. Hoff, Assistant Minister of Telecommunications Planning, in attendance of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988); considering the many inherent technical and procedural imperfections of the Plan, found in Parts A and B of the Plan, treating of national allotments, and existing systems, together with the associated procedures, reserves the rights of its Government, to resort to any actions that may be deemed necessary by the Government of Liberia to safeguard its national interest.

However the Delegation of Liberia expresses the hope that the Plan developed by the ITU at this Conference will lead to the equitable access of the Geostationary Orbit by all Member States of the ITU.

No. 28

Original: Arabic

For the Syrian Arab Republic:

The Delegation of the Syrian Arab Republic to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988) reserves for its Government the right:

- to accept or reject the consequences of reservations entered by other countries;
- to take any action it may deem necessary to safeguard its interests and protect its telecommunication services should any Member of the Union fail to comply with the provisions of the International Telecommunication Convention and the Regulations annexed thereto.

No. 29

Original: English

For the Islamic Republic of Iran:

In the Name of God, The Almighty,

1. The Administration of the Islamic Republic of Iran declares that due to the time constraint it was not possible to carefully verify the precise geographical coordinates (longitudes and latitudes) of the test points submitted by other Administrations to the Conference. Should any of the above-mentioned test points be situated (partially or totally) within the territory under the jurisdiction of this Administration:

a) The association of the subject test points to the Administration(s) notified is fully rejected by this Administration.

b) Said test points will in no way be protected with respect to (vis-à-vis) the assignments of this Administration as contained in the Plan(s).

This Administration further declares that it rejects the test point 55.0(55.03)E 25.9(25.87)N submitted by and appearing in the entry of the Administration of the United Arab Emirates to the Plan(s). This test point as presently specified is situated within the territory under the jurisdiction of the Islamic Republic of Iran, and therefore, its association to and inclusion with the entry of the Administration of the United Arab Emirates may directly or indirectly affect the operation of telecommunication services or the sovereign rights of the Administration of the Islamic Republic of Iran.

2. The Delegation of the Islamic Republic of Iran reserves for its Government the right to take any action as it may consider necessary to safeguard its interests should they be affected by decisions taken at this Conference, or by failure on the part of any other country or Administration in any way to comply with the requirements of the International Telecommunication Convention (Nairobi, 1982) or its Annexes or the Protocols or the Regulations attached thereto, or these Final Acts, or should reservations or declarations by other countries or Administrations jeopardize the proper and efficient operation of its telecommunication services, or infringe the full exercise of the sovereign rights of the Islamic Republic of Iran.

No. 30

Original: English

For the United Republic of Tanzania:

In signing these Final Acts, the Delegation of the United Republic of Tanzania reserves the right of its Government to take any action it will deem necessary to safeguard its interests (national, subregional or international) should any Member fail to comply with these Final Acts.

Furthermore, reservations of any administration shall not be recognized by the United Republic of Tanzania if it will in any way jeopardize the smooth implementation of the allotment of the United Republic of Tanzania in accordance with the guaranteed C/I criterion as adopted by the Conference.

No. 31

Original: English

For the Islamic Republic of Pakistan:

1. In signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Delegation of the Islamic Republic of Pakistan hereby declares that its Government reserves the right to take any action which it considers necessary to safeguard its interests, should any country or countries fail to observe the provisions of the Final Acts and its Annexes or the Protocols attached thereto or should the reservations made by other countries adversely affect the satellite-broadcasting and telecommunications services of the Islamic Republic of Pakistan.

2. The Delegation of the Islamic Republic of Pakistan declares that the decisions of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988) regarding areas falling within the territory of the disputed state of Jammu and Kashmir are without prejudice to the position recognized by the relevant resolutions of the United Nations on the question.

3. The Delegation of the Islamic Republic of Pakistan has noted with concern that the Plan has frequency assignments to the Indian Administration for providing fixed-satellite services and feeder links for the satellite-broadcasting services to include coverage of a large area of the territory of Pakistan. This spillover, which is technically avoidable, is not acceptable to the Pakistan Administration. The Government of Pakistan reserves the right to take appropriate measures to ensure that its territory does not come under international coverage by such Indian services.

No. 32

Original: French

For the Central African Republic:

The Delegation of the Central African Republic to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), hereby declares that it reserves for its Government the right to take any action it may deem necessary to safeguard its interests should the reservations entered by other Delegations to the Conference or non-compliance by other Member countries of the provisions adopted by the Conference jeopardize the proper operation of its telecommunication services.

No. 33

Original: English

For the Socialist Federal Republic of Yugoslavia:

In signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Delegation of the Socialist Federal Republic of Yugoslavia reserves for its Government the right to take any measures that it deems necessary to safeguard the interest of its telecommunications should any Member fail in any way to comply with the provisions adopted by this Conference.

No. 34

Original: English

For Malaysia:

The Delegation of Malaysia hereby:

1. reserves for its Government the right to take such action as it may deem necessary to safeguard its interest should any Member fail in any way to comply with the Final Acts of this Conference, or should reservation by any country jeopardize its telecommunication services;

2. declares that the signature, and possible subsequent approval by the Government of Malaysia of the Final Acts of this Conference, is not valid with respect to the Member appearing under the name of Israel, and in no way implies its recognition.

No. 35

Original: French

For France:

The French Administration approves the Final Acts of this Conference as a whole, and in particular, accepts the orbital positions foreseen in the Allotment Plan. It nevertheless regrets that some operating parameters are not entirely satisfactory.

With regard to the Allotment Plan, it considers that better results could have been obtained using other methods and other initial hypotheses. It expresses reservations with regard to the coherence of the procedures associated with the Plan, which were developed under difficult conditions in the very last days of the Conference, and to their applicability by the Administrations and the IFRB.

No, 36

Original: French

For the People's Democratic Republic of Algeria:

The Delegation of the People's Democratic Republic of Algeria to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988) reserves for its Government the right to take any action it may deem necessary to safeguard its interests should any Member fail in any way to comply with the provisions of these Final Acts or should reservations entered by other Members jeopardize its telecommunication services or lead to an increase in its contribution to defraying the expenses of the Union.

No. 37

Original: English

For the United Arab Emirates:

In signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Delegation of the United Arab Emirates reserves the right of its Government to take such steps as it may deem necessary, to protect its national interests should Abu Musa island be shown or claimed to be territory other than ours, by reservation or claim entered by the Islamic Republic of Iran with the Annexes or Protocols of the Final Acts.

No. 38

Original: English

For Turkey:

In signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Delegation of Turkey reserves its Government's right to take whatever action may be necessary to safeguard its interests in the Plans adopted by the Conference and ensure the proper functioning of its broadcasting-satellite, fixed-satellite and terrestrial services should any country fail in any way to comply with the Final Acts, Annexes and the Radio Regulations thereto, or should reservations by other countries jeopardize its above-mentioned services and the Plans.

No. 39

Original: French

For the Republic of Mali:

In signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Delegation of the Republic of Mali reserves for its Government the right to take any action it may deem necessary to safeguard its interests should any Member fail in any way to comply with the provisions of the Convention or the Regulations annexed thereto or should reservations entered by other administrations jeopardize the proper operation of its telecommunication services.

No. 40

Original: Spanish

For the Argentine Republic:

a) The Argentine Republic, exercising its sovereign rights over the Malvinas Islands, the South Georgia Islands and the South Sandwich Islands does not recognize the allotments (or the assignments deriving therefrom) appearing on behalf of the United Kingdom of Great Britain and Northern Ireland in the Plans established by this Conference to provide services in the territories mentioned and denies any right on the part of the United Kingdom to submit requirements, to notify the bringing into use of the allotments referred to or to set up any installation therein.

The Argentine Republic therefore reaffirms its indefeasible and inalienable sovereign rights over the Malvinas Islands, the South Georgia Islands and the South Sandwich Islands, which constitute an integral part of its territory.

The United Nations General Assembly adopted Resolutions 2065 (XX), 3160 (XXVIII), 31/49, 37/9 and 39/6 recognizing the existence of a sovereignty dispute on the Malvinas question and urging the Argentine Republic and the United Kingdom to resume negotiations with a view to reaching, as soon as possible, a peaceful and definitive solution to the dispute and the remaining differences relating to this matter through the good offices of the Secretary-General of the United Nations, who is to inform the General Assembly of the progress made. The 40th United Nations General Assembly adopted on 27 November 1985, Resolution 40/21 reiterating its appeal to both parties to resume negotiations, an appeal that was further repeated in Resolutions 41/40 and 42/19.

b) The Argentine Republic further reserves the right to adopt throughout its territory such measures as it considers necessary to ensure the provision of its telecommunication services should the interests of the nation be affected by the decisions taken at this Conference or by the reservations expressed by other countries.

No. 41

Original: French

For Burkina Faso:

The Delegation of Burkina Faso to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988) finds that the C/I ratio of its allotment for the fixed-satellite service (FSS) in the band 13/10 GHz is below the value of 26 dB adopted for planning. This situation is due mainly to the existing system EU1B1 of EUTELSAT.

The Delegation reserves the right of its Government to take any steps which it may consider useful to safeguard its interests in the event that Members of the Union fail to comply with the decisions of the Conference or that any reservations expressed jeopardize the proper operation of its telecommunication services.

The fatherland or death – we shall overcome!

No. 42

Original: Spanish

The Republic of Paraguay:

The Delegation of the Republic of Paraguay states that its Government reserves the right to take such action as it considers necessary to protect its telecommunication services, if they should be affected by the application of these Final Acts or as the result of any reservations expressed by other administrations.

No. 43

Original: French

For the People's Republic of Benin:

In signing the Final Acts, the Delegation of the People's Republic of Benin expresses its general satisfaction at the results achieved by the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988).

However, it feels some concern about certain provisions which some administrations, possibly still excessively attached to the "first come, first served" principle, albeit obsolete at the ITU, with regard to the use of the geostationary-satellite orbit, have been anxious to include in the procedures associated with the Allotment Plan for the fixed-satellite service.

For this reason, it reserves its Government's right to take any action which it may deem necessary to safeguard its interests if other administrations, in implementing certain provisions of the procedures, were to jeopardize the satisfactory bringing into use of its allotment appearing in the Plan for the fixed-satellite service adopted by the Conference.

No. 44

Original: Spanish

For the Republic of Colombia:

In signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Delegation of Colombia, having regard to the fact that, in accordance with the decisions of WARC Orb-85, this Conference has no authority to settle questions of sovereignty or jurisdiction, reaffirms its previous views on the geostationary orbit as a limited national resource and concerning the rights of the developing countries, including the equatorial countries.

The Delegation of Colombia likewise reserves its Government's right to take any action it may deem necessary – in keeping with its domestic legal system and international law – to safeguard its national interests in the event that the reservations expressed by representatives of other States affect the telecommunication services of Colombia or the full exercise of its sovereign rights; likewise, in the event that such action may be required by the application or interpretation of any provision adopted by the Conference for its incorporation in the Radio Regulations or the modification thereof.

No. 45

(This number has not been used.)

No. 46

Original: Spanish

For Cuba:

The Delegation of the Republic of Cuba to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988) reserves for its Government the right to take any action it may deem necessary to safeguard its interests should they be affected by the decisions taken at this Conference or should reservations entered by other administrations jeopardize the proper operation of its radiocommunication services.

No. 47

Original: Spanish

For Mexico:

On behalf of its Government, the Delegation of Mexico reserves the right to take any measures that it deems necessary to safeguard its interests in the event that other Members of the Union fail in any way to comply with the provisions contained in the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), or that reservations expressed by them jeopardize its telecommunication services.

No. 48

Original: French

For Austria, Denmark, Greece and the Kingdom of the Netherlands:

In signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Delegations of the above-mentioned States declare that, in the establishment of the Allotment Plan applicable to the fixed-satellite service (FSS) in the bands 6/4 and 14/11-12 GHz:

1. the planning guidelines enunciated in the Report of the First Session of the Conference (WARC Orb-85), and particularly those relating to the guarantee to all countries, in practice, of equitable access to the geostationary-satellite orbit and the radio frequency bands as limited natural resources, and also to equal burden sharing, are not applied in certain cases or in a satisfactory manner;

2. the scientific and technical means of ensuring optimized planning have not been fully explored;

3. the case of countries affected by the operation of existing systems is not dealt with in either an equitable or non-discriminitive manner;

4. finally, the specific purpose and underlying philosophy of WARC Orb-88 have not been adopted, since, instead of seeking largely to meet the national requirements of countries by simply taking account of the requirements of existing systems, the Plan, on the contrary, confers priority on such systems.

Consequently, the above-mentioned Delegations, while recognizing the utility of the existence of the Allotment Plan and the associated procedures contained in annex to these Final Acts, at the same time reserve their respective Governments' right to improve the Plan and associated procedures concerned in the light of the principles referred to above and with the assistance of the ITU.

No. 49

Original: English

For the Republic of India:

In signing the Final Acts of WARC Orb-88, the Delegation of the Republic of India reserves for its Government the right to take such action as may be considered necessary to safeguard its interests should any administration make reservations and/or not accept the provisions of the Final Acts or fail to comply with one or more provisions of the Final Acts, including those which form a part of the Radio Regulations.

The Delegation of the Republic of India reiterates its reservation entered in paragraph 2 of the Statement No. 13 in the Final Protocol of the Final Acts of the World Broadcasting-Satellite Administrative Radio Conference (WARC BC-1977) and states that the BSS feeder-link Plan adopted by the present Conference includes frequency assignments for the Administration of the Islamic Republic of Pakistan with service area covering part of the States of Jammu and Kashmir, which is an integral part of India. The Delegation of the Republic of India further wishes to state that some of the test points associated with the frequency allotments/assignments for the Administration of the Islamic Republic of Pakistan in the Plan for the fixed-satellite service, including those for its existing systems, are located in the States of Jammu and Kashmir. The Indian Administration, therefore, does not recognize any of these frequency allotments/assignments to the Administration of the Islamic Republic of Pakistan for operating such services. The Indian Administration reserves the right of its Government to take appropriate measures to ensure that its territory does not come under intentional coverage by the above-mentioned services of the Islamic Republic of Pakistan.

No. 50

Original: Spanish

For the Republic of Venezuela:

On 5 October, the Delegation of Côte d'Ivoire proposed an amendment in Document 470 to sub-paragraph b) of paragraph 202 of Section IA "Procedures for Conversion of an Allotment into an Assignment that is not in Conformity with Part A of the Plan or that Does not Comply with Annex 3B", to the effect that an alternative orbital position could be selected "within the PDA".

The Conference did not approve that amendment and, since it was 0200 hours in the morning, decided to leave the text unchanged as it appears in Document 477, which reads, "b) select an alternative orbital position preferably within its PDA".

WARC Orb-85 had decided that an orbital position would be identified with a predetermined arc in order to guarantee equitable access to the GSO and make the FSS Plan sufficiently flexible.

In the case of the text approved, there is so much flexibility that an administration may obtain an orbital position either within or outside its PDA, with the result that those who come first will have a much wider choice of orbital position than those unfortunate enough to begin using the geostationary orbit at a later date.

Accordingly, we wish to place on record and emphasize that although this planning model constitutes a step in the right direction in respect of access to the geostationary orbit, it falls a long way short of the concept of equality.

No. 51

Original: French

For the Republic of Cameroon:

The Delegation of the Republic of Cameroon to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of the Space Services Utilizing It (Second Session - Geneva, 1988) declares that its Government fulfils its international commitments. However, it reserves the right to take any appropriate measures to safeguard its interests in the event that the Final Acts of this Conference, particularly with regard to Part B of the Plan, the list of assignments associated with the Plan and additional uses, impede the development of its telecommunications.

No. 52

Original: English

For the Republic of Singapore:

The Delegation of the Republic of Singapore reserves for its Government the right to take such action as it may deem necessary to safeguard its interest if any Member country fails in any way to comply with the Final Acts of this Conference; or should any reservation by any Member country jeopardize its telecommunication services or its allotment in the fixed-satellite service Allotment Plan.

No. 53

Original: French

For Italy:

The Allotment Plan for the fixed-satellite service established by the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988) provides for Italy a totally unsatisfactory allotment in relation to the existing systems, as defined by this Conference, which considerably reduce Italy's possibilities for operating the allotment reserved to it. Italy is not in a position to approve these decisions which, in its opinion, conflict with the principle – reaffirmed by WARC Orb-88 – of guaranteeing in practice to all countries equitable access to the geostationary-satellite orbit.

In signing the Final Acts of the Conference, the Italian Delegation states that its signature does not signify the acceptance of the Allotment Plan in question, on which it wishes to reserve its position.

No. 54

Original: English

For Brunei Darussalam:

The Delegation of Brunei Darussalam reserves for its Government the right to take such action as it may deem necessary to safeguard its interests if any Member country fails in any way to comply with the Final Acts of this Conference, or should any reservation by any Member country jeopardize its telecommunication services or its allotment in the fixed-satellite Allotment Plan.

No. 55

Original: English

For the Arab Republic of Egypt:

The Delegation of the Arab Republic of Egypt to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), (WARC Orb-88), reserves for its Government the right to take such action as it may deem necessary to protect its interests, should any Member fail in any way to comply with the provisions of the Final Acts of this Conference, or should reservations entered by other Members jeopardize its telecommunication services.

No. 56

Original: English

For the Republic of Malta:

In signing the Final Acts and Final Protocol of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Delegation of the Republic of Malta reserves for its Government the right to take such action as it may consider necessary to safeguard its interests should any Members fail in any way to comply with the provisions of the said Final Acts or should reservations by other countries jeopardize the operation of its telecommunication and broadcasting services.

No. 57

Original: French

For Portugal:

Considering

a) that, for the purposes of the establishment by the Conference of the Allotment Plan for the fixed-satellite service, specific requirements were submitted with regard to the orbital position of 31° West by Spain, Ireland and Portugal for technical operational reasons;

b) that Ireland's specific requirements were considered later as a case of reduction of possible incompatibilities between allotments in the Plan and existing systems, and then finally as improvement to the Plan;

c) that, in view of the numerous specific requirements of the types indicated above which were submitted, Committee 4 of the Conference decided to take no further account of them for planning purposes.

having taken note

in the presentation of the final draft of the Plan, of the fact that this draft contains, for Ireland, the orbital position of 31° West, contrary to what occurred in the previous planning exercises,

the Delegation of Portugal declares that, on grounds of principle, the allotment to Ireland, in the Allotment Plan adopted by the Conference, of the orbital position of 31° West constitutes an extremely serious case of discrimination between Members of the Union enjoying the same rights and a breach of a relevant and valid decision already adopted.

No. 58

Original: Russian

For the Byelorussian Soviet Socialist Republic, the Ukrainian Soviet Socialist Republic and the Union of Soviet Socialist Republics:

In signing the Final Acts of the Conference, the above-mentioned Delegations reserve their right to take the necessary organizational and technical steps consistent with the provisions contained in the Final Acts of this Conference to ensure the normal operation of their existing systems.

The Delegations of the Byelorussian Soviet Socialist Republic, the Ukrainian Soviet Socialist Republic and the Union of Soviet Socialist Republics declare that they will take any steps that they consider necessary to safeguard their interests in the event that any Members of the Union fail in any way to comply with the provisions of the Final Acts of this Conference or that any reservations expressed by any Member of the Union affect the operation of their radio services.

No. 59

Original: French

For Greece:

In signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Delegation of the Republic of Greece declares that it reserves its Government's right to take any action in keeping with the constitution, legislation and international commitments of Greece that it may deem or judge necessary or useful to protect and safeguard its national rights and interests in the event that States Members of the Union should fail, in any way whatever, to comply with the provisions of these Final Acts and the Annexes thereto.

It likewise reserves its Government's right to refuse to accept any effect of any reservations expressed by other parties, which, *inter alia*, might entail financial implications, or if such reservations were to jeopardize the proper and efficient operation of the telecommunication services of the Republic of Greece.

No. 60

Original: English

For Norway:

Noting that a number of countries have submitted requirements in respect of Antarctica, the Government of Norway declares that its decision not to submit such requirements does not imply any change in Norway's sovereign position in Antarctica. In this context the Government of Norway draws the attention of the Conference to Article IV of the Antarctic Treaty.

No. 61

Original: English

For the Republic of San Marino:

The Republic of San Marino, considering that its allotment in the 11/13 GHz band is affected, not reaching an aggregate carrier-to-interference ratio over 26 dB, reserves the right to take all necessary measures to protect the said allotment and to ensure an aggregate C/I ratio over 26 dB.

No. 62

Original: Spanish

For Spain:

The Delegation of Spain to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988) declares that it cannot accept the procedure followed during the Conference in alloting the nominal orbital position 31° W.

The Spanish Delegation therefore rejects that allotment, which it considers arbitrary and invalid, and reserves for its Government the right to take any action it deems necessary should that allotment jeopardize its rights with respect to the use of the geostationary orbit/radio spectrum resource.

No. 63

Original: French

For the Republic of Senegal:

In signing these Final Acts, subject to ratification by its Government, the Delegation of the Republic of Senegal hereby declares, on behalf of its Government, that it does not accept any of the consequences of reservations entered by other governments which might jeopardize the operation of its telecommunication services.

Furthermore, the Republic of Senegal reserves the right to take any action it may deem necessary to safeguard its interests should any Member fail to comply with the provisions of the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988).

No. 64

Original: French

For Luxembourg:

In signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Luxembourg Delegation takes note of the reservations expressed by various countries and reserves its Government's right to take appropriate steps in the event that the application or interpretation of the decisions emerging from this Conference jeopardize its interests.

No. 65

Original: French

For the Republic of Côte d'Ivoire:

After noting the Declarations already deposited and upon signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Delegation of the Republic of Côte d'Ivoire hereby declares that it reserves for its Government the right to approve them and to take any action it may deem necessary to safeguard its interests should any Member or Members of the Union enter reservations liable to prejudice the sovereign rights of the Republic of Côte d'Ivoire.

No. 66

Original: English

For the State of Israel:

The Declarations made by certain Delegations in Nos. 16 and 34 of the Final Protocol, being in flagrant contradiction with the principles and purposes of the International Telecommunication Union and, therefore, devoid of any legal validity, the Government of Israel wishes to put on record that it rejects these Declarations outright and will proceed on the assumption that they can have no validity with respect to the rights and duties of any Member State of the International Telecommunication Union.

In any case, the Government of Israel will avail itself of its rights to safeguard its interests should the Governments of those Delegations in any way violate any of the provisions of the Convention, or the Annexes, Protocols or Regulations attached thereto, or the Final Acts of this Conference.

The Delegation of Israel further notes that Declaration No. 16 does not refer to the State of Israel by its full and correct name. As such it is totally inadmissible and must be repudiated as a violation of recognized rules of international behaviour.

No. 67

Original: French

For the Republic of Guinea:

In signing the Final Acts, the Delegation of the Republic of Guinea to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), after noting the Declarations which have been deposited, reserves for its Government the right to take any action it may deem necessary to safeguard its interests should any Member of the Union fail to comply with the provisions of the Final Acts of this Conference or the Annexes thereto, or should reservations entered by other countries jeopardize the proper operation of its telecommunication services.

No. 68

Original: English

For the United Kingdom of Great Britain and Northern Ireland:

With reference to Statement No. 40 by the Argentine Republic and to all other statements and reservations by the Argentine Delegation during the proceedings of this Conference concerning the Falkland Islands, and South Georgia and South Sandwich Islands, the Government of the United Kingdom of Great Britain and Northern Ireland have no doubt as to United Kingdom sovereignty over the Falkland Islands and South Georgia and South Sandwich Islands.

The United Kingdom is the recognized Administration for these territories and, as such, has the sole right to submit requirements in respect of them: all allotments (or assignments deriving therefrom) relating to these territories which, on behalf of the United Kingdom Administration, are contained in the Plans established by this Conference, or in other Conference documents, and are therefore not open to question.

No. 69

Original: English

For the United Kingdom of Great Britain and Northern Ireland:

With reference to statement No. 11 by the Delegation of Chile, the Government of the United Kingdom of Great Britain and Northern Ireland draws the attention of the Chilean Delegation to Article IV of the Antarctic Treaty to which both the Chilean Government and the Government of the United Kingdom of Great Britain and Northern Ireland are parties. Article IV freezes claims to Antarctic Territory south of latitude 60 degrees South.

The Government of the United Kingdom of Great Britain and Northern Ireland has no doubt as to the sovereignty of the United Kingdom over the British Antarctic Territory.

No. 70

Original: English

For the People's Democratic Republic of Ethiopia:

In signing the Final Acts, the Delegation of the People's Democratic Republic of Ethiopia to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), after noting the reservations and statements made by some Delegations regarding the FSS Allotment Plan, reserves the right of its Government to take all steps it may deem necessary to safeguard its telecommunication services should any Member of the Union fail to comply with the provisions of this Conference.

No. 71

Original: English

For the People's Republic of China:

In signing the Final Acts, the Delegation of the People's Republic of China to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988) declares that:

1. Having noted the Statement No. 25, the Delegation of the People's Republic of China reiterates the position of its Government, already stated in its Declaration (No. 115) included in the Final Protocol to the International Telecommunication Convention (Nairobi, 1982).

2. Should failure to comply with the Radio Regulations or the Decisions in the Final Acts of the relevant Administrative Radio Conference, or reservations by any other Member country, affect the interests and the telecommunication services of the People's Republic of China, the Chinese Delegation reserves for its Government the right to take any action it deems necessary to ensure that its rights are not encroached upon.

No. 72

Original: English

For Ireland:

a) Ireland reserves the right to take such action as it may consider necessary to safeguard its interests should any Member fail to observe the provisions of this Conference or should Declarations by other administrations jeopardize its rights with respect to the use of the geostationary orbit/radio spectrum resource.

b) The Delegation of Ireland referring to statement No. 57 by Portugal wishes to state that its allotment is in accordance with the procedures adopted by this Conference.

No. 73

Original: Spanish

For the Argentine Republic:

With reference to Declaration No. 11 in the Final Protocol of this Conference and to any other claim to sovereignty over the Antarctic territories that may be raised by any other State, the Argentine Republic hereby declares that no such claim can affect its indefeasible and inalienable rights of sovereignty over the sector of the Antarctic south of latitude 60° South between longitude 25° and 74° West.

No. 74

Original: English

For the Federal Republic of Germany, Australia, Austria, Belgium, Canada, Denmark, the United States of America, Finland, France, Greece, Italy, Japan, Luxembourg, Norway, New Zealand, the Kingdom of the Netherlands, Papua New Guinea, Portugal, the United Kingdom of Great Britain and Northern Ireland, Sweden and the Confederation of Switzerland:

The above-mentioned Delegations, referring to the Declarations made by the Republic of Colombia and Ecuador, consider that, inasmuch as these statements refer to the Bogota Declaration of 3 December 1976 by equatorial countries and to the claims of those countries to exercise sovereign rights over segments of the geostationary-satellite orbit, the claims in question cannot be recognized by this Conference. Further, the above-mentioned Delegations wish to reaffirm the Declarations made on behalf of their administrations in this regard when signing the Final Acts of the World Administrative Radio Conference (Geneva, 1979), and the World Administrative Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (First Session - Geneva, 1985), and the International Telecommunication Convention (Nairobi, 1982) by which the Conference is bound.

The above-mentioned Delegations also wish to state that reference in Article 33 to the "geographical situation of particular countries" does not imply a recognition of claim to any preferential rights to the geostationary orbit.

No. 75

Original: French

For the Socialist Republic of Viet Nam:

As time does not permit the Delegation of the Socialist Republic of Viet Nam to check all the test points and service areas submitted by other administrations in the region, it reserves the right not to recognize the test points and service areas located on Viet Nam's territory.

No. 76

Original: French

For the Rwandese Republic:

Having taken note of the Declarations already deposited and upon signing the Final Acts, the Delegation of the Rwandese Republic reserves for its Government the right to take any action it may deem necessary to safeguard its interests should the application of the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988) by any other Member of the Union jeopardize the orbital position it obtained when the Allotment Plan was established, or worsen the C/I ratio of 26 dB.

No. 77

Original: English

For the Federal Republic of Germany and Sweden:

The above-mentioned Delegations wish to state that the Declaration made by Chile can in no way restrict or otherwise modify the provisions of Article IV of the Antarctic Treaty.

No. 78

Original: English

For the Federative Republic of Brazil:

Having carefully studied the Declarations and, in particular, the reservations contained in Document 484, the Delegation of Brazil to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988) is compelled to reserve for its Government the right to take all necessary measures to protect its interests should any country fail to comply with the decisions of this Conference or as a consequence of reservations expressed by other countries in the document referred to above.

No. 79

Original: English

For the Islamic Republic of Pakistan:

The Delegation of Pakistan has the honour to refer to paragraph 2 of the reservations made by the Delegation of the Republic of India (Document 484) and wishes to make the following comments.

The State of Jammu and Kashmir has been recognized by the United Nations as a disputed territory and its final status has yet to be determined by the people of the State, in accordance with the relevant resolutions of the United Nations. Decisions regarding areas falling within the territory of the disputed State are without prejudice to the position recognized by the relevant resolutions of the United Nations on the question. The test points and areas to be covered by the Republic of India in the Plan for the fixed-satellite services, including part B of the Plan for the existing systems, and in the feeder-link Plan for the broadcasting-satellite services which fall within the State of Jammu and Kashmir are, therefore, not recognized by Pakistan as being in the Indian territory.

No. 80

Original: English

For the Islamic Republic of Iran:

In the Name of God, The Almighty,

In signing the Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988), the Delegation of the Islamic Republic of Iran referring to the statement No. 37 as appeared in Document 484, reserves the right of its Government for total sovereignty over the Abu Musa Island and rejects any claim or reservation by any Administration as far as the question of sovereignty is concerned.

No. 81

Original: Spanish

For Spain:

The Delegation of Spain to the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988) rejects the reservation appearing as No. 17 in the Final Protocol, submitted by the Delegation of the Kingdom of Morocco on the Spanish territories of Ceuta, Melilla and the Chafarinas Islands.

(The signatures follow)

(The signatures following the Final Protocol are the same as those shown on pages 5 to 20.)

RESOLUTION No. 4 (Rev.Orb-88)

Period of Validity of Frequency Assignments to Space Stations Using the Geostationary-Satellite Orbit [1]

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that rational and efficient use must be made of the frequency spectrum and the geostationary-satellite orbit and that account should be taken of the provisions of Resolution **2** of the World Administrative Radio Conference, Geneva, 1979, relating to the use by all countries, with equal rights, of frequency bands for space radiocommunication services;

b) that limiting the period of validity of frequency assignments to space stations using the geostationary-satellite orbit is a concept which could promote the attainment of these objectives;

c) that amortizing the considerable investments made in connection with the development of space radiocommunications is a particularly heavy burden for all administrations and that these investments should be spread over a predetermined period;

d) that efforts should be made to encourage administrations in a position to do so to develop techniques designed to improve the utilization of the frequency spectrum and the geostationary-satellite orbit with a view to increasing the total radiocommunication facilities available to the world community;

---

[1] This Resolution does not apply to the frequency bands covered by the Allotment Plan as contained in Appendix **30B**.

e) that it would be advantageous to introduce an experimental procedure to gain experience from application of the new concept of notifying the period of validity of an assignment in space radiocommunication, but that it is not desirable to impose on administrations a statutory period identical in all cases but that on the contrary administrations should be left to propose the period of validity themselves in the light of their requirements and of the common interest;

f) that the present Conference has reviewed this Resolution and decided that more time is required in its application before it can be properly assessed;

resolves

1. that, until this Resolution is reviewed by the next competent world administrative radio conference, frequency assignments to space radiocommunication stations located on the geostationary orbit shall be dealt with as follows:

1.1 a frequency assignment to a space station[1] on a geostationary satellite shall be deemed definitively discontinued after the expiry of the period of operation shown on the assignment notice, reckoned from the date on which the assignment was brought into service. This period shall be limited to that for which the satellite network was designed. The Board shall then invite the notifying administration to take steps to cancel the assignment. If the Board receives no reply within three months following the expiry of the period of operation, it shall insert a symbol in the Remarks Column of the Master Register to indicate that the assignment is not in conformity with this Resolution;

---

[1] The expression "space station" may apply to more than one satellite provided that only one satellite is in operation at any particular moment and that the stations installed on board successive satellites have identical basic characteristics.

1.2 if a notifying administration which wishes to extend the period of operation originally shown on the assignment notice of a frequency assignment of an existing space station[1] informs the Board accordingly more than three years before the expiry of the period in question and if all other basic characteristics of that assignment remain unchanged, the Board shall amend as requested the period of operation originally recorded in the Master Register and publish that information in a special section of the weekly circular;

1.3 if, at least three years before the expiry of the period of operation recorded in the Master Register of a frequency assignment to an existing space station[1], an administration initiates the coordination procedure specified in No. **1060** to bring into service a new space station using the same assigned frequency and the same orbital position but with different technical characteristics, and if the Board finds after the notification that the new assignment conforms with the provisions of No. **1503** and does not increase, in relation to the preceding assignment, the probability of interference to the detriment of a frequency assignment recorded in the Master Register or involved in the coordination procedure, the new assignment shall be given a favourable finding and shall be entered in the Master Register;

1.4 a notifying administration which wishes to modify a basic characteristic of a frequency assignment of a space station[1] recorded in the Master Register shall initiate, in any case other than those covered by paragraphs 1.2 and 1.3, the appropriate modification procedure in accordance with the provisions of Nos. **1547** to **1551**;

2. that, for the application of the provisions of paragraph 1.1 above, the information concerning the period of validity of frequency assignments to space stations shall be notified in addition to that contained in Appendices **3** and **4** to the Radio Regulations;

---

[1] The expression "space station" may apply to more than one satellite provided that only one satellite is in operation at any particular moment and that the stations installed on board successive satellites have identical basic characteristics.

3. that the application of this Resolution shall not prejudge in any way the decisions of future administrative radio conferences;

invites the next competent world administrative radio conference

to take cognizance of the results of the application of this Resolution and take action, as appropriate;

instructs the Secretary-General

to bring this Resolution to the attention of the Administrative Council.

RESOLUTION No. 42 (Rev.Orb-88)

Use of Interim Systems in Region 2 in the Broadcasting-Satellite and Fixed-Satellite (Feeder-Link) Services in Region 2 for the Bands Covered by Appendix 30 (Orb-85) and Appendix 30A (Orb-88)

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, prepared a Plan for the broadcasting-satellite service in the band 12.2 - 12.7 GHz and a Plan for the associated feeder links in the band 17.3 - 17.8 GHz with provisions for implementing interim systems in accordance with Resolution No. 2 (Sat-R2);

b) that in the implementation of their assignments in the Plans, administrations of Region 2 may find it more appropriate to adopt a phased approach and initially use characteristics different from those appearing in the appropriate Region 2 Plan;

c) that some administrations of Region 2 may cooperate in the joint development of a space system with a view to covering two or more service areas from the same orbital position or to using a beam which would encompass two or more service areas;

d) that some administrations of Region 2 may cooperate in the joint development of a space system with a view to covering two or more feeder-link service areas from the same orbital position or to using a beam which encompasses two or more feeder-link service areas;

e) that interim systems shall not adversely affect the Plans nor hamper the implementation and evolution of the Plans;

f) that the number of assignments to be used in an interim system shall not in any case exceed the number of assignments appearing in the Region 2 Plan which are to be suspended;

g) that the interim systems shall not in any case use orbital positions that are not in the Region 2 Plan;

h) that an interim system shall not be introduced without the agreement of all administrations whose space and terrestrial services are considered to be affected;

resolves

that administrations and the IFRB shall apply the procedure contained in the Annex to this Resolution, so long as Appendices **30 (Orb-85)** and **30A (Orb-88)** remain in force.

ANNEX TO RESOLUTION No. 42 (Rev.Orb-88)

1. An administration or a group of administrations in Region 2 may, after successful application of the procedure contained in this Annex and with the agreement of the affected administrations, use an interim system during a specified period not exceeding ten years in order:

1.1 *For an interim system in the broadcasting-satellite service*

a) to use an increased e.i.r.p. in any direction relative to that appearing in the Region 2 Plan provided that the power flux-density does not exceed the limits given in Annex 5 to Appendix **30 (Orb-85)**;

b) to use modulation characteristics[1] different from those appearing in the Annexes to the Region 2 Plan and resulting in an increased probability of harmful interference or in a wider assigned bandwidth;

c) to change the coverage area by displacing boresight, or by increasing the major or minor axis, or by rotating them from an orbital position which shall be one of the corresponding orbital positions appearing in the Region 2 Plan;

d) to use a coverage area appearing in the Region 2 Plan or a coverage area encompassing two or more coverage areas appearing in the Region 2 Plan from an orbital position which shall be one of the corresponding positions appearing in the Region 2 Plan;

e) to use a polarization different from that in the Region 2 Plan.

1.2 *For an interim feeder-link system*

a) to use an increased e.i.r.p. in any direction relative to that appearing in the Region 2 feeder-link Plan;

b) to use modulation characteristics[1] different from those appearing in the Annexes to the Plan and resulting in an increased probability of harmful interference or in a wider assigned bandwidth;

---

[1] For example, modulation with sound channels frequency-multiplexed within the bandwidth of a television channel, digital modulation of sound and television signals, or other pre-emphasis characteristics.

c) to change the feeder-link beam area by displacing the boresight, or by increasing the major or minor axis, or by rotating them in relation to an orbital position which shall be one of the corresponding orbital positions appearing in the Region 2 feeder-link Plan;

d) to use a feeder-link beam area appearing in the Region 2 feeder-link Plan or a feeder-link beam area encompassing two or more feeder-link beam areas appearing in the Region 2 feeder-link Plan in relation to an orbital position which shall be one of the corresponding orbital positions appearing in the Region 2 feeder-link Plan;

e) to use a polarization different from that in the Region 2 feeder-link Plan.

2. In all cases, an interim system shall correspond to assignments in the appropriate Region 2 Plan; the number of assignments to be used in an interim system shall not in any case exceed the number of assignments appearing in the Region 2 Plan which are to be suspended. During the use of an interim system, the use of the corresponding assignments in the Region 2 Plan is suspended; they shall not be brought into use before the cessation of the use of the interim system. However, the suspended assignments, but not the interim system's assignments, of an administration shall be taken into account when other administrations apply the procedure of Article 4 of Appendix **30 (Orb-85)** or of Article 4 of Appendix **30A (Orb-88)**, as appropriate, in order to modify the Plans, or the procedure of this Annex in order to bring an interim system into use. The assignments of interim systems shall not be taken into account in applying the procedure of Article 6 or Article 7 of Appendix **30 (Orb-85)** and the procedure of Article 6 or Article 7 of Appendix **30A (Orb-88)**.

3. As a specific consequence of paragraph 2 above, Region 2 interim system assignments shall not obtain protection from, or cause harmful interference to, new or modified assignments appearing in the Regions 1 and 3 Plans following the successful application of the procedure of Article 4 of Appendix **30 (Orb-85)** or of Article 4 of Appendix **30A (Orb-88)**, as appropriate, even if the assignment modification procedure is concluded and the assignments become operational within the time-limits specified in paragraph 4 *a)*.

4. When an administration proposes to use an assignment in accordance with paragraph 1, it shall communicate to the IFRB the information listed in Annex 2 to Appendix **30 (Orb-85)** or in Annex 2 to Appendix **30A (Orb-88)**, as appropriate, not earlier than five years but, preferably, not later than twelve months before the date of bringing into use. The administration shall also indicate:

a) the maximum specified period during which the interim assignment is intended to remain in use;

b) the assignments in the Region 2 Plans the use of which will remain suspended for the duration of the use of the corresponding interim assignment;

c) the names of the administrations with which an agreement for the use of the interim assignment has been reached, together with any comment relating to the period of use so agreed and the names of administrations with which an agreement may be required but has not yet been reached.

5. Administrations are considered to be affected as follows:

5.1 *For an interim system in the broadcasting-satellite service*

a) an administration of Region 2 is considered to be affected if any overall equivalent protection margin of one of its assignments in the Region 2 Plan, calculated in accordance with Annex 5 to Appendix **30 (Orb-85)** including the cumulative effect of all interim uses during the maximum

specified period of use of the interim system, but excluding the corresponding suspended assignments (paragraph 4 *b)*), becomes negative or a former negative value is made more negative;

b) an administration of Region 1 or 3 is considered to be affected if it has an assignment which is in conformity with the Regions 1 and 3 Plan contained in Appendix **30 (Orb-85)** or in respect of which proposed modifications have been published by the Board in accordance with the provisions of Article 4 of that Appendix with a necessary bandwidth which falls within the necessary bandwidth of the proposed interim assignment and the appropriate limits of Section 3 of Annex 1 to Appendix **30 (Orb-85)** are exceeded;

c) an administration of Region 1 or 3 is considered to be affected if it has a frequency assignment in the fixed-satellite service which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. **1060** of the Radio Regulations or under Article 7 of Appendix **30 (Orb-85)** or which has been published in accordance with No. **1044** of the Radio Regulations or of paragraph 7.1.3 of Appendix **30 (Orb-85)** and the appropriate limits of Section 6 of Annex 1 to Appendix **30 (Orb-85)** are exceeded;

d) an administration of Region 1 or 3 is considered to be affected if, although having no frequency assignment in the appropriate Regions 1 and 3 Plan in the channel concerned, it nevertheless would receive on its territory a power flux-density value which exceeds the limits given in Section 5 of Annex 1 to Appendix **30 (Orb-85)** as a result of the proposed interim assignment, or if it has such an assignment for which its associated service area does not cover the whole of the territory of the administration, and in its territory outside that service area the power flux-density from the interim system space station exceeds the above mentioned limits;

e) an administration of Region 2 is considered to be affected if, although having no frequency assignment in the appropriate Region 2 Plan in the channel concerned, it nevertheless would receive on its territory a power flux-density value which exceeds the limits given in Section 8 *b)* of Annex 1 to Appendix **30 (Orb-85)** as a result of the proposed interim assignment, or if it has such an assignment for which its associated service area does not cover the whole of the territory of the administration, and in its territory outside that service area the power flux-density from the interim system space station exceeds the above-mentioned limits;

f) an administration of Region 3 is considered to be affected if it has a frequency assignment to a space station in the broadcasting-satellite service in the band 12.5 - 12.7 GHz with a necessary bandwidth any portion of which falls within the necessary bandwidth of the proposed assignment, and which:

– is recorded in the Master Register; *or*

– has been coordinated or is being coordinated under the provisions of Resolution **33** of the World Administrative Radio Conference, Geneva, 1979; *or*

– appears in a Region 3 Plan to be adopted at a future administrative radio conference, taking account of modifications which may be introduced subsequently in accordance with the Final Acts of that Conference,

and the limits of Section 3, Annex 1 to Appendix **30 (Orb-85)** are exceeded.

5.2 *For interim feeder-link systems*

a) an administration of Region 2 is considered to be affected if any overall equivalent protection margin of one of its assignments in the Plan, calculated in accordance with

Annex 3 to Appendix **30A (Orb-88)** including the cumulative effect of all interim uses during the maximum specified period of use of the interim system, but excluding the corresponding suspended assignment(s) (paragraph 4 *b)*), becomes negative or a former negative value is made more negative;

b) an administration in Region 1 or 3 is considered to be affected if it has an assignment for feeder links in the fixed-satellite service (Earth-to-space), any portion of the necessary bandwidth of which falls within the necessary bandwidth of the proposed assignment, which is in conformity with the feeder-link Plan for Regions 1 and 3, or in respect of which proposed modifications to the Plan have already been published by the Board in accordance with the provisions of paragraphs 4.2.6.1 and 4.2.7 of Article 4 of Appendix **30A (Orb-88)** and for which the limits set out in Section 5 of Annex 1 to Appendix **30A (Orb-88)** are exceeded;

c) an administration in Regions 1, 2 or 3 is considered to be affected if it has a frequency assignment in the fixed-satellite service (space-to-Earth) which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. **1060** of the Radio Regulations and the appropriate limits of Section 1 of Annex 1 to Appendix **30A (Orb-88)** are exceeded;

d) an administration in Regions 1, 2 or 3 is considered to be affected if it has a frequency assignment in the band 17.7 - 17.8 GHz to a terrestrial station, in use or intended to be brought into use within three years of the projected date of bringing into use of the feeder-link earth station, which is located within the coordination area of the feeder-link earth station concerned and the limits of Section 2 of Annex 1 to Appendix **30A (Orb-88)** are exceeded.

6. The Board shall publish in a special section of its weekly circular the information received under paragraph 4, together with the names of the administrations which the Board has identified in applying paragraph 5.

7. When the Board finds that the suspended assignment of an administration having an interim system is not affected, it shall examine the projected interim system with respect to the interim system of that administration and if there is an incompatibility, it shall request the two administrations concerned to adopt any measures that may enable the new interim system to be operated.

8. The Board shall send a telegram to the administrations listed in the special section of the weekly circular drawing their attention to the information it contains and shall send them the results of its calculations.

9. Any administration not listed in the special section which considers that its planned interim assignment may be affected shall so inform the administration responsible for the interim system and the Board, and the two administrations shall endeavour to resolve the difficulty before the proposed date of bringing the interim assignment into use.

10. An administration which has not sent its comments either to the administration seeking agreement or to the Board within a period of four months following the date of the weekly circular referred to in paragraph 6 shall be understood as having agreed to the proposed interim use.

11. On the expiry of four months following the date of publication of the weekly circular referred to in paragraph 6, the Board shall review the matter, and, depending on the results obtained, shall inform the administration proposing the interim assignment that:

a) it may notify its proposed use under Article 5 of Appendix **30 (Orb-85)** or Article 5 of Appendix **30A (Orb-88)**, as appropriate, if no agreement is required or the required agreement has been obtained from the administrations concerned. In this case the Board shall update the Interim List;

b) it may not bring into use its interim system before having obtained the agreement of the administrations affected, either directly or by applying the procedure described in Article 4 of Appendix **30 (Orb-85)** or Article 4 of Appendix **30A (Orb-88)**, as appropriate, as a means of obtaining that agreement.

12. The Board shall include all the interim assignments in an Interim List in two parts, one each for the broadcasting-satellite service and the feeder-link assignments, and shall update it in accordance with this Annex. The Interim List shall be published together with the Region 2 Plans but does not constitute part of them.

13. One year prior to the expiry of the interim period, the Board shall draw the attention of the administration concerned to this fact and request it to notify in due time the deletion of the assignment from the Master Register and the Interim List.

14. If, notwithstanding the reminders by the Board, an administration does not reply to its request sent in application of paragraph 13, the Board shall, at the termination of the interim period:

a) enter a symbol in the Remarks Column of the Master Register to indicate the lack of response and that the entry is for information only;

b) not take that assignment into account in the Interim List;

c) inform the administrations concerned and affected of its action.

15. When an administration confirms the termination of the use of the interim assignment, the Board shall delete the assignment concerned from the Interim List and the Master Register. Any corresponding assignment in the Plan(s), suspended earlier, may then be brought into use.

16. An administration which considers that its interim system may continue to be used after the expiry of the interim period may extend it by not more than four years and to this effect shall apply the procedure described in this Annex.

17. When an administration applies the procedure in accordance with paragraph 16, but is unable to obtain the agreement of one or more affected administrations, the Board shall indicate this situation by inserting an appropriate symbol in the Master Register. Upon receipt of a complaint of harmful interference, the administration shall immediately cease operation of the interim assignment.

18. When an administration, having been informed of a complaint of harmful interference, does not cease transmission within a period of thirty days after the receipt of complaint, the Board shall apply the provisions of paragraph 14.

RESOLUTION No. 45 (Orb-88)

Improvement of the Accuracy of the Master International Frequency Register, the International Frequency List, and List VIIIA

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that an accurate and updated Master International Frequency Register is essential for the application of all the relevant procedures in the Radio Regulations;

b) that there is a need to improve the accuracy and reliability of the Master International Frequency Register;

c) the importance to administrations of an accurate and up-to-date record in the Master International Frequency Register, the International Frequency List, and List VIIIA for the efficient use of the radio-frequency spectrum and geostationary-satellite orbit;

d) that previous initiatives of the IFRB have shown that, with the cooperation of administrations, substantial improvements can be made in the accuracy and reliability of the Master International Frequency Register;

e) that the application of the periodical inquiry procedure in Article **13** by the IFRB has encountered difficulties;

recognizing

a) that only vigorous and cooperative worldwide action on this problem will lead to a solution;

b) that a procedure involving the mutual cooperation of all administrations and the IFRB is required for the purpose of revising parts of the Master International Frequency Register;

resolves

1. to urge administrations to observe the time limits prescribed in the Radio Regulations concerning modification, cancellation and review of entries in the Master International Frequency Register;

2. to urge administrations to cooperate fully with the IFRB in the application of the provisions of the Radio Regulations relating to the cancellation of assignments no longer in use and to the notification of suspended assignments to space and earth stations.

RESOLUTION No. 69 (Orb-88)

Estimation of Interference between Satellite Networks Using Simplified Methods

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that CCIR texts contain information on evolving simplified methods which may be used to provide a significant improvement in the accuracy of interference estimates when compared with the calculations of Appendix **29** of the Radio Regulations;

b) that an improvement in the accuracy of interference estimates would facilitate the coordination process, thereby relieving administrations of an administrative burden and unnecessary costs;

c) that most of the data requirements for these methods are identified in Appendix **3** of the Radio Regulations;

resolves

to invite the CCIR to continue studies on simplified methods for estimating interference between satellite networks and to recommend a preferred method or methods;

encourages

administrations to participate in the studies of the CCIR, to assure full consideration of all potential methods, to use these methods and to provide the necessary data.

RESOLUTION No. 92 (Orb-88)

Revision, Replacement and Cancellation of Resolutions of the World Administrative Radio Conference, Geneva, 1979, and the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (First Session – Geneva, 1985) (Orb-85)

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

its agenda, in particular items 6, 7, 10 and 13, and the action taken on a number of Resolutions of the World Administrative Radio Conference, Geneva, 1979, and of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (First Session – Geneva, 1985) (Orb-85);

further considering

a) that the following Resolutions of the conferences referred to above have been revised as indicated:

Resolution **4**	Relating to the Period of Validity of Frequency Assignments to Space Stations Using the Geostationary-Satellite Orbit, replaced by Resolution **4 (Rev.Orb-88)**;

Resolution **42 (Orb-85)** Relating to the Provisional Application for Region 2 of Resolution No. 2 - (Sat-R2), replaced by Resolution **42 (Rev.Orb-88)** relating to the Use of Interim Systems in Region 2 in the Broadcasting-Satellite and Fixed-Satellite (Feeder Link) Services in Region 2 for the Bands Covered by Appendix **30 (Orb-85)** and Appendix **30A (Orb-88)**;

Resolution **506** Relating to the Use, by Space Stations Operating in the 12 GHz Frequency Bands Allocated to the Broadcasting-Satellite Service, of the Geostationary-Satellite Orbit and No Other, replaced by Resolution **506 (Rev.Orb-88)**;

b) that all necessary action has been taken for the implementation of the following Resolutions of the conferences referred to above:

Resolution **3** Relating to the Use of the Geostationary-Satellite Orbit and to the Planning of Space Services Utilizing It;

Resolution **31** Relating to the Application of Certain Provisions of the Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, to Take into Account Changes Made by the World Administrative Radio Conference, Geneva, 1979, to the Table of Frequency Allocations for Region 2 in the Band 11.7 - 12.7 GHz;

Resolution **40 (Orb-85)** Relating to the Recording in the Master International Frequency Register of the Assignments for Region 2 contained in Appendix **30 (Orb-85)** and Appendix **30A** ;

Resolution **41 (Orb-85)** Relating to the Provisional Application of the Partial Revision of the Radio Regulations as Contained in the Final Acts of the WARC Orb-85 Prior to its Entry into Force;

Resolution **43 (Orb-85)** Relating to Orbital Position Limitations for the Broadcasting-Satellite Service in Regions 1 and 2 in the Band 12.2 - 12.5 GHz and for the Fixed-Satellite Service (Feeder-Link Stations) in Region 2 for the Band 17.3 - 17.8 GHz;

Resolution **100** Relating to the Coordination, Notification and Recording in the Master International Frequency Register of Assignments to Stations in the Fixed-Satellite Service with Respect to Stations in the Broadcasting-Satellite Service in Region 2;

Resolution **101** Concerning the Drawing Up of Agreements and of the Associated Plans for Feeder Links to Space Stations in the Broadcasting-Satellite Service Operating in the 12 GHz Band Under the Plan Adopted by the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, for Regions 1 and 3;

Resolution **102** Relating to Coordination among Administrations of the Technical Characteristics of Feeder Links to Space Stations in the Broadcasting-Satellite Service in the Band 11.7 - 12.5 GHz (Region 1) and 11.7 - 12.2 GHz (Region 3) during the Period Between the Entry into Force of the Final Acts of the World Administra-

tive Radio Conference, Geneva, 1979, and the Entry into Force of the Final Acts of a Future Conference on the Planning of Feeder Links to Such Space Stations;

Resolution **502** — Relating to the Period Between the Entry into Force of the Final Acts of the Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, and the Date on Which the Provisions and Associated Plan Adopted by that Conference Are Annexed to the Radio Regulations;

Resolution **503** — Relating to the Coordination, Notification and Recording in the Master International Frequency Register of Frequency Assignments to Stations in the Broadcasting-Satellite Service in Region 2;

Resolution **504** — Relating to the Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, with respect to Region 2;

Resolution **700** — Relating to Sharing Between the Fixed-Satellite Service in Regions 1 and 3 and the Broadcasting-Satellite Service in the 12 GHz Band and Associated Feeder Links in Region 2;

Resolution **701** — Relating to the Convening of a Regional Administrative Radio Conference for the Detailed Planning of the Broadcasting-Satellite Service in the 12 GHz Band and Associated Feeder Links in Region 2;

resolves

that the Resolutions of the World Administrative Radio Conference, Geneva, 1979, and the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (First Session – Geneva, 1985) (Orb-85), listed under *a)* above shall apply as revised by this Conference and that those listed under *b)* above shall be cancelled.

RESOLUTION No. 104 (Orb-88)

Application of the Provisions of No. 1550 of the Radio Regulations as Modified by WARC Orb-88

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that it has revised No. **1550** of the Radio Regulations relating to the extension of the date of bringing into use of assignments to space radiocommunication stations;

b) that, in accordance with the revised provision, an administration may extend the date of bringing into use of its assignment by a period of three years, leading to a total period of nine years between the date of publication of the Special Section referred to in No. **1044** and the date of bringing into use;

c) that the current No. **1550** limits this period to five years and 18 months;

d) that exceptional circumstances may make it difficult for administrations to bring satellite networks into use by the date originally envisaged;

e) that one such exceptional circumstance is the problem of the availability of launch facilities;

f) that currently there exist satellite networks in the advanced publication or coordination stages, for which an extension of the date of bringing into use beyond five years and 18 months has been requested;

resolves

that administrations and the IFRB shall, with immediate effect, apply the provisions of No. **1550** of the Radio Regulations, as contained in the Final Acts of this Conference, with respect to any request for an extension of the date of bringing into use of assignments to space radiocommunication stations;

instructs the IFRB

1. to apply forthwith, for all satellite networks for which the IFRB has already received the advance publication information or for which the coordination procedure has been initiated, a period of extension which would lead to a total period of nine years between the date of publication under No. **1044** and the date of bringing into use;

2. when revising its Rules of Procedure relating to the application of No. **1550**, to take account of the revision adopted by the Conference for this provision, and of this Resolution.

RESOLUTION No. 105 (Orb-88)

Improvement of the Quality of certain Allotments in Part A of the Fixed-Satellite Service Plan

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that the delegations of the administrations participating in this Conference have made intensive efforts to achieve the goals identified in the agenda of the Conference;

b) that the Conference has made intensive use of the ITU computer facilities and associated software to develop an Allotment Plan for the fixed-satellite service in the frequency bands identified for the Plan;

c) that a Plan has been developed which guarantees one coverage for each administration (Part A of the Plan) and accommodates existing systems (Part B of the Plan);

d) that, in the case of a small number of allotments in the Plan, the reference value of 26 dB has not been achieved for the C/I ratio;

noting

that in spite of all efforts made by the conference, some allotments in Part A of the Plan are still below the reference value for C/I;

noting further

that the evaluation of some solutions for raising the value of C/I would be facilitated by appropriate consultations after the Conference between administrations working together in a spirit of cooperation to find equitable solutions;

recognizing

the right of each administration to have a value of C/I of 26 dB for its allotment;

believing

that further cooperation among administrations, and the application of technical aspects to particular situations, could improve the allotments in *considering c)* above, given the progress made in this field;

resolves

1. that, following the Conference, an administration which has an allotment with a value of C/I lower than 26 dB, and administrations whose allotments may have an impact on that allotment, should make every effort to reach agreement on measures to improve the quality of that allotment;

2. that, with the agreement of the administrations concerned, consideration could be given to slight adjustments to the nominal orbital position of other satellites on condition that all agreed protection criteria are observed;

invites administrations

to implement the provision of this Resolution in the spirit of cooperation which characterizes the relations between Members of the ITU;

calls upon

the permanent organs of the ITU to provide technical advice, if requested by the administrations concerned, to facilitate mutually satisfactory solutions.

RESOLUTION No. 106 (Orb-88)

Provisional Application of the Partial Revision of the Radio Regulations (Appendix 30A (Orb-88)) as Contained in the Final Acts of the WARC Orb-88 Prior to its Entry into Force

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that the present Session has decided to incorporate in the Radio Regulations the provisions and the associated Plans for the fixed-satellite service for feeder links in the bands 14.5 - 14.8 GHz and 17.3 - 18.1 GHz in Regions 1 and 3;

b) that during the period preceding the date of entry into force of the partial revision of the Radio Regulations, as contained in the Final Acts of the Second Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (WARC Orb-88), administrations of countries of Regions 1 and 3 may wish to bring into use assignments appearing in the Regions 1 and 3 feeder-link Plans or to modify them;

c) that there is a need to apply the interregional sharing criteria developed by this Session for all Regions;

further considering

that there is a need for procedures to be applied by all administrations and the IFRB during the interim period referred to in *b)* above;

resolves

1. that during the period preceding the date of entry into force of the partial revision of the Radio Regulations included in Appendix **30A (Orb-88)**, as contained in the Final Acts of the WARC Orb-88, administrations and the IFRB shall apply the said partial revision on a provisional basis;

2. that on the date of entry into force of the partial revision of the Radio Regulations referred to in *resolves* 1, as contained in the Final Acts of the WARC Orb-88, the IFRB shall publish the modifications to the Plans introduced in application of *resolves* 1 above, in a special section of its weekly circular in order to enter them into the Regions 1 and 3 feeder-link Plan.

RESOLUTION No. 107 (Orb-88)

Satellite Networks Intended for Use in the Frequency Bands of the Plan in Appendix 30B for Which Information Was Communicated to the IFRB Between 8 August 1985 and 5 October 1988

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that it has adopted a Plan with a Part B containing the existing systems which had commenced the procedures of Article **11** of the Radio Regulations before 8 August 1985;

b) that, since that date, information on new satellite networks intended for use in the frequency bands of the Plan has been communicated to the IFRB between 8 August 1985 and 5 October 1988 (see Annex);

c) that in order to safeguard the Plan and its associated procedures, it is essential to prevent other satellite networks from being implemented in the planned bands before the date of the entry into force of Appendix **30B**;

d) that, nevertheless, the satellite networks referred to in *considering b)* should be permitted to develop if they can be regarded as a conversion of national allotments in Part A of the Plan into assignments;

resolves

1. that the satellite networks mentioned in *considering b)* may continue to develop and, if necessary, the provisions of Section I or IA of Article 6 of Appendix **30B** may exceptionally be applied to only one of those networks per administration before the date of the entry into force of the Plan provided it is compatible with Parts A and B of the Plan;

2. that the Board shall invite the Administrations concerned to indicate whether their satellite networks listed in the Annex to this Resolution are to be regarded as a conversion of their national allotments in Part A of the Plan into assignments;

3. that the networks not identified in the application of *resolves* 2 will be considered as additional uses and be subject to the provisions of Section III of Article 6 of Appendix **30B**.

ANNEX

Administration	Space station	Longitude	Status *	11 GHz	13 GHz
D	DFS 5	33.50	A	X	X
	DFS 1	23.50	A	X	X
	DFS 2	28.50	A	X	X
E	HISPASAT 1/2	–31.00	A	X	X
USA	USASAT 13N	70.00	C	X	
	USASAT 13L	–165.00	A	X	
I	SARIT	–19.00	A	X	X

* A: Advance publication
C: Coordination

RESOLUTION No. 108 (Orb-88)

Use of the Bands 4 500 - 4 800 MHz, 6 725 - 7 025 MHz, 10.70 - 10.95 GHz, 11.2 - 11.45 GHz and 12.75 - 13.25 GHz prior to the Date of Entry into Force of Appendix 30B

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that this Conference has adopted a new Appendix **30B** dealing with the frequency bands listed above covered by the Allotment Plan for the fixed-satellite service;

b) that Appendix **30B** and Resolution **107** contain provisions relating to satellite networks intended for use in the frequency bands listed above and communicated to the Board prior to 5 October 1988 in application of Articles **11** and **13** of the Radio Regulations;

c) that new satellite networks intended for use in these frequency bands may not be compatible with the allotments in the Plan;

resolves

that administrations shall not apply the provisions of Article **11** of the Radio Regulations in the bands mentioned above for satellite networks not listed in Part B of the Plan in Appendix **30B** pending the entry into force of this Appendix;

instructs the IFRB

to apply the provisions of this Resolution to information it receives concerning any satellite network intended for use in all or part of the frequency bands listed above and to return the information to the Administration concerned, drawing its attention to the present Resolution.

RESOLUTION No. 109 (Orb-88)

Recording in the Master International Frequency Register of the Assignments for Regions 1 and 3 Contained in Appendix 30A(Orb-88)

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

that the provisions and associated feeder-link Plans adopted by this Conference with the appropriate modifications have been incorporated in the Radio Regulations in Appendix **30A (Orb-88)**;

resolves

that, on the date of signature of the Final Acts of the Second Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1988, the frequency assignments in the Plans will be entered in the Master Register. The date of signature of these Final Acts will be entered, together with an appropriate symbol, in Column 13c opposite these assignments.

RESOLUTION No. 110 (Orb-88)

Improved Procedures for Certain Bands of the Fixed-Satellite Service

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that the process of coordination of space services was initially laid down by the Extraordinary Radio Conference, 1963, improved by the World Administrative Radio Conference for Space Telecommunications, 1971 (WARC-71), and further expanded by the World Administrative Radio Conference, 1979 (WARC-79);

b) that Resolution **2** of WARC-79 reiterated the principle of the equitable use by all countries, with equal rights, of the geostationary-satellite orbit (GSO) and of the frequency bands allocated to space services, first embodied in Resolution No. **Spa2** – 1 of WARC-71;

c) that Resolution **3** of WARC-79 resolved on the need to guarantee in practice for all countries equitable access to GSO and to the frequency bands allocated to space services and for this purpose decided to convene the World Administrative Radio Conference, to be held in two sessions;

d) that the First Session of the present Conference (Orb-85) agreed on the need for improved regulatory procedures as one of the methods for the planning of the fixed-satellite service and stipulated certain guidelines for this purpose;

noting

that Article **11** of the Radio Regulations has elements of bilateral and multilateral consultations for coordinating the space systems and networks which administrations plan to bring into use;

noting further

that the concept of Multilateral Planning Meetings (MPM) is a part of a mechanism to provide equitable access to the limited natural resources of the GSO and the radio-frequency spectrum;

recognizing

a) that the coordination of each satellite network presents unique circumstances and requirements;

b) that success in such coordination and the resolution of the difficulties of new satellite networks could, in some cases, necessitate appropriate burden sharing;

c) that any coordination process requires the cooperation and goodwill of all concerned administrations so as to realize a balance of interests of all parties;

d) the need and obligation of all administrations concerned to reach mutually acceptable solutions in regard to the characteristics of the systems involved in the coordination process;

e) that the provisions of Article **11**, as amended by this Conference, foresee bilateral and multilateral discussions at any stage in the process of obtaining access to the limited natural resources of the GSO and the radio-frequency spectrum;

f) that in some circumstances the convening of Multilateral Planning Meetings (MPM), as a part of the process of obtaining access to the limited natural resources of the GSO and the radio-frequency spectrum, could become an effective means of resolving difficulties;

g) that the IFRB can assist administrations seeking to resolve difficulties in accordance with Nos. **1088-1094** of the Radio Regulations;

resolves

1. that Multilateral Planning Meetings (MPM) shall also be a part of the process of coordination for the fixed-satellite service in the bands:

- 3 700 - 4 200 MHz
  5 850 - 6 425 MHz

- 10.95 - 11.20 GHz
  11.45 - 11.70 GHz
  11.70 - 12.20 GHz in Region 2[1]
  12.50 - 12.75 GHz in Regions 1 and 3[1, 2]
  14.00 - 14.50 GHz

2. that the convening of such Multilateral Planning Meetings (MPM) would be appropriate when an administration finds it has a major difficulty in obtaining coordination under the pertinent provisions of Article **11** in the frequency bands specified in *resolves* 1 above;

---

[1] In these bands the improved procedures shall apply between networks of the fixed-satellite service only.

[2] When a fixed-satellite service network is to be operated in the frequency band 12.5 - 12.75 GHz, as well as under No. **845** in the frequency band 12.2 - 12.5 GHz, the improved procedures may apply for coordination of that network.

3. that any administration seeking the coordination of a satellite network in the fixed-satellite service to be operated in the frequency bands mentioned in *resolves* 1 above with respect to any other satellite network of the fixed-satellite service, has the right to propose to the other administrations concerned the holding of a Multilateral Planning Meeting (MPM);

4. that any administration which cannot attend a Multilateral Planning Meeting (MPM) may delegate another administration to represent it;

5. that if one or more of the affected administrations are unable to participate in a Multilateral Planning Meeting (MPM) for any reason, then the pertinent provisions of Article **11** shall be applied to its (their) network(s);

6. that the results of a Multilateral Planning Meeting (MPM) shall be considered as coordination agreements among the participants and shall in no way prejudice the rights of non-participating administrations;

7. that the results of a Multilateral Planning Meeting (MPM) shall be conveyed to the Board in accordance with **1087B** and **1087C**;

also resolves

that the representatives of the organizations responsible for the affected multi-administration systems can also participate in the Multilateral Planning Meeting (MPM);

urges

1. all administrations and organizations whose systems are affected to make every effort to participate in the Multilateral Planning Meeting (MPM);

2. all participants to make every effort for the success of the Multilateral Planning Meeting (MPM);

resolves further

1. that the Multilateral Planning Meeting (MPM) may be held at a place agreed by the affected administrations;

2. that the cost of a Multilateral Planning Meeting (MPM) shall be borne by the participants according to the arrangements agreed upon by all participants;

3. that, at the request of the administration initiating the Multilateral Planning Meeting (MPM), in agreement with the other affected administrations, the Secretary-General may supply secretarial services under contractual arrangements in accordance with No. **286** of the Nairobi Convention;

4. that any affected administration may call upon the permanent organs of the Union (General Secretariat, IFRB and CCIR) for any technical advice as it deems necessary;

further urges administrations

1. to hold bilateral or multilateral consultations at any stage of the process of obtaining access to the limited natural resources of the GSO and the radio-frequency spectrum when it is expected that such consultations will assist in the resolution of difficulties;

2. to cooperate and resolve mutually coordination problems in a spirit of international understanding, so as to uphold the principles of equal rights and equitable access to the GSO and the frequency bands allocated to space services for all administrations;

invites

the Administrative Council to monitor the progress of the application of this Resolution and, if difficulties arise in practice in the assurance of such equitable access, to propose that the Multilateral Planning Meeting (MPM) process be reviewed by a future competent conference.

RESOLUTION No. 111 (Orb-88)

Planning of the Fixed-Satellite Service in the Bands 18.1 - 18.3 GHz, 18.3 - 20.2 GHz and 27 - 30 GHz

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that the First Session of the present Conference (Geneva, 1985) in its Report to the Second Session, requested the CCIR to study the technical characteristics of the fixed-satellite service in the bands 18.1 - 18.3 GHz, 18.3 - 20.2 GHz and 27 - 30 GHz with a view to a decision on the future planning of these bands for the fixed-satellite service being taken by a future competent conference;

b) that the CCIR concluded that it would be extremely unwise for these bands to be subject to planning at this time and that further study would be necessary;

recognizing

1. that these bands have not been exploited extensively due to technical and economic reasons, although they potentially have great capacity;

2. that the required satellite orbital spacing may be reduced, thus resulting in easier coordination between satellite networks because narrower satellite antenna beamwidths can be achieved than in the lower frequency bands;

3. that different performance criteria may well be necessary from those which currently exist for frequency bands below 15 GHz, since the propagation characteristics are different;

resolves

that the bands 18.1 - 18.3 GHz, 18.3 - 20.2 GHz and 27 - 30 GHz shall not be included in frequency bands identified for planning at this time;

invites the CCIR

to continue its studies into the technical characteristics of the bands 18.1 - 18.3 GHz, 18.3 - 20.2 GHz and 27 - 30 GHz until a decision is taken by a future competent conference.

RESOLUTION No. 506 (Rev.Orb-88)

Use by Space Stations Operating in the 12 GHz Frequency Bands Allocated to the Broadcasting-Satellite Service of the Geostationary-Satellite Orbit and No Other

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that a Plan designating frequency assignments in the above-mentioned frequency bands and positions in the geostationary-satellite orbit has been adopted by the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, for Regions 1 and 3;

b) that a similar Plan for Region 2 has been adopted by the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983;

c) that the Plans referred to in *considering a)* and *b)* above were consolidated in Appendix **30 (Orb-85)** to the Radio Regulations at the First Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1985 (Orb-85);

d) that the operation of space radiocommunication services in the frequency bands concerned in orbits other than the geostationary-satellite orbit would be incompatible with the plans referred to in *a)* and *b)* above;

resolves

that administrations shall ensure that their space stations in these frequency bands are operated in the geostationary-satellite orbit and no other.

RESOLUTION No. 518 (Orb-88)

Country/Geographical Area Symbols Used in Appendix 30 (Orb-85) and Appendix 30A (Orb-88)

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

noting

that several country/geographical area symbols used in Appendix **30 (Orb-85)** have changed or are no longer appropriate and are therefore not listed in the Preface to the International Frequency List (IFL);

noting further

the provisions of No. **2237** of the Radio Regulations;

recognizing

that country symbols in the Preface to the IFL may be changed at irregular intervals, as the need arises and on the basis of prior consultation between the Secretary-General and the IFRB and the countries concerned;

considering

that there should be no discrepancies between the country/geographical area symbols listed in the Preface to the IFL and those appearing in Appendix **30 (Orb-85)** and Appendix **30A (Orb-88)**;

resolves to instruct the Secretary-General

to ensure that, when publishing updated versions of the Radio Regulations, the country/geographical area symbols used in Appendix **30 (Orb-85)** and Appendix **30A (Orb-88)** reflect the latest status, following consultation with the countries concerned.

RESOLUTION No. 519 (Orb-88)

Possible Extension to Regions 1 and 3 of Provisions for Interim Systems

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that this Conference has reviewed Resolution **42 (Orb-85)** of the First Session and has incorporated into the Radio Regulations a modified text of that Resolution containing provisions covering the use of interim systems in Region 2;

b) that this Conference has adopted a feeder-link Plan for the broadcasting-satellite service in Regions 1 and 3;

c) that some administrations in Regions 1 and 3 have expressed interest in the adoption, for these Regions, of provisions similar to those adopted for interim systems in Region 2;

d) that the broadcasting-satellite and associated feeder-link Plans for Regions 1 and 3 differ from those adopted for Region 2;

resolves

1. that a future competent conference should consider the possible application of regulatory provisions covering the operation of interim systems in Regions 1 and 3;

2. that administrations of Regions 1 and 3 wishing to bring into use interim systems of the broadcasting-satellite service before the date that may be determined by the future competent conference referred to in *resolves* 1, shall apply the provisions of Article 4 of Appendix **30 (Orb-85)** or Article 4 of Appendix **30A (Orb-88)** as appropriate, using if necessary the provisions of 4.3.15 of Appendix **30 (Orb-85)** or 4.2.16 of Appendix **30A (Orb-88)**.

3. that, when such interim systems are notified, Article 5 of Appendix **30 (Orb-85)** or Article 5 of Appendix **30A (Orb-88)**, as appropriate, shall be applied;

invites the Administrative Council

to place this matter on the agenda of the next conference competent to consider broadcasting-satellite service matters.

RESOLUTION No. 520 (Orb-88)

Future Change in Article 8 for the Broadcasting-Satellite Service (Sound) In the Frequency Range 500 MHz to 3 000 MHz

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that the subject of the broadcasting-satellite service (sound) has been under consideration within the Union for a quarter of a century;

b) that the World Administrative Radio Conference, Geneva, 1979 (WARC-79) resolved in Resolution **505** that the next world administrative radio conference dealing with space radiocommunication services in general or with a specific space radiocommunication service should be authorized to consider the results of various studies and to take appropriate decisions regarding the allocation of a suitable frequency band;

c) that Recommendation **2** of the First Session of this Conference (Geneva, 1985) recommended that the Second Session of this Conference should consider the results of the various up-to-date studies and in reviewing the situation prevailing at that time take appropriate decisions concerning the various aspects of this system as outlined in Resolution **505** of WARC-79;

d) that, at the Conference Preparatory Meeting (CPM) (1984), the CCIR indicated that further work would be needed to define the system parameters;

e) that the CCIR has provided this Session of the Conference with a report on its studies relating to the broadcasting-satellite service (sound);

f) that the broadcasting-satellite service (sound) is technically feasible;

g) that there is a need by a number of administrations for broadcasting-satellite services (sound) for individual reception with low cost, portable and mobile receivers with simple antennas, in rural and urban areas;

h) that a number of administrations consider that existing services have high importance and should be protected;

i) that individual reception of sound programmes with portable and automobile receivers is not possible using the frequency bands at present allocated to the broadcasting-satellite service;

j) that several administrations made proposals to WARC-79 concerning frequency band allocations to the broadcasting-satellite service (sound) in the range 500 to 2 000 MHz;

k) that, on the basis of the technical characteristics of the systems and of propagation factors, as studied by the CCIR up to now, the band 500 to 2 000 MHz would be preferable for the implementation of the service, the lower end at approximately 500 MHz because of increasing man-made noise and transmitting antenna size with decreasing frequency, and the upper end at approximately 2 000 MHz because of the decreasing effective area of the receiving antenna and reduced diffraction around obstacles with increasing frequency;

l) that studies to date have shown that accommodation of the broadcasting-satellite service (sound) in the frequency range 500 to 2 000 MHz or nearby will cause considerable sharing difficulties with other services and that extensive use of this frequency range is now being made by many services, thus making difficult the allocation of a band to the broadcasting-satellite service (sound);

m) that recent studies and developments included in the Report of the CCIR to this Session of the Conference have shown that the use of FM modulation techniques in low latitudes, the application of advanced digital modulation techniques in higher latitudes and the possibilities of sharing on the basis of geographical separation may, under the conditions specified in the CCIR Report, facilitate band-sharing with other radiocommunication services;

n) that by taking into consideration the extended band 500 to 3 000 MHz the possibility of identifying a new frequency band for the broadcasting-satellite service (sound) is enhanced, and that in general it is not easy for a broadcasting-satellite service (sound) to share a frequency band with other services, for which reason the CCIR reports that an exclusive band allocation would be preferred;

o) that due consideration should also be given to the need for the necessary associated feeder links for the broadcasting-satellite service (sound);

p) that more time is required to design and plan a sound-broadcasting system which might be introduced in the early part of the next century and, where necessary, to plan and effect the re-accommodation of existing services for those countries interested in these services;

considering also, as regards the work of the CCIR

a) that the frequency range now being considered is 500 to 3 000 MHz;

b) that experiments have confirmed certain postulates made in theoretical studies and further, that an experimental system using advanced digital modulation techniques has been demonstrated;

c) that advanced digital modulation systems have, amongst others, the advantage of low transmitting power and, consequently present the possibility of sharing with other services, although further studies are required;

d) that further system studies are necessary before the implementation of operational systems;

e) that studies concerning this service have been conducted in accordance with Study Programme 2K-1/10 and 11;

f) that the appropriate frequency range for the service is limited by man-made noise, the size of both the transmitting and receiving antennas, propagation factors, satellite transmit power, and sharing (including sharing on a geographical basis);

g) that the bandwidth requirements of the broadcasting-satellite service (sound) will depend on the extent of the possibilities of frequency re-use;

noting

that the World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service, Geneva, 1987, in Recommendation **511 (HFBC-87)** already raised the question of a future world administrative radio conference to review and, as necessary, revise the Table of Frequency Allocations in the high frequency portion of the spectrum; and that the World Administrative Radio Conference for the Mobile Services (Mob-87), Geneva, 1987, in Resolution **208 (Mob-87)** also raised the question of a world administrative radio conference to be held not later than 1992 to consider a partial revision of the Table of Frequency Allocation in the range 1 000 to 3 000 MHz;

further noting

that the reception conditions (portable and vehicular reception) and propagation factors (echoes, selective fading, etc.) for the broadcasting-satellite service (sound) are similar to those for the mobile-satellite service and a frequency band in a similar frequency range can therefore be considered;

resolves

a) that a band (or bands) of frequencies in the range 500 to 3 000 MHz be sought with a view to a possible allocation to the broadcasting-satellite service (sound);

b) that appropriate provisions be made for the associated feeder links;

c) that appropriate provisions be made to regulate sharing, with other radiocommunication services wherever applicable, of any bands identified in *resolves a)* and *b)*;

d) that appropriate provisions be developed to protect existing services and, if necessary, to re-accommodate in other bands assignments to the stations of existing services that may be affected in those countries in which frequency bands will be allocated to the broadcasting-satellite service (sound);

resolves to recommend

that the Plenipotentiary Conference, Nice, 1989, should include in the programme of conferences the subject of the revision of the Table of Frequency Allocations in Article **8**, as referred to in *noting*, taking into account the *further noting* and the Conference proposed in Resolution **208 (Mob-87)** by WARC Mob-87, in order to provide, if possible, for the necessary allocation to the broadcasting-satellite service (sound) within the frequency range 500 - 3 000 MHz and the appropriate provisions to accommodate the associated feeder links;

invites the CCIR

to pursue its technical studies on the broadcasting-satellite service (sound) in the frequency range 500 - 3 000 MHz, especially on the following issues:

a) the impact of choice of frequency on system parameters, especially satellite power requirements, the characteristics of transmitting and receiving antennas and on propagation characteristics;

b) the bandwidth required by the service;

c) the technical aspects of sharing between services with special consideration to geographical sharing,

and to provide a report to the Conference referred to in the *resolves to recommend* above;

instructs the Secretary-General

to bring this Resolution to the attention of the Plenipotentiary Conference, Nice, 1989, and to the Session of the Administrative Council in 1990.

RESOLUTION No. 521 (Orb-88)

Selection of a Frequency Band for Use by the Broadcasting-Satellite Service and Intended for Wide RF-Band High Definition Television [1], and of an Associated Frequency Band for HDTV Feeder Links, and the Adoption of Related Provisions by a Future Competent Conference

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that the development of techniques for high definition television broadcasting is rapidly progressing;

b) that the frequency bands around 12 GHz allocated to the broadcasting-satellite service do not, as presently planned, provide a worldwide allocation suitable for the implementation of HDTV via satellite;

c) that a worldwide frequency allocation to the broadcasting-satellite service suitable for HDTV transmissions is desirable to facilitate the implementation of a unique worldwide standard for HDTV transmissions by satellite and to reduce interregional inter-service sharing constraints;

[1] Wide RF-Band High Definition Television is referred to in the text of this Resolution as HDTV.

d) that the band 22.5 - 23 GHz is allocated to the broadcasting-satellite service in Regions 2 and 3, and is authorized in those Regions subject to agreement obtained under the procedure set forth in Article **14** of the Radio Regulations;

e) that due account should be taken of other radiocommunication services appearing in Article **8** of the Radio Regulations;

considering also

a) that the CCIR has carried out a number of studies concerning the broadcasting of HDTV signals, propagation aspects, and the difficulties of sharing with other services (see the CCIR Reports to the First and Second Sessions of this Conference);

b) that the CCIR in its Report to the Second Session has concluded that:

i) narrow RF-band systems (operating in a 24 - 27 MHz channel) are characterized by relatively high degrees of bandwidth compression and by analogue modulation;

ii) wide RF-band systems (both analogue and digital) require an RF channel bandwidth typically in the order of 50 - 120 MHz;

iii) some use of the 12 GHz band, as planned, can be made for narrow RF-band systems using single channel, highly compressed signal formats and, at the expense of a significant reduction in the number of available programmes, for formats using two RF channels. However, the 12 GHz band, as planned, will not accommodate single wide RF channel high definition TV, analogue or digital signals on a worldwide basis;

iv) from a propagation point of view, all bands from 12 GHz to 23 GHz may be suitable, but rain attenuation, which increases with frequency, and atmospheric absorption need to be taken into account;

c) that this Conference has confirmed the need for a suitable band to be made available, preferably on a worldwide basis, for the future introduction of HDTV in the broadcasting-satellite service (BSS) with an associated band for HDTV feeder links, also preferably on a worldwide basis;

resolves

1. that opportunities be given in Article **8** of the Radio Regulations to achieve a well balanced situation for all Regions to facilitate the introduction of HDTV on a worldwide basis;

2. that the frequency range 12.7 - 23 GHz be considered for the choice of an appropriate band for HDTV;

3. that, while the Plans for the 11.7 - 12.7 GHz band can already be used for certain types of high definition television, studies should be continued on the long range future suitability of these bands for HDTV without prejudice to the existing plans in this band;

4. that appropriate bands be considered for associated HDTV feeder links;

5. that further studies (going beyond those presented in the Reports of the CCIR to this Conference) will be essential before the most suitable bands can be chosen;

6. that, in choosing the band for the long term use by HDTV, due account must be taken of other services with allocations in the band and of existing systems operating in the band, and a minimum period, to be determined by the Conference referred to in *resolves to recommend* 2 below, should be allowed for any re-accommodation or adjustment of these services that might arise;

resolves to recommend

1. that the Plenipotentiary Conference, Nice, 1989, when establishing the post-1989 programme of conferences and meetings, should include provision for a world administrative radio conference competent to deal, *inter alia*, with matters relating to HDTV, which should be held sufficiently early to take due account of any period that may be needed to re-accommodate or adjust other services if necessary;

2. that the Administrative Council, when establishing the agenda for the above-mentioned WARC, should ensure that the Conference is authorized:

a) to make definitive selection of, and the appropriate radio regulatory provision for, a frequency band for HDTV in the broadcasting-satellite service in the long-term and for an associated HDTV feeder-link band, both preferably on a worldwide basis;

b) to adopt appropriate provisions to regulate the sharing of any such bands with other radiocommunication services, being guided by the appropriate CCIR studies, taking into account the needs of any existing services which might perhaps have to be adjusted or re-accommodated elsewhere in the frequency spectrum, including the time required to effect any necessary changes;

c) to determine the dates for the entry into force of its decisions, including the earliest date for the introduction of HDTV and associated feeder links into any frequency bands selected for these purposes;

invites the CCIR

to undertake further studies of feeder links and down-links necessitated by this Resolution and to submit its report not later than one year before the WARC mentioned above. These studies are to include the following:

1. system parameters for HDTV transmissions by satellite, with emphasis on the effect of the choice of frequency, e.g.:

- modulation (including baseband coding and channel coding);
- satellite power requirements;
- satellite and earth station technology;
- receiving system characteristics;
- type of polarization (including propagation effects);

2. propagation characteristics, e.g.:

- attenuation, including precipitation losses;
- atmospheric absorption;
- cross-polar discrimination;

3. inter- and intra-service sharing and interference, interregional sharing;

invites administrations

to carry out studies as required, taking into account the above-listed topics, and to communicate the results to the CCIR;

instructs the Secretary-General

to bring this Resolution to the attention of the Plenipotentiary Conference, Nice, 1989, and of the Administrative Council.

RESOLUTION No. 709 (Orb-88)

Coordination Between Feeder-Link Earth Stations and Stations of other Services in the Bands 14.5 - 14.8 GHz and 17.7 - 18.1 GHz in Regions 1 and 3

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that in Regions 1 and 3 the frequency bands 14.5 - 14.8 GHz and 17.7 - 18.1 GHz are allocated to several services on an equal primary basis;

b) that prior to the commencement of this Conference the IFRB was in receipt of notices for recording in the Master Register, concerning stations of services not included in the planning process;

c) that this Conference recognized in its agenda that the rights of such services must be taken into account;

d) that nevertheless administrations should be in a position to implement their feeder-link earth stations operating in accordance with Appendix **30A (Orb-88)** in shared bands;

resolves

1. that administrations in Regions 1 and 3 should examine within a period of six months after the end of this Conference whether it would be necessary to coordinate with the administrations identified in accordance with paragraph 5.1.4 of Appendix **30A (Orb-88)**;

2. that, if such a coordination with the administrations identified in accordance with paragraph 5.1.4 of Appendix **30A (Orb-88)** appears necessary, these administrations should inform those administrations responsible for existing stations mentioned in *considering b)* , the notices of which were submitted to the IFRB prior to 29 August 1988, of their intention to bring into use their frequency assignments in conformity with the Regions 1 and 3 feeder-link Plans as soon as they are able to do so;

3. that administrations responsible for such existing stations mentioned in *considering b)* shall make every effort to accelerate the process of coordination in order not to delay unduly the implementation of feeder-link earth stations.

RECOMMENDATION No. 15 (Orb-88)

Review of Article 14 of the Radio Regulations and Further Development of Technical Criteria for its Application

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that Article **14** of the Radio Regulations in many instances does not contain provisions relating to time limits and the steps to be taken in the case of continuing disagreement between administrations;

b) that, because the provisions of Article **14** are in many cases applicable to terrestrial services in shared bands and, in some cases, to terrestrial services only, the general revision of the Article is beyond the competence of the Conference, even though the space services are more frequently affected and have experienced some difficulty in its application;

c) that in some cases in the application of Article **14** there exist no technical criteria to identify the affected administrations;

d) that recent administrative radio conferences have used extensively the reference to Article **14** when revising existing footnotes to the Table of Frequency Allocations or developing new ones;

e) that there is a need to review the provisions of Article **14** and to consider any consequential changes to the Radio Regulations necessary for an efficient and simplified application of this Article;

noting

that this Conference has reviewed the provisions of Article **14** which refer to space services, and has made the minimal necessary changes to the procedures, until a more extensive revision can be made, covering all services;

recommends

that a future competent world administrative radio conference should review and revise, as appropriate, the provisions of Article **14** and make consequential changes arising from such a revision;

instructs the IFRB

to prepare an updated report on the application of the procedure of Article **14** and on any difficulties encountered in its application and submit it to a competent world administrative radio conference;

invites the CCIR

1. to continue appropriate studies of the development of sharing criteria for the different services which are involved in the application of Article **14**;

2. to provide technical criteria permitting administrations to evaluate the effect on their services of the application of Article **14** with respect to a given assignment;

urges administrations

to study this matter and, on the basis of their experience in the application of Article **14**, to submit proposals for consideration by a future competent world administrative radio conference;

instructs the Secretary-General

to bring this Recommendation to the attention of the Administrative Council.

RECOMMENDATION No. 32 (Orb-88)

International Monitoring of Emissions Originating from Space Stations

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that the geostationary-satellite orbit and the radio-frequency spectrum are limited natural resources and are being increasingly utilized by space services;

b) that it is desirable to ensure efficient and economical use of the radio-frequency spectrum and geostationary-satellite orbit and also to eliminate harmful interference;

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

d) that monitoring information obtained should assist the IFRB in discharging that function;

e) Recommendation **2** of the World Administrative Radio Conference, 1979, relating to the examination by world administrative radio conferences of the situation with regard to occupation of the frequency spectrum in space radiocommunications;

f) that facilities for monitoring of emissions originating from space stations may be expensive;

noting

that the CCIR is studying the question of monitoring of radio emissions from spacecraft at fixed monitoring stations and CCIR Report 276-5 contains current results of these studies;

invites the CCIR

to continue the studies in collaboration with the IFRB, and to provide technical guidelines concerning the space monitoring facilities;

recommends administrations

1. to participate in the CCIR studies concerning the possible development of guidelines for space monitoring facilities;

2. to consider the various aspects of monitoring the emissions originating from space stations to enable the provisions of Article **20** of the Radio Regulations to be applied.

RECOMMENDATION No. 715 (Orb-88)

Multi-band and/or Multiservice Satellite Networks Using the Geostationary-Satellite Orbit

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that, for economic and practical reasons, administrations may find it desirable to utilize multi-band and/or multiservice satellite networks using the geostationary-satellite orbit (for example: fixed-satellite, broadcasting-satellite and mobile-satellite services);

b) that there may be several different regulatory mechanisms covering the services provided by multi-band and/or multiservice satellites and that some of these regulatory mechanisms are associated with plans that include fixed orbital positions;

c) that the need to apply separate regulatory procedures may lead to incompatible results for the different bands or services concerned;

d) that the application of these procedures to bands and services with equal category of allocation shall normally result in equal rights for the networks concerned;

recognizing

a) that an administration having a satellite network subject to more than one procedure will need to apply the procedures independently;

b) that an administration attempting to bring into use a satellite network subject to more than one procedure may find that the process can be difficult to complete but may be facilitated by the sequence in which the coordination procedures are initiated;

c) that additionally there is less flexibility when one of the procedures includes a plan with fixed orbital positions;

d) that, when one or more of these services are planned, it may be practicable to use the modification provisions of those plans as aids in the resolution of difficulties;

e) that it is desirable to simplify the process for bringing into use multi-band and/or multiservice satellite networks;

recommends

1. that administrations should take into account the above *considering* and *recognizing* when planning and implementing multi-band and/or multiservice satellite networks;

2. that administrations cooperate to overcome the particular problems of bringing into use multi-band and/or multiservice satellite networks, subject to multiple procedures;

invites

1. the CCIR to continue its technical studies into the efficient use of the geostationary-satellite orbit as it pertains to multi-band and/or multiservice satellite networks;

2. the Administrative Council, in the light of experience with the bringing into use of multi-band and/or multiservice satellites, to place on the agenda of a future competent world administrative radio conference, if necessary, a review of the process for bringing into use multi-band and multiservice satellite networks.

instructs the Secretary-General

to bring this Recommendation to the attention of the Plenipotentiary Conference, Nice, 1989, and of the Administrative Council.

RECOMMENDATION No. 716 (Orb-88)

Use of Certain Frequency Bands Below 3 000 MHz by the Space Research and Space Operation Services

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that the bands 2 025 - 2 110 MHz and 2 200 - 2 290 MHz are allocated to the space research and space operation services, subject to the provisions of Article **14** of the Radio Regulations;

b) that both this Conference and the World Administrative Radio Conference for the Mobile Services (Geneva, 1987) have requested the convening of a future competent world administrative radio conference to address allocation issues in certain frequency bands below 3 000 MHz;

recognizing

a) that there is increasing use of these bands by the space research and space operation services, leading to increased coordination difficulties in view of the provisions of Article **14**;

b) that the task of obtaining the agreements required for the development of space systems in the bands mentioned in *considering a)* above has therefore become more difficult;

invites the Administrative Council

to place this matter on the agenda of the next competent world administrative radio conference, in order to examine the difficulties referred to in *recognizing a)* and *b)* above;

invites the CCIR

to continue its studies of sharing criteria for the services in these bands.

Printed in Switzerland

ISBN 92-61-03931-6