INTERNATIONAL TELECOMMUNICATION UNION

WRC-2003

WORLD
RADIOCOMMUNICATION
CONFERENCE

Document _E
9 February 2003
Original: English

Geneva, Switzerland, 9 June to 4 July 2003

PLENARY MEETING

United States of America

PROPOSALS FOR THE WORK OF THE CONFERENCE

CONTENTS

Introduction

In this document the United States makes proposals for many of the items on the WRC-03 agenda. The United States hopes that its proposals will serve to facilitate the development of consensus on these agenda items. The United States looks forward to working with the ITU membership to address these items that hold the potential for bringing benefits to governments, industries and consumers around the globe.

The United States plans to supplement this document with some additional proposals, including some related to future Conferences, at a later date. The United States also notes its support for many of the Inter-American Proposals developed within the Inter-American Telecommunications Commission (CITEL). The United States will consider adoption of additional Inter-American Proposals as they are developed.

United States Proposals

Agenda Item 1.1:

requests from administrations to delete their country footnotes or to have their country name deleted from footnotes, if no longer required, in accordance with Resolution **26 (Rev.WRC-97)**;

Background Information: WRC-95 added footnote **5.389D** to the Table of Allocations in the simplified Radio Regulations adopted by that Conference. Since the date specified in the footnote has come and gone, the United States is of the view that its name can be deleted from this provision in accordance with Resolution **26 (WRC-97)**.

Proposal:

ARTICLE 5

Frequency allocations

MOD USA/ /1

5.389D In Canada ~~and the United States~~ the use of the bands 2 010-2 025 MHz and 2 160-2 170 MHz by the mobile-satellite service shall not commence before 1 January 2000.

Reasons: Footnote is overcome by date and is no longer needed.

Agenda Item 1.2:

to review and take action, as required, on No. **5.134** and related Resolutions **517 (Rev.WRC-97)** and **537 (WRC-97)** and Recommendations **515 (Rev.WRC-97)**, **517 (HFBC-87)**, **519 (WARC-92)** and Appendix **11**, in the light of the studies and actions set out therein, having particular regard to the advancement of new modulation techniques, including digital techniques, capable of providing

an optimum balance between sound quality, bandwidth and circuit reliability in the use of the HF bands allocated to the broadcasting service.

Background Information: This agenda item is directed towards the operational use of digital modulation techniques for broadcasting in the HF bands. There has been sufficient progress in ITU-R SG 6, so that the digital modulation techniques to be considered under this agenda item are limited to just the digital modulation techniques recommended in Recommendation ITU-R **BS.1514**. WRC-2003 will therefore be fully competent to set any necessary conditions for introducing these digitally modulated emissions to the HF bands allocated to broadcasting.

The collection of all the articles, resolutions and recommendations listed in the agenda item text are the ones that will need to be reviewed for suppression or modification in the light of the progress that has been made in the intervening years for digital modulation use in the HF broadcasting bands. To complete the overall need, some additions will have to be made. The suppressions, modifications and additions that are incorporated in the U.S. proposal form an integrated package that deals in an efficient manner with all the aspects of the consequent needs connected with this non-allocation agenda item. By and large, the specific wording of these suggested changes are those that were developed within the ITU-R's Study Group 6 at its WP6E meetings during 2001.

Recommendation ITU-R **BS.1514,** mentioned above, is a system recommendation, wherein the acceptable digital modulation techniques are recorded. The development and testing of this modulation, including its various "modes" associated with different levels of robustness and audio quality, has brought the techniques close to consumer product status. It is expected that by the end of 2003, or not long thereafter, there will be on the market receivers that include a HF digital capability. In addition, modern HF transmitters can accept these digital signal inputs.

It is because of this progress that this agenda item and this proposal exist -- and, without diminishing broadcaster and listener access to traditional amplitude modulation, simply permits digital modulation in the mix of acceptable and available listening.

Furthermore, since the introduction of digital modulation for operational use is two years or so from 2002, the proposed modifications to existing articles, resolutions and recommendations treat all HF broadcasting bands on an equal footing. There is no longer any compelling reason to separate the conditions of use of the "WARC-92" bands from the other HF broadcasting bands. The solution proposed is to modify Article footnote **5.134** so that any ITU-R approved amplitude modulation or digital modulation can be broadcast in the "WARC-92" bands after 1 April 2007. Before that time, the proposal is not to permit broadcasting in these bands, other than on a non-harmful interference basis (as is the current situation using **4.4**).

Three resolutions and recommendations are proposed to be suppressed since they are no longer relevant. They are noted at the end of the proposal, with appropriate reasons.

Proposals:

MOD USA/ 2

RESOLUTION 517 (REV.WRC-03)~~(REV.WRC-97)~~

Introduction of digitally modulated and single-sideband emissions ~~Transition from double-sideband to single-sideband or other spectrum-efficient modulation techniques~~ in the high-frequency bands between 5 900 kHz and 26 100 kHz allocated to the broadcasting service

The World Radiocommunication Conference (Geneva, ~~1997~~2003),

considering

a) that digital techniques are being introduced into many existing services ~~the high-frequency (HF) bands allocated to the broadcasting service between 5 900 kHz and 26 100 kHz are severely congested~~;

b) that digital and single-sideband (SSB) techniques allow more ~~efficient~~ effective utilization of the frequency spectrum than double-sideband (DSB) techniques;

c) that digital and SSB techniques enable reception quality to be improved;

~~*d)* that Recommendation **515(Rev.WRC-97)** encourages the acceleration design and manufacture of SSM transmitters and receivers;~~

~~*e)*~~*d)* Appendix **11** concerning the digital and SSB system specifications in the HF broadcasting services;

~~*f)* that rapid developments are taking place in digital sound broadcasting technologies;~~

e) that ITU-R in its Recommendation ITU-R **BS.1514** has recommended system characteristics for digital sound broadcasts in the broadcast bands below 30 MHz;

~~*g)*~~*f)* that digital modulation ~~or other spectrum efficient modulation~~ techniques are expected to provide the means to achieve the optimum balance between sound quality, circuit reliability and bandwidth;

~~*h)*~~*g)* that digitally modulated emissions can, in general, provide more efficient coverage than amplitude-modulated transmissions by using fewer simultaneous frequencies and less power;

~~*i)* that the lifetime of a transmitter is at least twenty years;~~

~~*j)*~~*h)* that it is economically ~~un~~attractive, using current technology, to convert modern ~~existing~~ conventional DSB broadcasting systems to ~~SSB~~ digital operation in accordance with *considering d)* above;

~~*k)*~~*i)* that some DSB transmitters have been used with digital modulation techniques without transmitter modifications;

~~*l)* that the lifetime of a receiver is of the order of ten years;~~

~~*m)*~~*j)* that ITU-R is carrying out ~~urgent~~ further studies on the development of broadcasting using digitally modulated~~ion~~ emissions in the bands allocated to the broadcasting service below 30 MHz~~;~~,

~~*n)* that other spectrum-efficient modulation techniques may be developed in the future,~~

resolves

1 that the early introduction of digitally modulated emissions as ~~procedure in the Annex to this Resolution shall be used for the purpose of ensuring an orderly transition from DSB to SSB or~~

~~other spectrum-efficient modulation techniques~~ recommended by ITU-R in the HF bands between 5 900 kHz and 26 100 kHz allocated to the broadcasting service is to be encouraged;

2 that digitally modulated and SSB emissions shall comply with the characteristics specified in Appendix **11**;

3 that whenever an administration replaces a DSB emission by an emission using digital or SSB modulation techniques, it shall ensure that the level of interference is not greater than that caused by the original DSB emission, and shall use RF Protection values specified in Recommendations **DAB (WRC-03)** and **517 (Rev. WRC-03)**;

~~2~~4 that the ~~final date for the cessation~~ continued use of DSB shall be periodically reviewed by a competent future world radiocommunication conference in the light of the latest available complete statistics on the capability of administrations to introduce digital systems ~~worldwide distribution of SSB and other spectrum efficient modulation technique transmitters and receivers, as called for in Resolution **537 (WRC-97)**~~,

instructs the Director of the Radiocommunication Bureau

to compile and maintain the statistics referred to in *resolves* ~~2~~4, to make these statistics available to administrations and to submit summaries thereof to a competent future world radiocommunication conference~~s~~,

invites ITU-R

to continue its studies on digital techniques in HF broadcasting ~~as a matter of urgency~~ with a view to assist in the development of this technology for future use,

invites administrations

1 to assist the Director of the Radiocommunication Bureau by providing the relevant statistical data and to participate in ITU-R studies on matters relating to the development and introduction of digitally modulated emissions ~~transmissions~~ in the HF bands between 5 900 kHz and 26 100 kHz allocated to the broadcasting service~~.~~;

2 to bring to the notice of transmitter and receiver manufacturers the most recent results of relevant ITU-R studies on spectrum-efficient modulation techniques suitable for use at HF as well as the information referred to in considerings *d)* and *e).*

Reasons: The changes to this resolution reflect the introduction of digital and SSB emissions and the consequent need to protect DSB emissions from digital and single sideband emissions, and vice versa. The introduction of digital emissions does not substitute for single sideband emission use. The resolution has been modified so that both are considered on an equal regulatory footing. Several modifications made in the *considerings* are a consequence of digital modulation development for HF broadcasting since WRC-97.

SUP USA/ / 3

ANNEX TO RESOLUTION 517 (REV.WRC-97)

Reasons: Due to the modifications to Resolution **517** related to the introduction of digital and SSB emissions and deletion of the requirement of the transition procedures, this annex is no longer needed. This annex deals with a previous idea that all DSB would cease after 2015. The complete package with regard to this agenda item considers that this concept of cessation of one of the approved modulation methods should be considered by a future competent conference; that it is

unrealistic to consider ceasing a particular type of modulation without any concern for the listener and broadcaster market 12 years after WRC-03.

MOD USA/ / 4

APPENDIX 11

System specifications for Double-Sideband (DSB), ~~and~~ Single-Sideband (SSB) and Digitally Modulated Emissions ~~System Specifications~~ in the HF Broadcasting Service

Reasons: Updating the appendix title to reflect the proposed use.

NOC USA/ / 5

Double-sideband system (DSB)

Reasons: The current text is adequate as written.

PART B - Single-sideband system (SSB)

1 System parameters

MOD USA/ / 6

1.1 Channel spacing

In a mixed DSB, SSB and Digital environment ~~During the transition period~~ (see Resolution **517 (Rev. WRC-03 ~~HFBC-87~~)**), the channel spacing shall be 10 kHz. In the interest of spectrum conservation, ~~during the transition period,~~ it is also permissible to interleave SSB emissions midway between two adjacent DSB channels, i.e., with 5 kHz separation between carrier frequencies, provided that the interleaved emission is not to the same geographical area as either of the emissions between which it is interleaved.

In an all inclusive SSB environment, ~~After the end of the transition period~~ the channel spacing and carrier frequency separation shall be 5 kHz.

Reasons: Updating this text to reflect digital and SSB use and deleting text concerning the transition period. No change in the carrier reduction levels.

MOD USA/ / 7

2.6 Carrier reduction (relative to peak envelope power)

In a mixed DSB, SSB and Digital environment ~~During the transition period~~ the carrier reduction shall be 6 dB to allow SSB emissions to be received by conventional DSB receivers with envelope detection without significant deterioration of the reception quality.

In an all inclusive SSB environment ~~At the end of the transition period~~, the carrier reduction shall be 12 dB.

Reasons: Updating this text to reflect digital and SSB use and deleting text concerning the transition period. No change in the carrier reduction levels.

ADD USA/ / 8

PART C - Digital System

1 System parameters

1.1 Channel spacing

The initial spacing for digitally modulated emissions use shall be 10 kHz. However, interleaved channels with a separation of 5 kHz may be used in accordance with the appropriate protection criteria appearing in Recommendation **DAB (WRC-03)**, provided that the interleaved emission is not to the same geographical area as either of the emissions between which it is interleaved.

Reasons: To make reference to Recommendation **DAB (WRC-03)** to implement interleaved channels.

ADD USA/ / 9

1.2 Channel utilization

Channels using digitally modulated emissions may be commingled with analogue emissions in the same HFBC band provided the protection to the analogue emissions is at least as great as that which currently is in force with analogue-to-analogue protection. To accomplish this may require that the digital spectral power density (and total power) be lower by several dB than is currently used for the same emission circuit using either DSB or SSB emissions.

2 Emission characteristics

2.1 Bandwidth and centre frequency

A full digitally modulated emission will have a 10 kHz bandwidth with its centre frequency at any of the 5 kHz possibilities within the HFBC bands.

There are “simulcast” modes, which are a combination of analogue and digital emissions of the same programme in the same channel, that may use a digital emission of 5 kHz or 10 kHz bandwidth, next to either a 5 kHz or 10 kHz analogue emission. In all cases of this type, the 5 kHz interleaved raster used in HFBC shall be adhered to in placing the emission within the HFBC bands.

2.2 Frequency tolerance

The frequency tolerance shall be 10 Hz.

2.3 Audio frequency band

Digital source coding within a 10 kHz bandwidth, taking account of the need for various levels of error avoidance, detection and correction coding emission mitigation, can range from the equivalent of monophonic FM (approximately 15 kHz) to low level speech codec performance of the order of 3 kHz. The choice of audio quality is connected to the needs of the broadcaster/listener, and includes such characteristics to consider as the propagation channel conditions expected. There is no single specification, only the upper and lower bounds noted in this paragraph.

2.4 Modulation

Quadrature amplitude modulation (QAM) with Orthogonal frequency division multiplexing (OFDM) shall be used. 64 QAM is feasible under many propagation conditions; factors of ½, ¼ and perhaps 1/8 of this are specified for use when needed.

Reasons: Part C is added to address the requirements of digital systems. Specific channelization values, audio frequency bandwidths and "modes" of digital modulation conform to ITU-R system Recommendation **BS.1514**.

ADD USA/ / 10

RECOMMENDATION DAB (WRC-03)

RF protection ratios associated with digitally modulated emissions in the HF bands allocated exclusively to the broadcasting service

The World Radiocommunication Conference (Geneva, 2003),

considering

a) that this Conference has resolved to encourage the introduction of digitally modulated emissions in the high frequency broadcast bands allocated exclusively to the broadcasting service;

b) that the current use of the spectrum is based on the use of double-sideband (DSB) emissions;

c) that RF co-channel and adjacent channel protection ratios are among the fundamental parameters when determining compatibility;

d*)* that this Conference has adopted Resolution **517 (Rev. WRC-03)** relating to the introduction of digitally modulated emissions in the HF bands allocated exclusively to the broadcasting service;

e) that Part C of Appendix **11** contains digital system specifications that refer to this recommendation for matters dealing with appropriate protection ratios,

recommends

1 that in the application of Article **12**, the protection ratios specified in the Annex to this Recommendation be used for all those cases where digitally modulated emissions operate in the same bands as double-sideband analogue emissions.

Reasons: This resolution provides protection ratios associated with digital emissions in the same manner as that of Recommendation **517**, originally from HFBC-87, which deals with SSB and DSB only. It, along with its annex, specifies the levels of protection required both to protect the amplitude modulation transmissions from digital modulation emissions, digital modulation emissions from other digital modulation emissions, and digital modulation emissions from amplitude modulation emissions.

ADD USA/ / 11

ANNEX TO RECOMMENDATION DAB (WRC-03)

RF protection ratio values

1. In accordance with Resolution **517 (Rev. WRC-03)** digital modulation may be used in any of the HF bands allocated exclusively to the broadcasting service. This accommodation has to be made with the appropriate amounts of protection given to both analogue and digital emissions. RF protection ratios are part of the overall regulation of these emissions. Their values appear in the table in this annex.

2. The table consists of RF protection ratios for co-channel and adjacent channel conditions. The independent variable in the table is the centre frequency separation in kHz of any pair of emissions, wanted vs. unwanted. The ratio data are in decibels.

3. The digital modulation governing these protection ratios is that which appears in summary in Part C of Appendix **11**, as revised at this conference, and the analogue modulation is double-sideband modulation or single sideband modulation as summarized in Parts A and B, respectively, of the same Appendix.

TABLE

Relative RF protection ratios (dB) between broadcasting systems below 30 MHz, and Digital (64-QAM, protection level No. 1) interfered with by Digital (identical robustness modes and spectrum occupancy types)

Wanted signal	Unwanted signal	Frequency separation $f_{unwanted}$-f_{wanted} (kHz)									Parameters	
		-20	-15	-10	-5	0	5	10	15	20	B_{DRM} (kHz)	S/I (dB)
AM	DRM_B3	-47.2	-41.9	-32	3	6	3	-32	-41.9	-47.2	10	-
DRM_B3	AM	-53.9	-48	-39.9	-3.1	0	-3.1	-39.9	-48	-53.9	10	7.3
DRM_B3	DRM_B3	-52.7	-47	-37.7	-3.1	0	-3.1	-37.7	-47	-52.7	10	15.9

AM: DSB AM signal

DRM_B3: DRM signal, robustness mode B, spectrum occupancy type 3

B_{DRM}: Nominal bandwidth of DRM signal

S/I: Signal-to-interference ratio for a BER of 10^{-4}

Reasons: This annex provides the appropriate amounts of protection given to both analogue and digital emissions and supports the text of DRAFT RECOMMENDATION **DAB (WRC-03)**.

MOD USA/ / 12

RECOMMENDATION 517 (~~HFBC-87~~REV.WRC-03)

~~Relative~~ RF protection ratio values for single-sideband (SSB) emissions in the HF bands allocated exclusively to the broadcasting service

The World ~~Administrative Radio~~ Radiocommunication Conference ~~for the Planning of the HF Bands Allocated to the Broadcasting Service~~ (Geneva, 2003~~-1987~~),

considering

a) that WRC-97 ~~the Conference has~~ adopted Article **12** as the seasonal ~~a method for the~~ planning procedure for ~~of~~ the HF bands allocated exclusively to the broadcasting service;

b) that this ~~method~~ procedure is based principally on the use of double-sideband (DSB) emissions;

c) that the RF co-channel protection ratio is one of the fundamental planning parameters;

d) that ~~the~~ this Conference has adopted Resolution **517 (Rev. WRC-03)** relating to the ~~transition~~ introduction of digitally modulated and ~~from DSB to~~ SSB emissions in the HF bands allocated exclusively to the broadcasting service ~~and Recommendation 515 relating to the introduction of transmitters and receivers capable of both DSB and SSB modes of operation~~;

e) that the SSB system characteristics for HF broadcasting are contained in Appendix **11**;

~~*f)* that, however, due to their provisional nature, the values of the relative RF protection ratio to be applied for all relevant combinations of wanted and unwanted DSB and SSB emissions have not been included in the Appendix mentioned in considering e);~~

~~g~~f) that ~~preliminary~~ studies have shown that SSB emissions may require a lower RF co-channel protection ratio for the same reception quality;

~~*h)* Resolution **514 (HFBC-87)*** relating to the procedure to be applied by the Radio Regulations Board and the Bureau in the revision of relevant parts of their Technical Standards used for HF broadcasting,~~

recommends

~~that, subject to the procedure to be applied by the Radio Regulations Board and the Bureau in the revision of relevant parts of their Technical Standards used for HF broadcasting given in Resolution **514 (HFBC-87)*,** the values of relative RF protection ratio given in the Annex to this Recommendation be used by the Bureau in its application of Article **12** Technical Standards relating to SSB and DSB emissions in the HF bands allocated exclusively to the broadcasting service,~~

~~*invites the ITU-R*~~

to continue to study the values of relative RF protection ratio for the different cases and frequency separations covered in the Annex to this Recommendation,

~~* This Resolution was abrogated by WRC-97.~~

~~*and recommends administrations*~~

~~to participate actively in these studies.~~

Reasons: This recommendation has been modified to reflect the introduction of digital emissions. No substantive changes were made in the protection ration values with SSB vs. DSB amplitude modulation.

MOD USA/ / 13

ANNEX TO RECOMMENDATION 517 (~~HFBC-87~~Rev.WRC-03)

~~Relative~~ RF protection ratio values

1 The values of ~~relative~~ RF protection ratio given in the table should be used whenever SSB emissions in conformity with the specification in Appendix **11** are involved in the use of the HF bands allocated exclusively to the broadcasting service.

~~2 The values given refer to the case of co-channel DSB wanted and unwanted signals for the same reception quality.~~

~~3~~2 For the reception of DSB and SSB (6 dB carrier reduction relative to peak envelope power) wanted signals, a conventional DSB receiver with envelope detection designed for a channel spacing of 10 kHz is assumed.

~~4~~3 For the reception of an SSB wanted signal (12 dB carrier reduction relative to peak envelope power), the reference receiver as specified in Appendix **11**, Part B, Section 3, is assumed.

~~5~~4 SSB signals with 6 dB carrier reduction relative to peak envelope power assume equivalent sideband power as specified in Appendix **11**, Part B, § 1.2.

~~6~~5 The figures for case 2 in the following table relate to a situation where the centre frequency of the intermediate frequency pass-band of the DSB receiver is tuned to the carrier frequency of the wanted SSB signal. If this is not the case, the value for a difference of +5 kHz may increase to –1 dB.

~~Relative~~ RF protection ratio values with reference to the co-channel RF protection ratio for DSB wanted and unwanted signals (dB)[1] for use in the HF bands allocated exclusively to the broadcasting service

	Wanted signal	Unwanted signal	Carrier frequency separation f unwanted – f wanted, Δf (kHz)								
			–20	**–15**	**–10**	**–5**	**0**	**+5**	**+10**	**+15**	**+20**
1	DSB	SSB (6 dB carrier reduction relative to p.e.p.)	–51	–46	–32	+1	3	–2	–32	–46	–51
2	SSB (6 dB carrier reduction relative to p.e.p.)	DSB	–54	–49	–35	–3	0	–3	–35	–49	–54
3	SSB (6 dB carrier reduction relative to p.e.p.)	SSB (6 dB carrier reduction relative to p.e.p.)	–51	–46	–32	+1	0	–2	–32	–46	–51
4	SSB (12 dB carrier reduction relative to p.e.p.)	SSB (12 dB carrier reduction relative to p.e.p.)	–57	–57	–57	–45	0	–20	–47	–52	–57

1 Frequency separation Δf less than –20 kHz, as well as Δf greater than 20 kHz, need not be considered.

Reasons: Minor text changes were made to update the annex from **HFBC-87**. No changes were made in the DSB vs. SSB table of protection ratios.

MOD USA/ / 14

5.134 The ~~use of the~~ bands 5 900-5 950 kHz, 7 300-7 350 kHz, 9 400-9 500 kHz, 11 600-11 650 kHz, 12 050-12 100 kHz, 13 570-13 600 kHz, 13 800-13 870 kHz, 15 600-15 800 kHz, 17 480-17 550 kHz and 18 900-19 020 kHz ~~by~~ are allocated to the broadcasting service on a primary basis as from 1 April 2007.~~is limited to single sideband emissions with the characteristics specified in Appendix 11 or to any other spectrum efficient modulation techniques recommended by ITU-R. Access to these bands shall be subject to the decisions of a competent conference.~~

Reasons: The proposed modification provides a simple unambiguous regulatory environment for the use of the WARC-92 extension bands both before and after the envisaged implementation date of 1 April 2007. Before the 01/04/07 date, there is no change: in other words, the bands are not allocated to HFBC. After that date, broadcasters can choose any modulation means that has ITU-R approval, such as the digital modulation described in ITU-R Recommendation **BS.1514** and the SSB and DSB amplitude modulations noted in Article **11**.

SUP USA/ / 15

RESOLUTION 537 (WRC-97)

Reasons: The survey mentioned in the resolution on transmitter and receiver statistics related to SSB has been completed, and submitted by the BR for WRC-2000, as requested from WRC-97.

Therefore, there is no need to carry forward this resolution. The associated Recommendation **515 (Rev.WRC-97)** is also proposed for suppression as detailed below.

SUP USA/ / 16

RECOMMENDATION 515 (Rev.WRC-97)

Reasons: With the adoption of this Recommendation **BS.1514** and the fact that IEC has been informed of this development, Recommendation **515 (Rev.WRC-97)** can be suppressed.

SUP USA/ / 17

RECOMMENDATION 519 (WARC-92)

Reasons: This Recommendation, from WARC-92, considers the possibility of advancing the date of cessation of DSB. In the light of broadcasting needs in HF, this is totally unrealistic. Thus, there is concern within many Administrations, expressed on many occasions at WRC-97, that the introduction of SSB into HF Broadcasting (and now digital modulation) should not restrict the ability of administrations to continue with their existing DSB transmissions for the foreseeable future and that at this point in time it is inappropriate to specify a cessation of DSB in favour of SSB in the year 2015. It is also evident from information presented at WRC-2000 by the Director that the interest in SSB within HF Broadcasting is virtually non-existent. This Recommendation should therefore be suppressed.

MOD USA/ / 18

ARTICLE 23.12

~~Double-sideband and single side-band t~~Transmitting stations operating in the HF bands allocated exclusively to the Broadcasting Service shall meet the system specifications contained in Appendix **11**.

Reasons: A consequential change that reflects the change in Appendix **11** that has added digital modulation to the acceptable modulation methods.

Agenda Item 1.3:

to consider identification of globally/regionally harmonized bands, to the extent practicable, for the implementation of future advanced solutions to meet the needs of public protection agencies, including those dealing with emergency situations and disaster relief, and to make regulatory provisions, as necessary, taking into account Resolution **645 (WRC 2000)**;

Background Information: At WRC-2000, there were discussions of the radiocommunication needs of public agencies and organizations dealing with law and order, disaster relief and emergency response. Based on these discussions and a proposal that was submitted on this subject by an Administration, WRC-2000 recommended that this issue be on the Agenda for WRC-03. WRC-2000 also adopted Resolution **645**, which invited the ITU-R to undertake appropriate studies

and report the results of these studies to WRC-03. In addition to the invitation to study the identification of frequency bands that could be used on a global/regional basis by Administrations intending to implement future solutions for public protection and disaster relief, Resolution 645 also invites the ITU-R to conduct studies for the development of a resolution identifying the technical and operational basis for cross-border circulation of radiocommunication equipment in emergency and disaster relief situations.

The proposed text for a WRC Resolution will help promote economies of scale in the production of radiocommunication equipment for public protection and disaster relief, the consolidation of duplicated infrastructure, spectrum efficiency, operational effectiveness, and interoperability nationally, regionally, and globally. Furthermore, it may also facilitate cross-border public protection operations and foster the ability of rescue teams from different Administrations and international relief organizations to communicate and interact more quickly and efficiently, thereby speeding disaster relief efforts. At the same time, the ability of any Administration or relief organization to continue to use spectrum it currently uses for public protection and disaster relief will not be constrained.

Based on the studies conducted by the ITU-R, it is proposed that any spectrum recognized for future advanced solutions for public protection and disaster relief should be developed in a WRC Resolution. The attached proposed WRC Resolution recognizes the importance of spectrum used for public protection and disaster relief, acknowledges the need for national prerogatives. Furthermore, by continuing to study this issue in the ITU-R, the results of the studies could be developed into an ITU-R Recommendation which allows flexible updates without maintaining a WRC agenda item specifically for this issue. In addition, the proposed WRC Resolution provides uniform guidance to Administrations, users and manufacturers, without conveying any special status or priority to public protection and disaster relief in Article **5** of the Radio Regulations.

The United States believes that it is neither necessary nor advisable to identify frequency bands in Article **5** of the Radio Regulations for public protection and disaster relief. Band identification is not needed to achieve spectrum harmonization. Administrations have the flexibility to designate any band for public protection and disaster relief, and thus they already may use common frequency bands for public protection and disaster relief. Therefore, there is no need for Article **5** of the Radio Regulations to identify bands specifically for that purpose. Furthermore, if bands are identified in Article **5** of the Radio Regulations, there is a risk that Administrations may misinterpret the identification as a constraint on their ability to use those bands for purposes other than public protection and disaster relief. Moreover, identifying frequency bands in Article **5** of the Radio Regulations for public protection and disaster relief applications, compared to other mobile systems or radio services that are not footnoted in the Radio Regulations, could be misinterpreted as giving a different regulatory status to public protection and disaster relief compared with other uses.

Therefore, at this time, it is proposed that the importance of these points be highlighted in a new Resolution as shown below. This Resolution has been developed as a stand-alone Resolution and is consistent with the methods of the CPM report for this agenda item (see Annex 2.1-2 of the CPM report).

Proposal:

NOC USA/ / 19

No change is proposed to Frequency Allocations pursuant to this Agenda Item

ARTICLE 5

Frequency Allocations

Reasons: Creating a WRC Resolution, without any specific identification in Article **5** of the Radio Regulations, avoids misinterpretation of the regulatory status of systems supporting public protection and disaster relief applications and disassociates any additional recognition of spectrum for public protection and disaster relief from the Table of Frequency Allocations. At this point in time, there has been little support from internationally oriented public safety or disaster relief organizations for the identification of frequency bands in Article **5** of the Radio Regulations for public protection and disaster relief. Moreover, significant concerns have been raised regarding possible regulatory restrictions that may result from international identification of spectrum for public protection or disaster relief. Therefore, in order to avoid any perceived constraints on the ability of individual administrations to use spectrum in which they currently operate, it is appropriate not to make changes to Article **5** of the Radio Regulations.

ADD USA/ / 20

RESOLUTION PUBLIC PROTECTION AND DISASTER RELIEF (WRC-03)

Public protection and disaster relief

The World Radiocommunication Conference (Geneva, 2003),

considering

a) the growing and increasing telecommunication and radiocommunication needs of public protection agencies and organizations including those dealing with emergency situations and disaster relief that are vital to the maintenance of law and order, protection of life and property, disaster relief, and emergency response;

b) that future advanced solutions used by such public protection and disaster relief agencies and organizations will require high data rates and possibly contiguous blocks of spectrum for some applications;

c) that there is a need for interoperability and interworking between public protection and disaster relief networks, both nationally and for cross-border operations, in emergency situations and disaster relief;

d) that current public protection and disaster relief applications are mostly narrow-band, including voice and low data-rate applications, typically in channel bandwidths of 25 kHz or less;

e) that although there will continue to be narrow-band requirements, many future applications will be wideband (indicative data rates in range of 384-500 kb/s) and/or broadband (indicative data rates in range of 1-100 Mbit/s) with channel bandwidths dependent on the use of spectrally efficient technologies;

f) that commercial systems may serve as a complement to dedicated systems in support of public protection and disaster relief applications and that such complementary use would be in response to market demands;

g) that new technologies such as IMT-2000 and systems beyond and Intelligent Transportation Systems (ITS) that will support or supplement advanced public protection and disaster relief applications;

h) that satellite systems can and do support or supplement disaster relief applications;

i) that new technologies for wideband and broadband public protection and disaster relief applications are being developed in various standards organizations;

j) that Resolution **36 (PP-98)** urges Member States to facilitate use of telecommunications for the safety and security of humanitarian personnel,

k) that Draft New Recommendation ITU-R M.[DR.RCIRC] offers guidance to facilitate the global circulation of radiocommunication equipment in emergency and disaster relief situations

recognizing

a) the potential benefits of different Administrations using common frequency bands for public protection and disaster relief, such as:

i) increased potential for interoperability;

ii) a broader manufacturing base and increased volume of equipment resulting in economies of scale and expanded availability of equipment;

iii) improved spectrum management and planning;

iv) enhanced cross-border and international coordination;

v) improved cross-border circulation of equipment,

b) that spectrum planning for public protection and disaster relief is done at the national level, taking into account the need for interoperability and benefits of neighboring administrations using common frequency bands;

c) the benefits of cooperation between countries for the provision of effective and appropriate humanitarian assistance during disasters;

d) the special needs of developing countries, taking into account the ITU-D Handbook on Disaster Communications;

e) the needs of countries, particularly of developing countries, for cost-effective communications equipment for public protection and disaster relief agencies and organizations;

f) that the trend is to increase the use of Internet Protocol (IP) based technologies;

g) that currently some bands, or parts thereof, have been designated for public protection and disaster relief, specifically: that some administrations in Region 2 have designated the bands in the range of 821-824/866-869 MHz;

h) that for solving future bandwidth requirements, there are several emerging technologies such as software defined radios, crossbanding, advanced compression waveforms and networking, that reduce the amount of new spectrum required to support public protection and disaster relief applications;

i) that technology exists today to enable dissimilar systems to be interoperable across different frequency bands with different waveforms;

j) that in times of disasters, if most terrestrial based networks are destroyed or impaired, amateurs, satellite and other non-ground based networks may be available to provide communications services to assist in public protection and disaster relief efforts;

k) that any specific spectrum identified for public protection and disaster relief should not preclude the possible use of any other spectrum to bring aid in times of disaster and humanitarian assistance,

noting

a) that the term *Public Protection* refers to radiocommunications used by responsible agencies and organizations dealing with maintenance of law and order, protection of life and property, and emergency situations;

b) that term *Disaster Relief* refers to radiocommunications used by agencies and organizations dealing with a serious disruption of the functioning of society, posing a significant, widespread threat to human life, health, property or the environment, whether caused by accident, nature or human activity, and whether developing suddenly or as a result of complex, long-term process;

c) that many administrations use frequency bands below 1 GHz for narrow-band public protection and disaster relief applications;

d) that applications requiring large coverage areas and providing good signal availability would generally be accommodated in lower frequency bands;

e) that applications requiring wider bandwidths would generally be accommodated in progressively higher bands;

f) that public protection and disaster relief agencies and organizations have a minimum set of requirements, including but not limited to, interoperability, reliable communications, sufficient capacity to respond to emergencies, priority access, fast response times, and ability to cover large areas as described in the ITU-R Report M.[public protection and disaster relief];

g) that in most administrations, public protection and disaster relief applications are provided at multiple levels, starting with national down to local levels, and cooperation between the levels is a national matter in which common spectrum and interoperable operations could assist;

h) that spectrum harmonization is one method to realize the benefits stated in recognizing a; however, multiple frequency bands can be a component of meeting the communication needs in disaster situations;

i) that many administrations have made significant investments in public protection and disaster relief systems;

j) that flexibility must be afforded to disaster relief agencies and organizations to use current and future radiocommunications, so as to facilitate their humanitarian operations,

resolves

1 that, to the extent practical, administrations encourage the use of globally and regionally harmonized bands for public protection and disaster relief;

2 that the use of bands specifically for public protection and disaster relief does not preclude Administrations from using any other frequency bands for public protection and disaster relief applications in accordance with the Radio Regulations;

3 to urge administrations to satisfy temporary needs for frequencies in addition to what may be normally provided for in agreements with neighboring administrations in emergency and disaster relief situations;

4 that administrations encourage public protection and disaster relief agencies and organizations to utilize both existing and new technologies and solutions (satellite and terrestrial), to the extent practicable, to satisfy their public protection and disaster relief interoperability

requirements and to further the goals of public protection and disaster relief agencies and organizations;

5 that administrations should encourage agencies and organizations to use advanced wireless solutions, such as IMT-2000, ITS, and satellite for providing complementary support to public protection and disaster relief agencies and organizations;

6 to urge administrations to reduce and remove any obstacles hindering global cross-border circulation of radiocommunication equipment intended for use in emergency and disaster relief situations;

7 that administrations encourage public protection and disaster relief agencies and organizations to utilize relevant ITU-R Recommendations in planning spectrum use and implementing technology and systems supporting public protection and disaster relief,

invites ITU-R

to continue its technical studies and make recommendations concerning technical and operational implementation, as necessary, for the advanced solutions to meet the needs of public protection and disaster relief radiocommunications.

Reasons: Resolution public protection and disaster relief was created to highlight and identify important points regarding public protection and disaster relief radiocommunications. Concerning this agenda item, every effort should be made to complete the work for WRC-03. To address any future developments after WRC-03, the Resolution invites the ITU-R to continue its technical studies, as necessary.

SUP USA/ / 21

RESOLUTION 645 (WRC-2000)

Reasons: It is possible to conclude this agenda item at WRC-03 on the basis that the necessary regulatory requirements have been met. Resolution **645 (WRC-2000)** should be suppressed.

Agenda Item 1.4:

to consider the results of studies related to **Resolution 114 (WRC-95)**, dealing with the use of the band 5 091-5 150 MHz by the fixed-satellite service (Earth-to-space) (limited to non-GSO MSS feeder links), and review the allocations to the aeronautical radionavigation service and the fixed-satellite service in the band 5 091-5 150 MHz;

Background Information: The frequency band 5 000-5 250 MHz is allocated on an international basis to the aeronautical radionavigation service (ARNS). Currently only the 5 030-5 150 MHz portion has a defined ARNS function; namely the microwave landing system (MLS), with only the 5 030-5 091 MHz portion containing defined MLS channels. However, The International Civil Aviation Organization (ICAO) has identified the band 5 091-5 150 MHz for expansion for MLS. In addition, the aviation community is exploring other applications in the 5 091 - 5 150 MHz band. The fixed satellite service (FSS) (Earth-to-space), limited to non-geostationary (non-GSO) mobile-satellite service (MSS) feeder links, is also allocated to the band 5 091-5 150 MHz in accordance with **S5.444A**. Also, FSS is allocated on a primary (Earth-to-space) in the band 5 150-5 250 MHz for the use of feeder uplinks for non-GSO MSS systems (**S5.447A**). The 5 091-5 150 MHz band

was allocated on a co-primary basis to the FSS for NGSO MSS feeder uplinks under **S5.444A** with the conditions that:

- prior to 1 January 2010, the use of the band 5 091-5 150 MHz by feeder links of non-geostationary-satellite systems in the mobile-satellite service shall be made in accordance with Resolution **114 (WRC-95)**;
- prior to 1 January 2010, the requirements of existing and planned international standard systems for the aeronautical radionavigation service which cannot be met in the 5 000-5 091 MHz band, shall take precedence over other uses of this band;
- after 1 January 2008, no new assignments shall be made to stations providing feeder links of non-geostationary mobile-satellite systems;
- after 1 January 2010, the fixed-satellite service will become secondary to the aeronautical radionavigation service.
-

Two MSS systems have implemented spacecraft tracking and control operations and one system has begun commercial service using the 5 091 – 5 150 MHz band for transmitting communications traffic, as well as, command signals, from gateway earth stations to the non-GSO spacecraft. These systems are successfully coexisting with the ARNS. Furthermore, civil aviation has not expanded its use to the band 5 091 - 5 150 MHz for MLS. ICAO is looking at alternatives to the instrument landing system (such as greater MLS implementation) before an all-weather Global Navigation Satellite System capability is available. There has been successful coordination between the FSS and ARNS based on Recommendation ITU-R **S.1342**, "Method for determining coordination distances, in the 5 GHz band, between the international standard microwave landing system in the aeronautical radionavigation service and non-geostationary mobile satellite service stations providing feeder uplink services." These studies showed that compatibility between MLS receivers and MSS feeder links (Earth-to-space) could exist if sufficient geographical separation exists between the two stations. As a result, Recommendation ITU-R **S.1342** was adopted to trigger coordination between the two operators to determine the acceptability of an MSS site, possibly with or without restrictions.

Two current aviation safety objectives are to provide more information to the pilot/cockpit, and to reduce runway incursions. A proposed application in the band 5 091-5 150 MHz, the Airport Network and Location Equipment (ANLE), would address both of those goals.

In its most basic form, ANLE is a high integrity, wireless local area network (LAN) that would provide aeronautical radionavigation and safety communications for the airport area, combined with a connected grid of distributed sensors. The wireless LAN would provide the cockpit with access to appropriate information via a high-bandwidth internet-like connection. The grid of distributed sensors would use those same transmissions to derive a 3-dimensional picture of the aircraft terminal, which could then be broadcast via the same data link to provide all users with situational awareness of the airport surface. Adding simple transmitters to other surface-movement vehicles would allow for the development of a high-fidelity complete picture of the airport surface environment. The feasibility of such a wideband system in the band 5 091-5 150 MHz is currently being assessed. The International Air Transport Association (IATA) is considering a system called Airport Vehicle Position System (AVPS) to meet the ANLE requirement. The AVPS is intended to monitor surface movements, reduce runway incursion and increase airport security.

No ITU-R study is currently available for the sharing between these aeronautical applications and already allocated services. ANLE provides both radionavigation signals and communication information and the proper allocation(s) under which ANLE should operate is under study. A feasibility trial of an AVPS has been conducted in one country using adaptive wireless networks. The trial showed that the system provided aircraft and vehicles with the ability to navigate with a higher level of accuracy around the airport.

Proposal:

MOD USA/ / 22

5.444 The band 5 030 – 5 150 MHz is to be used for the operation of the international standard system (microwave landing system) for precision approach and landing. The requirements of this system shall take precedence over other uses of this band. For the use of this band, No. **5.444A** and Resolution **114(WRC-~~95~~03)** apply.

Reasons: Consequential

MOD USA/ / 23

5.444A *Additional allocation:* the band 5 091-5 150 MHz is also allocated to the fixed-satellite service (Earth-to-space) on a primary basis. This allocation is limited to feeder links of non-geostationary mobile-satellite systems and is subject to coordination under No. **9.11A**.

In the band 5 091-5 150 MHz, the following conditions also apply:

– prior to 1 January ~~2010~~2018, the use of the band 5 091-5 150 MHz by feeder links of non-geostationary-satellite systems in the mobile-satellite service shall be made in accordance with Resolution **114 (WRC-~~95~~03)**;

– prior to 1 January ~~2010~~2018, the requirements of existing and planned international standard systems for the aeronautical radionavigation service which cannot be met in the 5 000-5 091 MHz band, shall take precedence over other uses of this band;

– after 1 January ~~2008~~2016, no new assignments shall be made to stations providing feeder links of non-geostationary mobile-satellite systems;

– after 1 January ~~2010~~2018, the fixed-satellite service will become secondary to the aeronautical radionavigation service.

Reasons: The allocations and conditions specified in the footnote are sufficient to accommodate both the ARNS and FSS for the foreseeable future.

MOD USA/ / 24

RESOLUTION 114 (WRC-~~95~~03)

Use of the band 5 091-5 150 MHz by the fixed-satellite service (Earth-to-space) (limited to feeder links of the non-geostationary mobile-satellite service)

The World Radiocommunication Conference (Geneva, ~~1995~~2003),

considering

a) the current allocation of the frequency band 5 000-5 250 MHz to the aeronautical radionavigation service;

b) the requirements of both the aeronautical radionavigation and the fixed-satellite (Earth-to-space) (limited to feeder links of non-geostationary (non-GSO) mobile-satellite systems) services in the above-mentioned band,

recognizing

a) that precedence must be given to the microwave landing system (MLS) in accordance with No. **5.444** of the Radio Regulations and to other international standard systems of the aeronautical radionavigation service in the frequency band 5 000-5 150 MHz;

b) that, in accordance with Annex 10 of the Convention of the International Civil Aviation Organization (ICAO), it may be necessary to use the frequency band 5 091-5 150 MHz for the MLS if its requirements cannot be satisfied in the frequency band 5 030-5 091 MHz;

c) that the fixed-satellite service providing feeder links for non-GSO mobile-satellite services will need access to the frequency band 5 091-5 150 MHz in the short term, in order to accommodate already identified requirements,

Reasons: Editorial.

MOD USA/ / 25

noting

a) the necessary evolution of the current MLS and of other international standard systems in the aeronautical radionavigation service implementation plans;

b) the small number of fixed-satellite service stations to be considered;

c) the development of new systems that will provide supplemental navigation information integral to the aeronautical radionavigation service will reduce runway incursions, increase airport security and provide a high-fidelity complete picture of the airport surface environment;

Reasons: Added to reflect requirements for new aeronautical navigation systems.

resolves

MOD USA/ / 26

~~1 that the provisions of this Resolution and of Nos. **5.444** and **5.444A** shall enter into force on 18 November 1995;~~

~~2~~**1** that administrations authorizing stations providing feeder links for non-GSO mobile-satellite systems in the frequency band 5 091-5 150 MHz shall ensure that they do not cause harmful interference to stations of the aeronautical radionavigation service;

Reasons: Editorial

MOD USA/ / 27

~~3~~**2** that the allocation to the aeronautical radionavigation service and the fixed-satellite service in the frequency band 5 091-5 150 MHz should be reviewed at ~~WRC-01*~~a future competent conference prior to 2018,

urges administrations

1 when authorizing stations of the aeronautical radionavigation service, to assign frequencies giving priority to the band below 5 091 MHz;

2 when assigning frequencies in the band 5 091-5 150 MHz before 1 January ~~2010~~2018 to stations of the aeronautical radionavigation service or to stations of the fixed-satellite service providing feeder links of the non-GSO mobile-satellite service (Earth-to-space), to take all practicable steps to avoid mutual interference between them,

instructs ITU-R

1 to study in the appropriate time frame the technical and operational issues relating to sharing of this band between the aeronautical radionavigation service and the fixed-satellite service providing feeder links of the non-GSO mobile-satellite service (Earth-to-space);

2 to bring the results of these studies to the attention of ~~WRC-01~~ a future competent conference prior to 2018,

Reasons: Consequential to revisions to **5.444A**.

invites

1 ICAO to further review, within the same time-frame, detailed spectrum requirements and planning for international standard aeronautical radionavigation systems in the above-mentioned band;

2 all members of the Radiocommunication Sector, and especially ICAO, to participate actively in such studies,

requests the Secretary-General

to bring this Resolution to the attention of ICAO.

Agenda Item 1.7:

to consider issues concerning the amateur and amateur-satellite services:

1.7.1 possible revision of Article **25**;

Background Information: At WRC-95, one administration proposed to delete from Article **25** the requirement that amateurs demonstrate Morse code capability to be licensed to operate on frequencies below 30 MHz. Instead, a review of Article **25** was placed on the preliminary agenda for WRC-99. At WRC-97, this agenda item was moved to the preliminary agenda for WRC-01. At WRC-2000, the item was confirmed on the agenda for WRC-03.

Article **25** contains 11 paragraphs, only one of which relates to the Morse code requirement. In 1996, the International Amateur Radio Union (IARU), an ITU Sector Member, initiated a review of the entire Article by publishing a discussion paper and soliciting comment. Several iterations of the paper and discussions at three regional conferences over a three-year period culminated in the adoption of a consensus view in 1998. This consensus view supports the following principles:

Retention of the requirement that administrations shall verify the technical and operational qualifications of any person wishing to operate an amateur station. The specific qualifications are subject to change over time and more appropriately belong in an ITU-R Recommendation. Accordingly, Recommendation ITU-R M.1544 was developed in Working Party 8A.

Protection of the non-commercial nature of the amateur and amateur-satellite services.

Inclusion of specific provisions to recognize the disaster communications role of the amateur service and to facilitate global roaming by amateur stations.

Relief from existing prohibition on transmitting international communications on behalf of third parties.

Elimination of the provision forbidding radiocommunications between amateurs of different countries if the administration of one of the countries has notified that it objects to such communications.

Elimination of redundant provisions that simply repeat regulations that apply generally to all radio services.

Proposal:

ARTICLE 25

Amateur services

Section I – Amateur service

SUP USA/ / 28

25.1 § 1

Reasons: No longer required. An administration has the necessary authority to determine the points of communication of amateur stations it has licensed.

ADD USA/ / 29

25.1 § 1 Administrations shall verify the technical and operational qualifications of any person wishing to operate an amateur station.

Reasons: To renumber and editorially simplify No. **25.6**.

MOD USA/ / 30

25.2 § 2 1) ~~When~~ Ttransmissions between amateur stations of different countries ~~are permitted, they~~ shall be ~~made in plain language and shall be limited to messages of a technical nature relating to tests and to remarks~~ limited to communications incidental to the purposes of the amateur service or of a personal character ~~for which, by reason of their unimportance, recourse to the public telecommunications service is not justified~~.

2) Except with the authority of the relevant administration granted to meet a particular operational need, transmissions between amateur stations shall not be encoded for the purpose of obscuring their meaning.

Reasons: To eliminate obsolete restrictions while retaining the non-commercial nature of the amateur service and to update the "plain language" requirement by replacing it with "not encoded for the purpose of obscuring their meaning."

SUP USA/ / 31

25.3 2)

Reasons: No longer required. Privatized telecommunications services do not require protection from bypass. The cost of telecommunications services is now so low that the amateur service is not an attractive alternative except in rare cases of isolated stations. Other regulations are sufficient to protect the non-commercial nature of the service.

ADD USA/ / 32

25.3 § 3 Administrations are urged to take the steps necessary to allow amateur stations to prepare for and meet communication needs in the event of a natural disaster.

Reasons: To recognize the disaster communications capability of the amateur service consistent with Recommendation ITU-R M.1042-1, which recommends that administrations encourage the development of amateur networks capable of providing communications in the event of natural disasters and that amateur organizations be allowed to exercise their networks periodically during normal non-disaster periods.

SUP USA/ / 33

25.4 3)

Reasons: No longer required. To eliminate the administrative burden of the necessity of making special arrangements between countries.

ADD USA/ / 34

25.4 § 4 An administration may, without issuing a licence, permit a person who has been granted a license to operate an amateur station by another administration, to operate an amateur station while that person is temporarily in its territory, subject to such conditions or restrictions it may impose.

Reasons: Article **18** requires that all transmitting stations be licensed but provides for special arrangements in certain circumstances. None of these special arrangements applies to the amateur and amateur-satellite services. The proposed addition makes it clear that administrations are authorized and encouraged to permit visiting amateurs to operate without being required to issue them a licence while protecting the prerogatives of administrations.

SUP USA/ / 35

25.5 § 3 1)

Reasons: To eliminate the requirement to prove Morse code ability and to leave this matter to administrations.

SUP USA/ / 36

25.6 2)

Reasons: To renumber and editorially simplify as No. **25.1**.

SUP USA/ / 37

25.7 § 4

Reasons: Redundant. See No. **15.2**, which provides that "Transmitting stations shall radiate only as much power as is necessary to ensure a satisfactory service."

SUP USA/ / 38

25.8 § 5 1)

Reasons: To simplify the Regulations by eliminating a redundant provision.

SUP USA/ / 39

25.9 2)

Reasons: Redundant. See Nos. **19.4 and 19.5**.

Section II – Amateur-satellite service

MOD USA/ / 40

25.~~105~~ 105 § ~~6~~5 The provisions of Section I of this Article shall apply equally, as appropriate, to the amateur-satellite service.

Reasons: Consequential renumbering.

MOD USA/ / 41

25.~~11~~6 § 7~~6~~ ~~Space stations in the amateur-satellite service operating in bands shared with other services shall be fitted with appropriate devices for controlling emissions in the event that harmful interference is reported in accordance with the procedure laid down in Article **15**.~~ Administrations authorizing ~~such~~ space stations ~~shall inform the Bureau and~~ shall ensure that sufficient earth command stations are established before launch to ~~guarantee~~ ensure that any harmful interference ~~which might be reported can be terminated by the authorizing administration (See No. 22.1)~~ caused by emissions from a station in the amateur-satellite service can be immediately eliminated.

Reasons: Consequential renumbering and simplification of provision. The first sentence is redundant (see No. **22.1**). Procedures for notification to the Bureau are given in Resolution **642 (WARC-79)**.

1.7.2 review of the provisions of Article **19** concerning the formation of call signs in the amateur services in order to provide flexibility for administrations;

Background Information: Agenda item 1.7.2 was proposed to provide more flexibility in amateur station call sign structure, especially to commemorate special events or special situations. There is some demand in the United States for amateur station call signs that do not conform to Article **19**. On occasion the FCC has granted permission for amateur stations to use call signs that are at variance with Article **19** to commemorate, for example, U.S. hosting of the Olympics and the bicentennial of the Constitution of the United States.

Proposal:

MOD USA/ / 42

19.68 § 30 1)

– one character (see No. **19.50.1**) and a single digit (other than 0 or 1), followed by a group of not more than ~~three letters~~four characters, the last of which shall be a letter, *or*

Reasons: Greater flexibility would be afforded.

SUP USA/ / 43

19.49

Reasons: This paragraph prohibits amateur station call signs commencing with a digit when the second character is the letter O or the letter I. This unnecessarily limits the call selections of administrations that are allocated such international call sign series. In the case of Yemen, which

has been allocated only the international call sign series 7OA-7OZ, no amateur call sign can be formed that conforms to No. **19.49**.

1.7.3: review of the terms and definitions of Article **1** to the extent required as a consequence of changes made in Article **25**.

Background Information: WRC-03 Agenda Item 1.7.1 deals with consideration of Article **25**. If changes are made to Article **25**, there may be consequential changes to the terms and definitions in Article **1** that may need to be considered.

Proposal:

NOC USA/ / 44

1.56 *amateur service:* A *radiocommunication service* for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest.

1.57 amateur-satellite service: A radiocommunication service using space stations on earth satellites for the same purpose as those of the amateur service.

Reasons: The U.S. is not proposing any changes to Article **25** that would require consequential changes in the terms and definitions in Article **1**.

Agenda Item 1.8.1:

consideration of the results of studies regarding the boundary between spurious and out-of-band emissions, with a view to including the boundary in Appendix **3**;

Background Information: The proposal herein amends Article **1**, Article **3** and Appendix **3** to take into account the most recent studies identifying the unwanted emissions to which the limits of Appendix **3** Section II apply. These studies define the out-of-band and spurious domains of an emission and determine the boundary between them.

In developing proposed text for Section II of Appendix **3** of the Radio Regulations, WRC-97, following guidance from Task Group 1/3, used an assumption that all unwanted emissions of a transmitter separated from the center frequency by more than 250% of the necessary bandwidth ($2.5B_n$) would generally be considered spurious emissions, for the purpose of applying spurious emission limits. Realizing, however, that $2.5B_n$ was not an appropriate threshold for all emissions, the WRC included exceptions for certain modulation types, bit rates, transmitter types, and coordination factors.

From 1997 through 2000, Task Group 1/5 continued the studies as to what frequencies the spurious emission limits of Appendix **3**, Section II should apply. While maintaining the $2.5B_n$ boundary for

most systems, the group developed guidance for narrowband and wideband emissions in various frequency ranges to avoid excessive variations in the boundary. The guidance, eventually promulgated in Recommendation ITU-R SM.1539, also addressed exceptions for certain radio systems, radio services, and frequency bands.

Recognizing a conflict in terminology, since no "boundary" exists in the frequency domain between out-of-band and spurious emissions, Task Group 1/5 adopted definitions for the out-of-band and spurious "domains" of an emission that would be disjoint in frequency, and thus have the intended boundary.

Proposal:

CHAPTER I

Article 1

Terms and definitions

Section VI – Characteristics of emissions and radio equipment

ADD USA/ / 45

1.146*bis* *out-of-band domain* (of an emission): The frequency range, immediately outside the necessary bandwidth but excluding the *spurious domain*, in which *out-of-band emissions* generally predominate.

Out-of-band *emissions*, defined based on their source, occur in the out-of-band domain and, to a lesser extent, in the spurious domain. Spurious emissions likewise may occur in the out-of-band domain as well as in the spurious domain.

1.146*ter* *spurious domain* (of an emission): The frequency range beyond the *out-of-band domain* in which *spurious emissions* generally predominate.

Reasons: Adoption of these two definitions will provide a means to distinguish between frequency ranges within which the emission limits of Appendix **3**, Section II either apply or do not apply.

Article 3

Technical characteristics of stations

MOD USA/ / 46

3.6 Transmitting stations shall conform to the maximum permitted ~~spurious~~ unwanted emission power levels specified in Appendix **3**.

Reasons: Section I of Appendix **3** pertains to spurious emissions, while Section II, as a consequence of the revisions proposed herein, will pertain to emissions in the spurious domain. The term "unwanted emission" covers both cases.

MOD USA/ / 47

3.7 Transmitting stations shall conform to the maximum permitted power levels for out-of-band emissions, or unwanted emissions in the out-of-band domain, specified for certain services

and classes of emission in the present Regulations. In the absence of such specified maximum permitted power levels transmitting stations should, to the maximum extent possible, satisfy the requirements relating to the limitation of the out-of-band emissions, or unwanted emissions in the out-of-band domain, specified in the most recent ITU-R Recommendations (see Resolution **27 (Rev. WRC-97)**).

Reasons: As a result of recent revisions, some ITU-R Recommendations, including Recommendation ITU-R SM.1541, now address unwanted emissions in the out-of-band domain instead of out-of-band emissions as before. Other provisions and Recommendations still address out-of-band emissions.

MOD USA/ / 48

APPENDIX 3

Table of maximum permitted ~~spuriousemission~~ power levels for certain unwanted emissions

(See Article **3**)

Reasons: Section I of this Appendix applies to spurious emissions, while Section II applies to unwanted emissions in the spurious domain. The proposed title encompasses both types of emission limits.

MOD USA/ / 49

1 The following sections indicate the maximum permitted levels of ~~spurious~~ certain unwanted emissions, in terms of power as indicated in the tables, of ~~any spurious~~ components supplied by a transmitter to the antenna transmission line. Section I, which provides spurious emissions limits, is applicable until 1 January 2012 to transmitters installed on or before 1 January 2003; Section II, which limits emissions in the spurious domain, is applicable to transmitters installed after 1 January 2003 and to all transmitters after 1 January 2012. ~~This Appendix does not cover out-of-band emissions. Out-of-band emissions are dealt with in~~ The provisions of No. **4.5** apply to unwanted emissions not covered in Sections I and II.

2 Spurious and spurious domain emissions (covered by Sections I and II) from any part of the installation, other than the antenna and its transmission line, shall not have an effect greater than would occur if this antenna system were supplied with the maximum permitted power at ~~that spurious emission~~the frequency of that emission.

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

4 For technical or operational reasons, more stringent levels than those specified may be applied to protect specific services in certain frequency bands. The levels applied to protect these services, such as safety and passive services, shall be those agreed upon by the appropriate world radiocommunication conference. More stringent levels may also be fixed by specific agreement between the administrations concerned. Additionally, special consideration of transmitter spurious or spurious domain emissions may be required for the protection of safety services, radio astronomy and space services using passive sensors. Information on the levels of interference detrimental to

radio astronomy, Earth exploration satellites and meteorological passive sensing is given in the most recent version of Recommendation ITU-R SM.329.

5 Spurious or spurious domain emission limits (covered by Sections I and II) for combined radiocommunication and information technology equipment are those for the radiocommunication transmitters.

Reasons: The revised paragraphs reflect the distinction between the types of emissions to which the limits of Sections I and II apply.

NOC USA/ / 50

Section I – Spurious emission limits for transmitters installed on or before 1 January 2003 (valid until 1 January 2012)

Reasons: The provisions of Section I apply to spurious emissions and are not affected by this agenda item.

MOD USA/ / 51

Section II – Spurious domain emission limits for transmitters installed after 1 January 2003 and for all transmitters after 1 January 2012

Application of these limits

7 The frequency range of the measurement of spurious domain emissions is from 9 kHz to 110 GHz or the second harmonic if higher.

8 Guidance regarding the methods of measuring spurious domain emissions is given in the most recent version of Recommendation ITU-R SM.329. The e.i.r.p. method specified in that Recommendation should be used when it is not possible to accurately measure the power supplied to the antenna transmission line (for example, radars), or for specific applications where the antenna is designed to provide significant attenuation ~~at~~ in the spurious ~~frequencies~~domain. Additionally, the e.i.r.p. method may need some modification for special cases, e.g. beam forming radars.

9 Guidance regarding the methods of measuring spurious domain emissions from radar systems is given in the most recent version of Recommendation ITU-R M.1177. The reference bandwidths required for proper measurement of radar spurious domain emissions should be calculated for each particular radar system. Thus, for the three general types of radar pulse modulation utilized for radionavigation, radiolocation, acquisition, tracking and other radiodetermination functions, the reference bandwidth values should be:

– for fixed-frequency, non-pulse-coded radar, one divided by the radar pulse length, in seconds (e.g. if the radar pulse length is 1 μs, then the reference bandwidth is 1/1 μs = 1 MHz);

– for fixed-frequency, phase coded pulsed radar, one divided by the phase chip length, in seconds (e.g. if the phase coded chip is 2 μs long, then the reference bandwidth is 1/2 μs = 500 kHz);

– for frequency modulated (FM) or chirped radar, the square root of the quantity obtained by dividing the radar bandwidth in MHz by the pulse length, in seconds (e.g. if the FM is from 1 250 MHz to 1 280 MHz or 30 MHz during the pulse of 10 μs, then the reference bandwidth is $(30 \text{ MHz}/10\ \mu\text{s})^{1/2} = 1.73$ MHz).

For those radar systems for which acceptable methods of measurement do not exist, the lowest practicable power of spurious domain emission should be achieved.

10 The spurious domain emission levels are specified in the following reference bandwidths:

– 1 kHz between 9 kHz and 150 kHz

– 10 kHz between 150 kHz and 30 MHz

– 100 kHz between 30 MHz and 1 GHz

– 1 MHz above 1 GHz.

As a special case, the reference bandwidth of all space service spurious domain emissions should be 4 kHz.

Reasons: The provisions of this Section apply to unwanted emissions in the spurious domain, here called "spurious domain emissions," as opposed to the spurious emissions addressed in Section I.

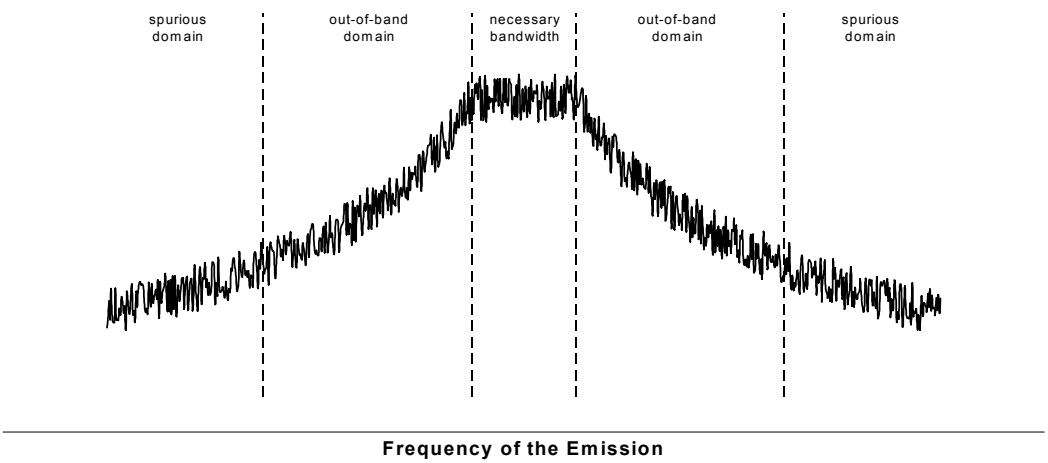
MOD USA/ / 52

11 ~~For the purpose of setting limits,~~ The emission limits of this section apply to all emissions, including harmonic emissions, intermodulation products, frequency conversion products and parasitic emissions, at frequencies in the spurious domain (see Figure 1). The upper and lower parts of the spurious domain extend outward from a boundary determined using Annex I.~~which fall at frequencies separated from the centre frequency of the emission by ± 250%, or more, of the necessary bandwidth of the emission will generally be considered as spurious emissions. However, this frequency separation may be dependent on the type of modulation used, the maximum bit rate in the case of digital modulation, the type of transmitter and frequency coordination factors. For example, in the case of digital (including digital broadcasting) modulation systems, broadband systems, pulsed modulation systems and narrow-band high power transmitters, the frequency separation may need to differ from the ± 250% factor. For multichannel or multicarrier transmitters/transponders, where several carriers may be transmitted simultaneously from a final output amplifier or an active antenna, the centre frequency of the emission is taken to be the centre of the –3 dB bandwidth of the transmitter or transponder and the necessary bandwidth is taken to be the transmitter or transponder bandwidth.~~

Reasons: Since the boundary between the out-of-band and spurious domains is determined using Annex I, the information is no longer needed here.

ADD USA/ / 53

FIGURE 1



Out-of-band and spurious domains

Reasons: The figure illustrates the text description of the locations of the out-of-band and spurious domains from the previous paragraph.

SUP **USA/** / 54

11bis

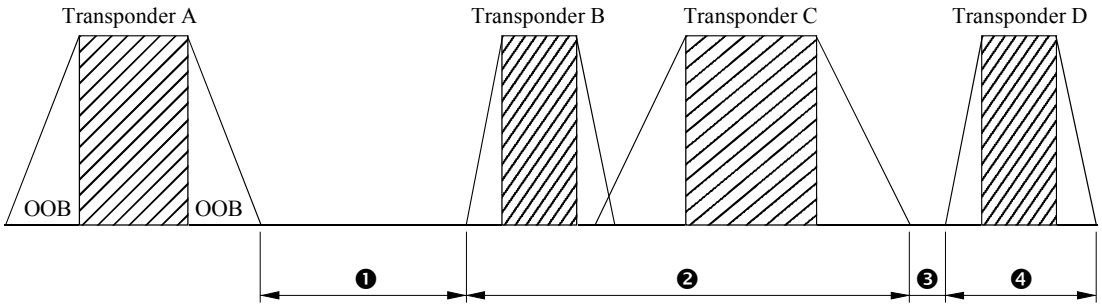
Reasons: The information used to determine the boundary between the out-of-band and spurious domains is now found in Annex I.

MOD USA/ / 55

11*bis~~ter~~*For the case of a single satellite operating with more than one transponder in the same service area, and when considering the limits for spurious domain emissions as indicated in § 11 of this Appendix, spurious domain emissions from one transponder may fall on a frequency at which a second, companion transponder is transmitting. In these situations, the level of spurious domain emissions from the first transponder is well exceeded by the fundamental or out-of-band domain emissions of the second transponder. Therefore, the limits of this Appendix should not apply to those ~~spurious~~ emissions of a satellite that fall within either the necessary bandwidth or the out-of-band ~~region~~ domain of another transponder on the same satellite, in the same service area (see Fig. ~~1~~2).

FIGURE ~~1~~2

Example of the applicability of spurious domain emission limits to a satellite transponder



Transponders A, B, C and D are operating on the same satellite in the same service area. Transponder A is not required to meet spurious domain emission limits in frequency ranges ❷ and ❹, but is required to meet them in frequency ranges ❶ and ❸.

12 Examples of applying 43 + 10 log (*P*) to calculate attenuation requirements

Where specified in relation to mean power, spurious domain emissions are to be at least *x* dB below the total mean power *P*, i.e. –*x* dBc. The power *P* (W) is to be measured in a bandwidth wide enough to include the total mean power. The spurious domain emissions are to be measured in the reference bandwidths given in the Recommendation. The measurement of the spurious domain emission power is independent of the value of necessary bandwidth. Because the absolute emission power limit, derived from 43 + 10 log (*P*), can become too stringent for high-power transmitters, alternative relative powers are also provided in Table II.

Example 1

A land mobile transmitter, with any value of necessary bandwidth, must meet a spurious domain emission attenuation of 43 + 10 log (*P*), or 70 dBc, whichever is less stringent. To measure spurious domain emissions in the frequency range between 30 MHz and 1 GHz, Recommendation ITU-R SM.329-~~7~~ 9 *recommends* 4.1 indicates the use of a reference bandwidth of 100 kHz. For other frequency ranges, the measurement must use the appropriate reference bandwidths given in *recommends* 4.1.

With a measured total mean power of 10 W:

– Attenuation relative to total mean power = 43 + 10 log (10) = 53 dBc.

– The 53 dBc value is less stringent than the 70 dBc, so the 53 dBc value is used.

– Therefore: Spurious domain emissions must not exceed 53 dBc in a 100 kHz bandwidth, or converting to an absolute level, ~~spurious emissions~~ they must not exceed 10 dBW – 53 dBc = –43 dBW in a 100 kHz reference bandwidth.

With a measured total mean power of 1 000 W:

– Attenuation relative to total mean power = 43 + 10 log (1 000) = 73 dBc.

– The 73 dBc value is more stringent than the 70 dBc limit, so the 70 dBc value is used.

– Therefore: Spurious domain emissions must not exceed 70 dBc in a 100 kHz bandwidth, or converting to an absolute level, ~~spurious emissions~~ they must not exceed 30 dBW – 70 dBc = –40 dBW in a 100 kHz reference bandwidth.

Example 2

A space service transmitter with any value of necessary bandwidth must meet a spurious domain emission attenuation of 43 + 10 log (*P*), or 60 dBc, whichever is less stringent. To measure spurious domain emissions at any frequency, Note 10 to Table II indicates using a reference bandwidth of 4 kHz.

With a measured total mean power of 20 W:

– Attenuation relative to total mean power = 43 + 10 log (20) = 56 dBc.

– The 56 dBc value is less stringent than the 60 dBc limit, so the 56 dBc value is used.

– Therefore: Spurious domain emissions must not exceed 56 dBc in a 4 kHz reference bandwidth, or converting to an absolute level, ~~spurious emissions~~ they must not exceed 13 dBW – 56 dBc = –43 dBW in a 4 kHz reference bandwidth.

TABLE II (WRC-2000)

Attenuation values used to calculate maximum permitted spurious domain emission power levels for use with radio equipment

Service category in accordance with Article 1, or equipment type [15]	Attenuation (dB) below the power supplied to the antenna transmission line
All services except those services quoted below:	43 + 10 log (*P*), or 70 dBc, whichever is less stringent
Space services (earth stations) [10, 16]	43 + 10 log (*P*), or 60 dBc, whichever is less stringent
Space services (space stations) [10, 17]	43 + 10 log (*P*), or 60 dBc, whichever is less stringent
Radiodetermination [14]	43 + 10 log (*PEP*), or 60 dB, whichever is less stringent
Broadcast television [11]	46 + 10 log (*P*), or 60 dBc, whichever is less stringent, without exceeding the absolute mean power level of 1 mW for VHF stations or 12 mW for UHF stations. However, greater attenuation may be necessary on a case by case basis.
Broadcast FM	46 + 10 log (*P*), or 70 dBc, whichever is less stringent; the absolute mean power level of 1 mW should not be exceeded
Broadcasting at MF/HF	50 dBc; the absolute mean power level of 50 mW should not be exceeded
SSB from mobile stations [12]	43 dB below *PEP*
Amateur services operating below 30 MHz (including those using SSB) [16]	43 + 10 log (*PEP*), or 50 dB, whichever is less stringent
Services operating below 30 MHz, except space, radiodetermination, broadcast, those using SSB from mobile stations, and amateur [12]	43 + 10 log (*X*), or 60 dBc, whichever is less stringent, where *X* = *PEP* for SSB modulation, and *X* = *P* for other modulation
Low-power device radio equipment[13]	56 + 10 log (*P*), or 40 dBc, whichever is less stringent
Emergency transmitters [18]	No limit

TABLE II (*end*)

P: mean power in watts supplied to the antenna transmission line, in accordance with No. **1.158**. When burst transmission is used, the mean power *P* and the mean power of any spurious domain emissions are measured using power averaging over the burst duration.

PEP: peak envelope power in watts supplied to the antenna transmission line, in accordance with No. **1.157**.

dBc: decibels relative to the unmodulated carrier power of the emission. In the cases which do not have a carrier, for example in some digital modulation schemes where the carrier is not accessible for measurement, the reference level equivalent to dBc is decibels relative to the mean power *P*.

[10] Spurious domain emission limits for all space services are stated in a 4 kHz reference bandwidth.

[11] For analogue television transmissions, the mean power level is defined with a specified video signal modulation. This video signal has to be chosen in such a way that the maximum mean power level (e.g. at the video signal blanking level for negatively modulated television systems) is supplied to the antenna transmission line.

[12] All classes of emission using SSB are included in the category "SSB".

[13] Low-power radio devices having a maximum output power of less than 100 mW and intended for short-range communication or control purposes; such equipment is in general exempt from individual licensing.

[14] For radiodetermination systems (radar as defined by No. **1.100**), spurious domain emission attenuation (dB) shall be determined for radiated emission levels, and not at the antenna transmission line. The measurement methods for determining the radiated spurious domain emission levels from radar systems should be guided by Recommendation ITU-R M.1177.

[15] In some cases of digital modulation (including digital broadcasting), broadband systems, pulsed modulation and narrow-band high-power transmitters for all categories of services, there may be difficulties in meeting limits close to ± 250% of the necessary bandwidth.

[16] Earth stations in the amateur-satellite service operating below 30 MHz are in the service category "Amateur services operating below 30 MHz (including those using SSB)".

[17] Space stations in the space research service intended for operation in deep space as defined by No. **1.177** are exempt from spurious domain emission limits.

[18] Emergency position-indicating radio beacon, emergency locator transmitters, personal location beacons, search and rescue transponders, ship emergency, lifeboat and survival craft transmitters and emergency land, aeronautical or maritime transmitters.

Reasons: These revisions again reflect the change in terminology from "spurious emissions" to "spurious domain emissions."

ADD USA/ / 56

ANNEX I

Determination of the boundary between the out-of-band and spurious domains

1 Except as provided below, the boundary between the out-of-band and spurious domains occurs at frequencies that are separated from the centre frequency of the emission by the values shown in Table 1. For most systems, the centre frequency of the emission is the centre of the necessary bandwidth. For multichannel or multicarrier transmitters/transponders, where several carriers may be transmitted simultaneously from a final output amplifier or an active antenna, the centre frequency of the emission is taken to be the centre of the 3 dB bandwidth of the transmitter or transponder and the transmitter or transponder bandwidth is used in place of the necessary bandwidth for determining the boundary. Some systems specify unwanted emissions relative to channel bandwidth, or channel spacing. These may be used as a substitute for the necessary bandwidth in Table 1, provided they are found in ITU–R Recommendations.

TABLE 1

Values for frequency separation between the centre frequency and the boundary of the spurious domain

Frequency range	Narrow-band case		Normal separation	Wideband case	
	for B_n <	Separation		for B_n >	Separation
9 kHz < f_c < 150 kHz	250 Hz	625 Hz	2.5 B_n	10 kHz	1.5 B_n + 10 kHz
150 kHz < f_c < 30 MHz	4 kHz	10 kHz	2.5 B_n	100 kHz	1.5 B_n + 100 kHz
30 MHz < f_c < 1 GHz	25 kHz	62.5 kHz	2.5 B_n	10 MHz	1.5 B_n + 10 MHz
1 GHz < f_c < 3 GHz	100 kHz	250 kHz	2.5 B_n	50 MHz	1.5 B_n + 50 MHz
3 GHz < f_c < 10 GHz	100 kHz	250 kHz	2.5 B_n	100 MHz	1.5 B_n + 100 MHz
10 GHz < f_c < 15 GHz	300 kHz	750 kHz	2.5 B_n	250 MHz	1.5 B_n + 250 MHz
15 GHz < f_c < 26 GHz	500 kHz	1.25 MHz	2.5 B_n	500 MHz	1.5 B_n + 500 MHz
f_c > 26 GHz	1 MHz	2.5 MHz	2.5 B_n	500 MHz	1.5 B_n + 500 MHz
NOTE—In Table 1, f_c is the centre frequency of the emission and B_n is the necessary bandwidth. If the assigned frequency band of the emissions extends across two frequency ranges, then the values corresponding to the higher frequency range shall be used for determining the boundary.					

Example 1: The necessary bandwidth of an emission at 26 MHz is 1.8 kHz. Since 2.5B_n is only 4.5 kHz, the minimum separation applies. The spurious domain begins 10 kHz each side of the centre of the necessary bandwidth.

Example 2: The necessary bandwidth of an emission at 8 GHz is 200 MHz. Since the wideband case applies for B_n > 100 MHz at that frequency, the spurious domain begins 400 MHz each side of the centre of the necessary bandwidth. Using the general separation formula, the out-of-band domain would have extended to 2.5 × 200 MHz = 500 MHz either side of the centre frequency.

2 Tables 2 and 3 show exceptions to Table 1 for narrow-band and wideband cases, respectively, applicable to particular systems or services and frequency bands.

TABLE 2

Narrow-band variations for systems or services and frequency bands

System or service	Frequency range	Narrow-band case	
		for B_n <	Separation
FS	14 kHz - 1.5 MHz	20 kHz[1]	50 kHz
FS	1.5-30 MHz	80 kHz[2]	200 kHz

[1] This is based on an assumption that the maximum value of the necessary bandwidth is about 3 kHz for the frequency range 14 kHz - 1.5 MHz. The value of 50 kHz separation is extremely large as compared with the necessary bandwidth. It is because unwanted emissions of high power transmitters under modulated conditions have to be below the spurious limit (70 dBc) at the boundary between the out-of-band and spurious domains.

[2] This is based on an assumption that the maximum value of the necessary bandwidth is about 12 kHz for the frequency range 1.5-30 MHz. The value of 200 kHz separation is extremely large as compared with the necessary bandwidth. It is because unwanted emissions of high power transmitters under modulated conditions have to be below the spurious limit (70 dBc) at the boundary between the out-of-band and spurious domains. Also, if future systems in the fixed service operating in this frequency range require a necessary bandwidth larger than 12 kHz, it may become necessary to review the 200 kHz separation. It should be noted that for medium or low power transmitters (e.g. below 1 kW), a smaller value may be appropriate as the minimum separation. This matter requires further study.

TABLE 3

Wideband variations for systems or services and frequency bands

System or service	Frequency range	Wideband case	
		for B_n >	Separation
FS	14-150 kHz	20 kHz	1.5 B_n + 20 kHz
FSS	3.4-4.2 GHz	250 MHz	1.5 B_n + 250 MHz
FSS	5.725-6.725 GHz	500 MHz	1.5 B_n + 500 MHz
FSS	7.25-7.75 GHz and 7.9-8.4 GHz	250 MHz	1.5 B_n + 250 MHz
FSS	10.7-12.75 GHz	500 MHz	1.5 B_n + 500 MHz
BSS	11.7-12.75 GHz	500 MHz	1.5 B_n + 500 MHz
FSS	12.75-13.25 GHz	500 MHz	1.5 B_n + 500 MHz
FSS	13.75-14.8 GHz	500 MHz	1.5 B_n + 500 MHz

3 For primary radar stations, the boundary between the out-of-band and spurious domains is the frequency at which the out-of-band limits specified in applicable ITU–R Recommendations are equal to the spurious limit defined in Table II of Appendix **3**. Further studies need to be conducted within the ITU–R to determine the appropriate spurious domain boundary for these systems.

Reasons: Annex I is added for the following reasons;

Section II of this Appendix states that the emission limits apply to unwanted emissions in the spurious domain. This Annex is needed to determine the boundary between the out-of-band and spurious domains, and thus the frequencies to which the emission limits of Section II apply.

Table 1, taken from Recommendation ITU–R SM.1539, shows the normal boundary of $2.5B_n$, along with the narrowband and wideband exception. The information in the Recommendation, along with the text of existing paragraphs 11 and 11*bis*, have been included, though they have been shortened to bring them in line with the form of other Appendices.

Tables 2 and 3 are also taken from Recommendation ITU–R SM.1539.

Studies regarding the frequencies to which the Section II limits for primary radar apply will not be completed in time for WRC–2003. This text is similar to that of Annex 8, § 5 of Recommendation ITU–R SM.1541.4

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Agenda Item 1.9:

to consider Appendix **13** and Resolution **331 (Rev.WRC-97)** with a view to their deletion and, if appropriate, to consider related changes to Chapter VII and other provisions of the Radio Regulations, as necessary, taking into account the continued transition to and introduction of the Global Maritime Distress and Safety System (GMDSS);

Background Information: In accordance with the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, all ships subject to this convention were fitted for the Global Maritime Distress and Safety System (GMDSS) by 1 February 1999. During the transition period to full implementation of the GMDSS, the RR had dual provisions; Appendix **13** includes the non-GMDSS provisions. Although many administrations have worked to increase fitting of GMDSS elements (e.g., radios incorporating DSC functions and satellite EPIRBs) on non-SOLAS vessels, this fitting on a world-wide basis is not expected to be completed in the foreseeable future. Therefore, the provisions in Appendix **13** continue to be required to provide necessary guidance (e.g., consideration of frequencies and modes of operation for their distress and safety communications) for non-SOLAS vessels. In addition to the guidance for non-GMDSS vessels, this Appendix includes certification requirements for personnel operating radio equipment on these non-GMDSS vessels. Because the majority of these vessels do not have radio carriage requirements (other than those of national authorities) coupled with the abandonment in many part of the world of radiotelegraphy; certification requirements (including the ability to send and receive Morse code) is no longer necessary.

Proposal:

NOC USA/ / 57

APPENDIX 13

Reasons: Deletion of Appendix **13** is premature at this time as a large number on non-SOLAS vessels have not yet been fitted for GMDSS. Revisions to this appendix would be a very time consuming effort without adequate benefit.

Agenda Item 1.10.1:

to consider the results of studies, and take necessary actions, relating to exhaustion of the maritime mobile service identity numbering resource (Resolution **344 (WRC-97)**);

Background Information: This agenda item addresses the potential of an impending exhaustion of the Maritime Mobile Service Identities (MMSI) numbering resource. Resolution **344** instructs the Radiocommunication Bureau to monitor the status of the MMSI resource and report the status to each WRC.

Maritime mobile service identities (MMSIs) are required for many shipborne communications equipment (e.g. DSC, mobile earth stations). The MMSI is a 9-digit number to uniquely identify ship stations, group ship stations, coast stations, and group coast stations. Three of the nine MMSI digits are the Maritime Identification Digits (MIDs) that represent territory or geographical area of administrations and are assigned by the ITU. The total possible number of MMSIs is reduced by ITU Recommendations, which advise administrations to assign MMSIs with three trailing zeros to ships sailing worldwide and communicating with foreign coast stations. Additionally, ITU-T Recommendation E.215 has a requirement to assign MMSIs ending in 3-zeros to vessels requiring access to certain satellite services. Therefore, for each MID assigned, there are only 999 numbers available for use by ships with the present generation of maritime mobile-satellite networks operated by Inmarsat Ltd. (Standard B, C and M). Additional MIDs are now assigned by the ITU to administrations when they have used 80% of the MMSIs with three trailing zeros as documented via the notification requirements of Article **19**. As the number of vessels carrying such systems increased, so has the demand for MMSIs with three trailing zeros.

A second issue that can affect the MMSI numbering resource is potential assignment to aircraft stations. Aircraft used for SAR purposes may have a need to establish aircraft-to-ship communications using DSC-equipped radios or using universal shipborne automatic identification systems (AIS). This AIS communications requirement is addressed in ITU-R M 1371-1, which includes a message to be used for SAR aircraft position report and requires the use of an MMSI.

Proposal:

ARTICLE 19

Identification of stations

SECTION II – ALLOCATION OF INTERNATIONAL SERIES AND ASSIGNMENT OF CALL SIGNS

MOD USA/ / 58

19.30 2) As the need arises, ship stations and ship earth stations to which the provisions of Chapter **IX** apply, and coast stations, ~~or~~ coast earth stations or aeronautical stations capable of communicating with such ship stations, shall have assigned to them maritime mobile service identities in accordance with Section VI of this Article.

Reasons: Permits MMSIs to be assigned to aeronautical stations that require communications to ship stations.

ADD USA/ / 59

19.31A 4) Means shall be provided for identifying uniquely mobile stations operating in automated terrestrial or satellite communication systems for the purposes of answering distress calls, avoiding interference and for billing. Identification of the mobile station by accessing a registration database is satisfactory, provided that the system can associate the mobile station radio calling number with the particular mobile station user.

Reasons: To provide guidance that identification of mobile stations can be provided by use of a registration database, thereby allowing use of all 9-digits of the MMSI.

MOD USA/ /60

19.35 § 16 The Secretary-General shall be responsible for allocating additional maritime identification digits (MIDs) to administrations within the limits specified[2], provided that he is satisfied that the possibilities offered by the MIDs allocated to an administration will soon be exhausted despite judicious ship station identity assignment as outlined in Section VI, which should be in conformity with the relevant ITU-R and ITU-T Recommendations.

Reasons: The suppression of footnote 2 (**19.35.1**) is consequential to **MOD 19.36** shown below.

MOD USA/ / 61

19.36 §17 ~~A single~~ Each administration has been allocated one or more maritime identification digits (MID) ~~has been allocated initially to each administration~~ for its use. A second or subsequent MID should not be requested[2] unless the ~~first~~ previously allocated MID ~~allocated~~ is more than 80% exhausted in the basic category of three trailing zeros and the rate of assignments is such that 90% exhaustion is foreseen. ~~The same criteria should be applied to subsequent requests for MIDs.~~

Reasons: Clarify the text describing requirements for requesting of additional MIDs. This is further explained in footnote 2 (**19.36.1**).

[2] **19.36.1** In no circumstances may an administration claim more MIDs than the total number of its ship stations notified to the ITU divided by 1 000, plus one. Administrations shall make every attempt to reuse the MMSIs assigned from earlier MID resources, which become redundant after ships leave their national ship registry. Such numbers should be considered for re-assignment after being absent from at least two successive editions of LIST VIIA of the ITU service documents. Administrations seeking additional MID resources must meet the criteria of having notified all previous assignments, in accordance with No. **20.16**. This criteria applies only to MMSIs in the basic category and to all MIDs assigned to the administration.

Section VI – Maritime mobile service identities in the maritime mobile service and the maritime mobile-satellite service

MOD USA/ / 62

19.99 § 39 When a station[5] in the maritime mobile service, ~~or~~ the maritime mobile-satellite service, or the aeronautical mobile service is required to use maritime mobile service identities, the responsible administration shall assign the identity to the station in accordance with the provisions described in Nos. **19.100** to **19.126**; in so doing, it should take into account the relevant ITU-R and ITU-T Recommendations. In accordance with No. **20.16,** administrations shall notify the Bureau immediately when assigning maritime mobile service identities

Reasons: Permits MMSIs to be assigned to aeronautical stations that require communications to ship stations.

MOD USA/ / 63

19.100 § 40 1) Maritime mobile service identities are formed of a series of nine digits which are transmitted over the radio path in order to uniquely identify ship stations, ship earth stations, coast stations, coast earth stations, aeronautical stations, and group calls.

Reasons: Add reference to aeronautical stations.

MOD USA/ / 64

19.101 2) These identities are formed in such a way that the identity or part thereof can be used by telephone and telex subscribers connected to the public~~general~~ telecommunications network principally to call ships automatically in the shore-to-ship direction. Access to public networks may also be achieved by means of free form numbering plans, so long as the ship can be uniquely identified using the systems registration database (see No. **19.31A**) to obtain the ship station identity, call sign or ship name and nationality.

Reasons: Allows use of free form numbering plans thereby alleviating the requirement for use of three trailing zeros.

19.108.1 *B – Maritime identification digits (MIDs)*

ADD USA/ / 65

19.108A § 42 The maritime identification digits $M_1I_2D_3$ are an integral part of the maritime mobile service identity and denotes the geographical area whose administration is responsible for the station so identified (see Nos. **19.102** to **19.106**).

Reasons: Provides additional definition for MIDs denoting linkage to geographical area.

SUP USA/ / 66

~~**19.109**~~ § 42 These provisions do not require an administration to assign numerical identities until it determines that such identities are necessary. They do not concern the assignment

of ship station identities without trailing zeros, since it is assumed that there is enough capacity inherent in the system to provide for the assignment of such identities to all ship stations which an administration may wish to identify in this manner.

Reasons: This change is consequential to **MOD 19.31A** above.

19.110 C – Ship station identities

MOD USA/ / 67

19.112 *a)* follow the guidelines contained in the ~~relevant~~ most recent version of Recommendation ITU-R ~~and ITU-T Recommendations for~~M.585 concerning the assignment and use of ship station identities.

Reasons: Gives ITU-R responsibility for management of MMSI and MID resources.

MOD USA/ / 68

19.114 *c)* take particular care in assigning ship station identities with six significant digits (three-trailing-zero identities), which should be assigned only to ship stations which can reasonably be expected to require such an identity for automatic access on a world-wide basis for public switched networks~~:~~, in particular for mobile satellite systems accepted for use in GMDSS on or before 1 February 2002, as long as those systems maintain the MMSI as part of their numbering scheme.

Reasons: Clarification that MMSI with three trailing zeros is applicable primarily for earlier mobile satellite systems.

SUP USA/ / 69

19.115 *d)*

Reasons: Originally, it was thought that a significant number of vessels which sailed domestically or on a regional basis and also required automatic access to Public Switched networks via DSC would be able to use a regional or domestic designator (8 or 9 respectively) as the first digit of the MMSI resulting in only two trailing zeros being available. There are no current or planned DSC coast stations planning to provide the automatic access, therefore, reserving MMSIs with one or two trailing zeros for this purpose is no longer necessary, confusing and undesirable.

SUP USA/ / 70

19.116 *e)*

Reasons: Since there are no longer needs for numbers ending with one or two zeros to be reserved for automatic access to PSTN via DSC, there are only two types of formats, those with three trailing zeros used mainly for INMARSAT and all others therefore there is no need for the above provision.

MOD USA/ / 71

RESOLUTION 344 (REV.WRC-~~97~~03)

~~Exhaustion~~Management of the maritime mobile service identity numbering resource

The World Radiocommunication Conference (Geneva~~, 1997~~2003),

noting

~~*a)* that ships not required to carry Global Maritime Distress and Safety System (GMDSS) equipment may do so, for safety purposes;~~

~~*b*~~*a)* that the installation of digital selective calling equipment ~~on such ships for VHF radio, and/~~or Inmarsat B, C or M ship earth station equipment on ships participating in the Global Maritime Distress and Safety System (GMDSS) on a mandatory or voluntary basis requires the assignment of a unique nine-digit maritime mobile service identity (MMSI);

b) that such equipment offers the possibility to connect with public telecommunications networks;

c) that only mobile-satellite systems have been able to resolve the various billing, routing, charging and signalling requirements needed to provide full two-way automatic connectivity between ships and the international public correspondence service;

d) that ships using the present generation of mobile-satellite ship earth stations have to be assigned an MMSI ending with three trailing zeroes in order to support automatic access to public telecommunication networks through a diallable ship telephone number whose format is compliant with ITU-T Recommendation E.164, but can only accommodate the first six digits of the MMSI;

e) that the first three digits of a ship station MMSI form the maritime identification digits (MID), which denote the ship's administration or geographical area of origin;

f) that each MID only has sufficient capacity to identify 999 ships using the three trailing zero number format, with the result that the widespread use of MMSIs with three trailing zeroes rapidly exhausts the capacity of each MID,

~~*c)* that not all administrations assign these identities to users of digital selective calling equipped VHF radios on such ships, from the numbers intended for use by vessels sailing and communicating only with domestic coast stations,~~

considering

a) that ~~VHF~~ digital selective calling distress alerts require valid identities ~~for use~~recognizable by search and rescue authorities in order to ensure a timely response;

b) that Recommendation ITU-R M.585 contains guidance for the assignment of MMSIs, including to non-compulsory ships which communicate only with domestic radio stations; and

c) that Recommendation ITU-R M.585 was derived from ITU-T Recommendation E.210,

recognizing

a) that even domestic ships which install the present generation of ship earth stations operating to Inmarsat B, C or M standards will require the assignment of MMSI numbers from those numbers originally intended ~~reserved~~ for ships communicating worldwide, further depleting the resource;

b) that future growth of Inmarsat B, C ~~and~~or M ~~mobile~~ship earth station use by non-compulsory ships ~~is not, however, expected to~~may further deplete the MMSI and MID resources;

c) that ~~growth projections of Inmarsat systems by non-compulsory ships could nevertheless change~~future generations of mobile-satellite systems offering access to public telecommunication networks and participating in the Global Maritime Distress and Safety System will employ a free-form numbering system that need not include any part of the MMSI,

noting further

a) that ITU-T has recommended that ITU-R assumes sole responsibility for managing the MMSI and MID numbering resources;

b) that ITU-R can monitor the status of the MMSI resource, through regular reviews of the spare capacity available within the MIDs already in use, and ~~by monitoring~~ the availab~~le~~ility of spare maritime identification digits ~~(first three digits of the MMSI)~~, taking account of regional variations,

instructs the Director of the Radiocommunication Bureau

1 to manage the allotment and distribution of the MID resource within the MMSI numbering format, taking into account:

– Sections II, V and VI of Article **19**;

– regional variations in MMSI use;

– spare capacity within the MID resource; and

– the guidelines on MID and MMSI management contained in the most recent version of Recommendation ITU-R M.585, in particular as regards the re-use of MMSIs;

~~1~~2 to ~~monitor the status of the MMSI resource, and to~~ report to each world radiocommunication conference on the use and status of the MMSI resource, noting in particular the anticipated reserve capacity and ~~expected~~any indications of rapid exhaustion of the resource,

resolves to invite ~~ITU-T and~~ *ITU-R*

1 to keep under review the Recommendations for assigning MMSIs, with a view to:

– improving the management of the MID and MMSI resources; and

– identifying alternative resources ~~before~~if there is an indication of rapid exhaust of these resources ~~are exhausted;~~,

2 to consult ~~each other~~ the ITU-T when addressing changes to any of the Recommendations affecting the MMSI numbering resources;

3 to complete studies on an urgent basis when a future world radiocommunication conference identifies the impending exhaustion of the MMSI resource,

instructs the Secretary-General

to communicate this Resolution to the International Maritime Organization.

Reasons: Changes needed to Resolution **344 (WRC-97)** in order to implement the new resource management responsibilities.

Agenda Item 1.11:

to consider possible extension of the allocation to the mobile-satellite service (Earth-to-space) on a secondary basis in the band 14-14.5 GHz to permit operation of the aeronautical mobile-satellite service as stipulated in Resolution **216 (Rev.WRC-2000)**;

Background Information: Aeronautical mobile-satellite service systems in the 14 -14.5 GHz band are proposed to meet the growing demand for two-way broadband communication, including data transmission, for commercial aircraft passengers and crew. At WRC-2000, Resolution **216** was adopted in response to a proposal to provide for the operation of the aeronautical mobile satellite service in the 14-14.5 GHz band for the purpose of providing broadband data transmissions for aircraft. Currently, the frequency band 14-14.5 GHz is allocated to the fixed-satellite service (Earth-to-space), the radionavigation service, the fixed service and the mobile service on a primary basis and, on a secondary basis, to several other services including the mobile-satellite service (Earth-to-space)(except aeronautical mobile- satellite service). The intention of this proposal was to provide for the aeronautical mobile-satellite service by removing the exception for this service from the allocation to the mobile-satellite service (Earth-to-space).

Under Resolution **216**, WRC-03 was asked to examine the possibility of broadening the secondary allocation to the mobile-satellite service to include the aeronautical mobile-satellite service if the ITU-R studies requested in Resolution 216 demonstrated that such a secondary provision for the aeronautical mobile-satellite service was possible without causing interference to the primary services allocated in that frequency band.

The ITU-R completed these studies and concluded that appropriately designed aeronautical mobile-satellite systems can operate on a secondary basis in the frequency band 14-14.5 GHz without causing harmful interference to services having primary allocations in the band. Additional studies have shown the feasibility of aeronautical mobile-satellite systems sharing with services operating under secondary allocations in this frequency band. The ITU-R has also developed [Draft New] Recommendation ITU-R M.[AMSS] to provide Administrations with a feasible technical basis for implementing aeronautical mobile-satellite systems in this frequency band. Furthermore, it was concluded that this allocation could be broadened to include the aeronautical mobile-satellite service and no other regulatory changes are required.

Since there are no related regulatory actions, this revised allocation could have provisional application as of the end of WRC-03. Also, Resolution 216 is no longer required and may be suppressed.

Proposal:

MOD USA/ / 72

14-14.5 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
14-14.25	FIXED-SATELLITE (Earth-to-space) 5.484A 5.506 RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) ~~except aeronautical mobile satellite~~ Space research 5.505	
14.25-14.3	FIXED-SATELLITE (Earth-to-space) 5.484A 5.506 RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) ~~except aeronautical mobile satellite~~ Space research 5.505 5.508 5.509	
14.3-14.4 FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.506 MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) ~~except aeronautical mobile satellite~~ Radionavigation-satellite	**14.3-14.4** FIXED-SATELLITE (Earth-to-space) 5.484A 5.506 Mobile-satellite (Earth-to-space) ~~except aeronautical mobile satellite~~ Radionavigation-satellite	**14.3-14.4** FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.506 MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) ~~except aeronautical mobile satellite~~ Radionavigation-satellite
14.4-14.47	FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.506 MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) ~~except aeronautical mobile satellite~~ Space research (space-to-Earth)	
14.47-14.5	FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.506 MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) ~~except aeronautical mobile satellite~~ Radio astronomy 5.149	

Reasons: On the basis of ITU-R studies, appropriately designed and controlled AMSS systems can operate on a secondary basis in the band 14-14.5 GHz without causing harmful interference to the primary services in the band. Studies have also shown the feasibility of AMSS sharing with systems employing secondary allocations in this frequency band.

*NOTE: A separate proposal will be needed to give immediate effect to this secondary allocation upon the conclusion of the conference. This is normally achieved by a resolution developed at the conference calling for provisional application of specific conference actions (such as Resolution **54** (WRC-97)) together with a reference in Article **59**, Entry into Force and Provisional Application of Radio Regulations (such as **59.6**).*

SUP USA/ / 73

RESOLUTION 216 (REV.WRC-2000)

Possible broadening of the secondary allocation to the mobile-satellite service (Earth-to-space) in the band 14-14.5 GHz to cover aeronautical applications

Reasons: Work is complete.

Agenda Item 1.12:

to consider allocations and regulatory issues related to the space science services in accordance with Resolution **723 (Rev. WRC-2000)**;

Proposal A (Agenda Item 1.12)

Background Information: ITU-R Recommendation SA.363-5 recommends that frequencies below 1 GHz are technically suitable for telecommand of satellites in the space science services operating below an altitude of 2000 km. A deficiency in telecommand (uplink) frequency allocations has been previously identified, compared to the available telemetry (downlink) allocations in the 100 MHz to 1 GHz range. The deficiency was first noted in Resolution **712 (WARC-92)**, repeated in Resolution **712 (Rev. WRC-95)**, and again in Resolution **723 (WRC-97)**.

This item was originally placed on the WRC-97 agenda. WRC-97 determined that insufficient study had been completed to take action on this agenda item.

Since WRC-2000, additional studies have been undertaken in the ITU-R. The study results show that show that separation distances for aeronautical mobile stations must be over 400 km and for MSS approximately 100 km. These required coordination distances make use of RR **9.17/17a** and Appendix **7** impractical and will result in large geographical regions where existing Aeronautical Mobile, MS, FS, and MSS services are unusable.

Proposal:

NOC USA/ / 74

220-335.4 MHz

<table>
<tr><th colspan="3">Allocation to services</th></tr>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td></td><td>220-225
AMATEUR
FIXED
MOBILE
Radiolocation 5.241</td><td></td></tr>
<tr><td>223-230
BROADCASTING
Fixed
Mobile

5.243 5.246 5.247</td><td rowspan="2">225-235
FIXED
MOBILE</td><td>223-230
FIXED
MOBILE
BROADCASTING
AERONAUTICAL RADIONAVIGATION
Radiolocation
5.250</td></tr>
<tr><td>230-235
FIXED
MOBILE

5.247 5.251 5.252</td><td>230-235
FIXED
MOBILE
AERONAUTICAL RADIONAVIGATION
5.250</td></tr>
<tr><td>235-267</td><td colspan="2">FIXED
MOBILE
5.111 5.199 5.252 5.254 5.256</td></tr>
<tr><td>267-272</td><td colspan="2">FIXED
MOBILE
Space operation (space-to-Earth)
5.254 5.257</td></tr>
<tr><td>272-273</td><td colspan="2">SPACE OPERATION (space-to-Earth)
FIXED
MOBILE
5.254</td></tr>
<tr><td>273-312</td><td colspan="2">FIXED
MOBILE
5.254</td></tr>
<tr><td>312-315</td><td colspan="2">FIXED
MOBILE
Mobile-satellite (Earth-to-space) 5.254 5.255</td></tr>
<tr><td>315-322</td><td colspan="2">FIXED
MOBILE
5.254</td></tr>
<tr><td>322-328.6</td><td colspan="2">FIXED
MOBILE
RADIO ASTRONOMY
5.149</td></tr>
<tr><td>328.6-335.4</td><td colspan="2">AERONAUTICAL RADIONAVIGATION
5.258 5.259</td></tr>
</table>

Reasons: ITU-R studies have shown that sharing between telecommand and existing services in the 225 – 400 MHz band results in impractical coordination requirements with existing services.

NOC USA/ / 75

335.4-410 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
335.4-387	FIXED MOBILE 5.254	
387-390	FIXED MOBILE Mobile-satellite (space-to-Earth) 5.208A 5.254 5.255	
390-399.9	FIXED MOBILE 5.254	

Reasons: ITU-R studies have shown that sharing between telecommand and existing services in the 225 – 400 MHz band results in impractical coordination requirements with existing services.

Proposal B (Agenda Item 1.12)

Background Information: The 7 145-7 235 MHz band is allocated by footnote **5.460** on a primary basis to the space research service (Earth-to-space), subject to agreement under No. **9.21**. The companion downlink band, 8 400-8 500 MHz, is allocated on a primary basis in the Table of Frequency Allocations. These bands are used on a worldwide basis for cross-support in accordance with international agreements concluded between a number of space agencies. The footnote calling for agreement under No. **9.21** was originally applied at **WARC-ST-71** because the coordination parameters necessary for earth station coordination were not agreed at that time. Currently, Appendix **S7** contains these coordination parameters for transmitting earth stations for the space research service in the 7 145-7 235 MHz band. Therefore, the premise behind requiring agreement under No. **9.21** no longer exists.

Proposal:

ARTICLE 5

Frequency allocations

5 830 7 550 MHz

USA/ / 76
MOD

Allocation to Services		
Region 1	**Region 2**	**Region 3**
7 075-7 145~~7250~~	FIXED MOBILE 5.458 5.459 ~~5.460~~	

USA/ / 77 **MOD**	**7 145-7 235**	FIXED MOBILE SPACE RESEARCH (Earth-to-space) **MOD** 5.460 5.458 5.459 ~~5.460~~
USA/ /78 **MOD**	**7 235-7 250**	FIXED MOBILE 5.458 5.459 ~~5.460~~

Reasons: To incorporate in the Table of Frequency Allocations the existing primary allocation to the space research service in the band 7 145-7 235 MHz under No. **5.460**.

MOD USA/ / 79

5.460 Additional allocation: the band 7 145-7 235 MHz is also allocated to the space research (Earth-to-space) service on a primary basis, subject to agreement obtained under No. 9.21. The use of the band 7 145-7 190 MHz by the space research service is restricted to deep space; no emissions to deep space shall be effected in the band 7 190-7 235 MHz.

Reasons: These changes are consequential to the table amendments offered above.

Proposal C (Agenda Item 1.12)

Background Information: Resolution **723 (Rev. WRC-2000)** *resolves 4,* recommends that WRC-03 consider a review of existing allocations to space science services near 15 GHz and 26 GHz, with a view to accommodating wideband space-to-Earth space research applications. This *resolves* is in response to a need for allocations to support planned high data rate space research missions requiring bandwidths up to 400 MHz. Spacecraft for these missions will carry telescopes to conduct sky surveys or Space Very Long Baseline Interferometry (SVLBI) observations. They may also carry other passive instruments to measure phenomenon such as the Earth's magnetosphere and solar flares. These missions will be limited in number and will generally be in a polar or equatorial orbit, with some at geostationary altitudes; highly elliptical orbit; or at the L1 or L2 Sun/Earth equilibrium libration points that are approximately 1.9 M km from Earth.

In response to Resolution **723 (WRC-2000),** ITU-R studies have shown that both the 15 GHz and 26 GHz bands are suitable for primary allocation to satisfy these requirements. Each band offers its own compelling and particular set of advantages for space research service (SRS) missions' support. The 15 GHz band is most desirable for high data rate SRS missions operating in low-to-mid inclination orbits, geostationary orbits, and L1/L2 libration points due to the possible sharing of ground station resources located at low-to-mid latitude Deep Space Network (DSN) and National Radio Astronomy Observatory (NRAO) sites. Similarly, the 26 GHz band is most desirable for high data rate SRS missions operating in high inclination orbits due to the possible sharing of ground station resources with Earth exploration-satellite service (EESS) missions operating in that band. Sharing of ground station resources can result in substantial cost and schedule benefits for international space agencies implementing high rate SRS missions. The 26 GHz band also affords SRS missions the flexibility of using a wide bandwidth space-to-space link in an existing or planned data relay satellite network as well as wide bandwidth space-to-earth links.

The 14.8-15.35 GHz band is currently allocated to the fixed and, mobile services on a primary basis and to the space research service on a secondary basis. The band 15.2-15.35 GHz is allocated to the space research service (passive) and to the Earth exploration-satellite service (passive) on a secondary basis by No. **5.339**.

ITU-R studies have demonstrated the feasibility of sharing between the space research service and other services currently allocated on a primary basis in the 14.8-15.35 GHz band.

With respect to co-ordination and notification procedures, the current provisions of Articles **9** and **11** and the proposed sharing criteria will continue to apply among the fixed, mobile and space research services in the band 14.8-15.35 GHz.

The 25.5-27.0 GHz band is currently allocated to the fixed, mobile, inter-satellite and Earth exploration-satellite services on a primary basis. The EESS primary allocation supports high data rate EESS (space-to-earth) links, while space-to-space links in data relay satellite networks are supported under the Inter-Satellite Service (ISS) allocation.

The use of the allocations is constrained by RR footnotes: **5.536** sets conditions on the use of the band by stations in the inter-satellite service (ISS); **5.536A** limits the protection afforded EESS earth stations from the emissions of stations in the fixed and mobile services; and, **5.536B** further limits the protection and status of EESS earth stations in a number of countries.

ITU-R studies have similarly demonstrated the feasibility of sharing between the space research service and other services currently allocated on a primary basis in the 25.5-27.0 GHz band.

Proposal:

MOD USA/ / 80

14.25-15.63

Allocation to services		
Region 1	**Region 2**	**Region 3**
14.8-15.35	FIXED MOBILE ~~Space research~~ SPACE RESEARCH 5.339	

Reasons: To upgrade the SRS to a primary allocation to satisfy requirements for high data rate space science missions.

MOD USA/ / 81

24.75-29.9 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
25.5-27	EARTH EXPLORATION-SATELLITE (space-to Earth) ~~5.536A~~ 5.536B FIXED INTER-SATELLITE 5.536 MOBILE SPACE RESEARCH (space-to-Earth) Standard frequency and time signal-satellite (Earth-to-space) **MOD** 5.536A	

Reasons: To add a primary space research service (space-to-Earth) allocation to the Table of Allocations and to show that the footnote **5.536A** will apply to the space research service as well as the Earth exploration-satellite service.

MOD USA/ / 82

5.536A Administrations installing Earth exploration-satellite service or space research service earth stations cannot claim protection from stations in the fixed and mobile services operated by neighbouring administrations. In addition, earth stations operating in the Earth exploration-satellite service and space research service should take into account Recommendations ITU-R SA.1278 and ITU-R SA.[26SHAR], respectively.

Reasons: This change amends RR footnote **5.536A** to include SRS earth stations and to give them the same status as Earth exploration-satellite service earth stations.

Table 21-4

Frequency band		Service*	Limit in dB(W/m2) for angle of arrival (δ) above the horizontal plane			Reference bandwidth
			0°-5°	5°-25°	25°-90°	
USA/ / 83 **MOD**	14.8-15.35 GHz	Space Research, geostationary-satellite orbit	-126	-126 + (δ – 5)/2	-116	1 MHz
USA/ / 84 **MOD**	14.8-15.35 GHz	Space Research, non-geostationary-satellite orbit	-124	-124 + (δ – 5)/2	-114	1 MHz
USA/ / 85 **MOD**	25.5-27.0 GHz	Space Research (space-to-Earth)	-115	-115 + (δ – 5)/2	-105	1 MHz

Reasons: These changes limit the emissions of the space research service in order to protect the fixed and mobile services from harmful interference.

APPENDIX 7 (WRC-200~~0~~3)

TABLE 8c

Parameters required for the determination of coordination distance for a receiving earth station

MOD USA/ / 86

Receiving space radiocommunication service designation			**Space Research**
Frequency band (GHz)			14.8-15.35
Transmitting terrestrial service designations			Fixed, mobile
Method to be used			§ 2.1, § 2.2
Modulation at earth station (1)			N
Earth station Interference Parameters and criteria	p_0 (%)		0.1
	n		2
	p (%)		0.05
	N_L (dB)		0
	M_S (dB)		1
	W (dB)		0
Terrestrial Station Parameters	E (dBW) in B (2)	A	25 (5)
		N	-8
	P_t (dBW) in B	A	-20 (5)
		N	-53
	G_x (dBi)		45
Reference band-width 6	B (Hz)		1
Permissible interference power	P_r (p) (dBW) in B		-216

Reasons: Provides the characteristics of the receiving SRS earth station in the 14.8-15.35 GHz band for coordination with transmitting fixed and mobile service stations. No change to the Table 8c notes is required.

NOC USA/ / 87

Notes to Table 8c

Reasons: No change to the Table 8c notes is required.

TABLE 8d

Parameters required for the determination of coordination distance for a receiving earth station

MOD USA/ / 88

Receiving space radiocommunication service designation	**space research (4)**	**space research (5)**

Frequency band (GHz)			25.5-27.0	25.5-27.0
Transmitting terrestrial service designations			Fixed, mobile	Fixed, mobile
Method to be used			§ 2.2	§ 2.1
Modulation at earth station [1]			N	N
Earth station Interference parameters and criteria	$p0$ (%)		0.1	0.1
	n		2	2
	p (%)		0.05	0.05
	N_L (dB)		0	0
	M_S (dB)		6	6
	W (dB)		0	0
Terrestrial station parameters	E (dBW) in B [2]	A	-	-
		N	42	42
	P_t (dBW) in B	A	-	-
		N	–3	–3
	G_X (dBi)		45	45
Reference bandwidth [6]	B (Hz)		10^6	10^6
Permissible interference power	P_r (p) (dBW) in B		–150	–150

Reasons: Provides the characteristics in Table 8d of Appendix **S7** of receiving earth stations in the space research service to be used in determining the coordination contour with respect to transmitting stations in the fixed and mobile services.

NOC USA/ / 89

1 A: analogue modulation; N: digital modulation.
2 E is defined as the equivalent isotropically radiated power of the interfering terrestrial station in the reference bandwidth.
3 Non-geostationary mobile-satellite service feeder links.
4 Non-geostationary-satellite systems.
5 Geostationary-satellite systems.
6 Non-geostationary fixed-satellite service systems.

Reasons: Table 8d notes, no change is required.

Proposal D (Agenda Item 1.12)

Background Information: Signals received on Earth from spacecraft in deep space are extremely weak and highly susceptible to interference of all kinds. In particular, the presence of near-Earth airborne and spaceborne interference sources can easily overwhelm the desired (but extremely weak) signal from deep space. Geographic isolation is not possible in the case of near-Earth orbiting spacecraft sharing the same band with space research (deep space). To satisfy present and future science deep space data return requirements, heavy reliance is being placed on space-to-Earth links in the 31.8-32.3 GHz band. The lack of compatibility between the inter-satellite service and the space research service (deep space) has been demonstrated within ITU-R Studies and is documented in Recommendation ITU-R SA.1016.

Proposal:

ARTICLE 5

Frequency Allocations

29.9-34.2 GHz

	Allocation to services		
	Region 1	Region 2	**Region 3**
USA/ / 90 **MOD**	**31.8-32**	FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 5.547B **MOD** 5.548	
USA/ / 91 **MOD**	**32-32.3**	FIXED 5.547A INTER-SATELLITE RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 **MOD** 5.547C **MOD** 5.548	
USA/ / 92 **MOD**	**32.3-33**	FIXED 5.547A INTER-SATELLITE RADIONAVIGATION 5.547 5.547D **MOD** 5.548	

Reasons: To protect the reception of deep-space space research service communications signals from harmful interference.

MOD USA/ / 93

5.547C *Alternative allocation*: in the United States, the band 32-32.3 GHz is allocated to the ~~inter-satellite,~~ radionavigation and space research (deep space) (space-to-Earth) services on a primary basis. (WRC-97)

Reasons: This change is consequential to the table amendment offered above.

MOD USA/ / 94

5.548 In designing systems for the inter-satellite <u>service in the band 32.3-33 GHz,</u> ~~and~~ <u>for the</u> radionavigation service~~s~~ in the band 32 - 33 GHz, and for the space research service (deep space) in the band 31.8-32.3 GHz, administrations shall take all necessary measures to prevent harmful interference between these services, bearing in mind the safety aspects of the radionavigation service (see Recommendation **707**).

Reasons: This change is consequential to the table amendment offered above.

Proposal E (Agenda Item 1.12)

Background Information: Resolution 730 (WRC-2000), resolves

1 to invite ITU-R to study sharing between spaceborne precipitation radars and other services in the band 35.5 - 35.6 GHz;

2 to recommend that WRC-03 review the results of those studies and consider the removal of the restriction currently contained in No. **5.551A** on spaceborne precipitation radars operating in the Earth exploration-satellite service in the band 35.5 - 35.6 GHz.

The frequency band 35.5 – 36 GHz is allocated to the Earth exploration-satellite (active) service on a primary basis limited by footnote **5.551A** and is also allocated to the meteorological aids and radiolocation services on a primary basis. Prior to WRC-97, operation by radars located on spacecraft on a primary basis was permitted in the band 35.5 – 35.6 GHz by footnote **5.551 (SUP WRC-97)**. This 100 MHz band is used by precipitation radars located on spacecraft. Furthermore, studies have shown that sharing between spaceborne active sensors and radiolocation systems in the band 35.5 – 36 GHz is feasible, as indicated in § 5.7.2.1 of Chapter 5 of the CPM-97 Report. ITU-R Joint Working Party 7-8R, which studied compatibility between spaceborne active sensors and other services prior to WRC-97, noted that in the band 33.4 – 36 GHz, compatibility analysis between spaceborne altimeters and scatterometers and terrestrial radars in the radiolocation service indicated that interference from these spaceborne active sensors into the radiolocation systems would not exceed the interference criteria for terrestrial radiolocation systems that are in normal use. JWP 7-8R also examined the compatibility of active sensors with radiolocation systems from the aspect of potential interference from these radiolocation systems into altimeters and scatterometers and concluded that interference into these sensors would not exceed their interference criteria. JWP 7-8R and subsequently CPM-97 concluded that compatibility between known spaceborne active sensors and radiolocation systems in the 33.4 – 36 GHz band existed and that an allocation of 500 MHz in this frequency range should be made. Therefore, there was no technical reason to apply the footnote **5.551A** to the table allocation for the Earth exploration-satellite (active) and space research (active) services in the 35.5 - 36 GHz band.

With respect to the EESS (passive) and SRS (passive) allocations in the band 36 – 37 GHz and the space research service allocation in the band 37 – 38 GHz, there have been no changes in the requirements for these allocations, nor have there been changes in the sharing conditions in these bands that would warrant any changes.

Proposal:

ARTICLE 5

Frequency Allocations

34.2-40 GHz

USA/ / 95
MOD

Allocation to services		
Region 1	**Region 2**	**Region 3**
35.5-36	METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.549 ~~5.551A~~	

SUP USA/ / 96

5.551A

Reasons: Based on demonstrated compatibility between active sensors in the earth exploration-satellite and space research services and the other services allocated on a primary basis in the 35.5 - 36 GHz band, the restrictions in this footnote are not necessary and the footnote should be suppressed.

34.2-40 GHz

	Allocation to services		
	Region 1	**Region 2**	**Region 3**
USA/ / 97 **NOC**	**36-37**	EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.149	
USA/ / 98 **NOC**	**37-37.5**	FIXED MOBILE SPACE RESEARCH (space-to-Earth) 5.547	
USA/ / 99 **NOC**	**37.5-38**	FIXED FIXED-SATELLITE (space-to-Earth) 5.551AA MOBILE SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5.547	

Reasons: There have been no changes in the requirements for these allocations, nor have there been changes in the sharing conditions in these bands that would warrant any changes.

Agenda Item 1.14:

to consider measures to address harmful interference in the bands allocated to the maritime mobile and aeronautical mobile (R) services, taking into account Resolutions **207 (Rev.WRC-2000)** and **350 (WRC-2000**), and to review the frequency and channel arrangements in the maritime MF and HF bands concerning the use of new digital technology, also taking into account Resolution **347 (WRC-97)**;

Background Information: In an ongoing effort to reduce interference to HF distress and safety frequencies used in the Global Maritime Distress and Safety System (GMDSS), WRC-2000 determined that after 31 December 2003, general calling should not be permitted on channels used for distress and safety traffic. The radio regulations now permit routine voice calling on the two GMDSS duplex distress and safety traffic channels in the 12 and 16 MHz band. WRC-2000 actions

removed the calling function on these two channels. It also changed these duplex channels to simplex channels, allocating one of the simplex channels for routine calling via radiotelephone and the other as dedicated for distress and safety communications. These changes are scheduled to take effect 31 December 2003. This change will result in a financial and personnel impact to maritime Search and Rescue (SAR) authorities that maintain listening watch in these bands, and receive occasional routine radiotelephone calls in addition to distress and safety calls. Removal of the ability of shore stations that have search and rescue responsibilities to receive and make routine calls on these frequencies will result in the receiving of distress and safety calls on a working channel not designated for distress and safety purposes. This has caused some confusion to mariners wishing to send distress and safety calls.

A second related issue involves a need for more effective methods for ships and coast stations to call ships using Digital Selective Calling (DSC) for routine communications. ITU Radio Regulations effectively prohibit ships and coast stations from making routine calls to other ships using DSC, and other alternatives do not exist. Channels are available for ships making routine calls to coast stations, and these channels should continue to be used. But ships do not guard these routine calling channels, and so cannot accept routine calls from coast stations. Simplex HF DSC channels allowing routine calls from other ships do not exist, and experience has shown that the number of such calls would be small, and should not interfere with the distress and safety uses of this channel if routine disc calls are permitted for ship to ship calling and shore to ship calling.

Proposal:

MOD USA/ / 100

52.221A 2) Calling on the carrier frequencies 12 290 kHz and 16 420 kHz ~~shall cease as soon as possible and no later than 31 December 2003~~ is permitted only to and from rescue coordination centres (see No. 30.6.1). The alternative carrier frequencies 12 359 kHz and 16 537 kHz may be used by ship stations and coast stations for calling on a simplex basis, provided that the peak envelope power does not exceed 1 kW.

Reasons: The addition in this footnote permits calling to and from stations that have search and rescue responsibilities, i.e., rescue coordination centres. Because of the very limited number of rescue coordination centres that are, or plan to be, operating in these bands, the additional traffic and potential for interfering with distress and safety traffic is very low. Additionally, this allows a vessel in a distress situation to communicate on these channels rather than making a distress call on a working channel; hence, de facto changing the working channel into the distress and safety channel. Monitoring of these two frequencies at the U.S. Coast Guard Communications Master Stations Atlantic have shown very little traffic on these channels.

APPENDIX 15

TABLE 15-1

Legend:

MOD USA/ / 101

DSC These frequencies are used exclusively for distress and safety calls using digital selective calling in accordance with No. **32.5** (see Nos. **32.9**, **33.11** and **33.34**). Exceptionally, however these frequencies may also be used for ship-to-ship and shore-to-ship routine calling if no other means are available and if no traffic is present on the channel (see No. **31.4**).

Reasons: This will facilitate communications to and from ships that are outside coverage of VHF radiotelephone frequencies, where no other means of DSC calling exist. This change includes the requirement to ensure no communications is present before making a routine call. It allows DSC-equipped radios to meet the recommendations of International Maritime Organization that GMDSS equipment not be reserved for emergency use only, as described in IMO COMSAR Circ. 17.

Agenda Item 1.17:

to consider upgrading the allocation to the radiolocation service in the frequency range 2 900-3 100 MHz to primary;

Background Information: Due to changes in requirements and missions of the radiolocation service, it is necessary to augment existing primary allocations in bands below 6 GHz where unique propagation properties exist. Changes in technology are driving a need for larger bandwidth in order to be able to pick smaller and less reflective radar targets out of background clutter. The radiolocation service, while recognizing the special needs of radionavigation services as noted in RR **4.10**, has demonstrated compatible operations with aeronautical and maritime radionavigation radars in common bands, including the 2 900-3 100 MHz band, which is now shared on a secondary basis.

ITU-R studies on maritime radionavigation radars and emissions from radiolocation radars in the band 2 900 - 3 100 MHz illustrate compatibility between radiolocation radars and radionavigation radars operating in the 2 900 - 3 100 MHz band. These tests indicate that typical maritime radionavigation radars can suppress emissions from other radars, even when that interference is received with very high interference-to-noise (I/N) ratios, and when the unwanted pulsed waveform is asynchronous and has a low duty cycle. These test results confirm the historical sharing experience between the two services in the 2 900-3 100 MHz band. An ITU-R Draft New Report on factors that mitigate interference from radiolocation radars to maritime and aeronautical radionavigation radars in the 2 900 - 3 100 MHz band confirms that interference from radiolocation radars to maritime and aeronautical radionavigation radars in the 2 900 - 3 100 MHz band can be mitigated.

Few aeronautical radionavigation radars use this band, and characteristics of those aeronautical radionavigation radars have not been documented within the ITU-R. However, characteristics of aeronautical radionavigation radars using the adjacent 2 700 - 2 900 MHz band have been documented in Recommendation ITU-R M.1464, and are expected to be similar to those in the 2 900 - 3 100 MHz band. Similarly, weather radars, which resemble radiolocation radars in their beam scanning, have operated successfully in close proximity with aeronautical radionavigation radars in the 2 700 - 2 900 MHz band. Radionavigation radars that have operated in this band have demonstrated compatible operations with the radiolocation systems, mainly as a result of newer

radar design features that mitigate received radar-to-radar interference as described in Recommendation ITU-R M.1372.

Proposal:

2 900-3 100 MHz

	Allocation to services		
	Region 1	Region 2	Region 1
USA/ / 102 **MOD**	**2 900-3 100 MHz**	RADIONAVIGATION 5.426 ~~Radiolocation~~ RADIOLOCATION **ADD** 5.RAD 5.425 5.427	

Reasons: Provides a worldwide primary allocation with respect to future entrants.

ADD USA/ / 103

5.RAD In the 2 900 - 3 100 MHz band stations of the radiolocation service shall not cause harmful interference to, nor claim protection from, stations of the radionavigation service.

Reasons: The radionavigation service will continue to be protected.

Agenda Item 1.19:

to consider regulatory provisions to avoid misapplication of the non-GSO FSS single-entry limits in Article **22** based on the results of ITU-R studies carried out in accordance with Resolution **135 (WRC-2000)**;

Background Information: WRC-2000 adopted, in Article **22**, a combination of single-entry validation, operational and, for 3 and 10 meter antennas in the 10.7-12.75 GHz band, single-entry additional operational equivalent power flux-density (epfd) limits to be met by non-geostationary (non-GSO) fixed-satellite service (FSS) systems in order to protect GSO FSS and GSO broadcasting-satellite service (BSS) networks in parts of the frequency range 10.7-30 GHz. Misapplication of non-GSO FSS single-entry epfd limits could occur by artificially splitting or combining the number of transmit stations associated with a non-GSO FSS system. As stated in the Conference Preparatory Meeting (CPM) Report to WRC-2000, it was agreed that such misapplication would invalidate the entire basis of the derivation of the single-entry limits. Misapplication of these limits could:

a) Cause excess interference into GSO networks;

b) Reduce the number of non-GSO FSS systems that could be implemented in an allocated frequency band;

c) Affect the regulatory requirements for a non-GSO FSS system in the ITU coordination notification process; and

d) Affect non-GSO FSS systems that meet the single-entry limits in Article **22**.

Resolution **135 (WRC-2000)** was adopted for the purpose of conducting technical studies and considering regulatory procedures, in time for consideration by WRC-03, to ensure that there will

not be any misapplication of limits in Tables **22-1** (epfd↓), **22-2** (epfd↑), and **22-3** ($epfd_{is}$) of Article **22**. Further, Resolution **135** instructs the Director of the Radiocommunication Bureau to review and, if appropriate, revise as of the end of WRC-03, any finding previously made in respect of compliance with the limits contained in Article **22** for a non-GSO FSS system, for which notification information has been received on or after 22 November 1997. The Bureau's review and revision of findings is to be based on the studies undertaken by the ITU-R pursuant to Resolution **135** after WRC-2000.

Proposal:

ARTICLE 22

Space services[1]

NOC USA/ / 104

Section II – Control of interference to geostationary-satellite systems

Reasons: The current Radio Regulations are adequate. There have been no apparent cases involving potential misapplication of the single-entry epfd limits nor technical studies to support new regulatory procedures.

Agenda Item 1.21:

to consider progress of the ITU-R studies concerning the technical and regulatory requirements of terrestrial wireless interactive multimedia applications, in accordance with Resolution **737 (WRC-2000)**, with a view to facilitating global harmonization;

Background Information: At WRC-2000, a proposal from several European administrations indicated a desire to address spectrum for terrestrial wireless interactive multimedia applications. After much discussion, WRC-2000 adopted Resolution **737,** which invites the ITU-R to pursue studies to facilitate the development of common, worldwide spectrum allocations or identifications suitable for new terrestrial wireless interactive multimedia (TWIM) technologies and applications; review the regulatory methods and appropriate means to facilitate the worldwide harmonization of spectrum for terrestrial wireless interactive multimedia, and to review service definitions in the light of convergence of applications, if necessary. In addition, WRC-2000 adopted agenda item 1.21 so that WRC-03 could review the progress of these studies and agenda item 2.15 for WRC-2005/6 to discuss the spectrum and regulatory issues associated with TWIM applications.

Studies on TWIM applications were managed by Joint Task Group 1-6-8-9 and carried out through a well-coordinated process since WRC-2000, drawing on a variety of resources and contributors. The results of the Joint Task Group's effort indicate that no regulatory impediments to TWIM applications exist; suggesting that no further ITU-R work is needed on the TWIM concept. This conclusion is reflected in Method B under section 7.1.3 (Methods to satisfy the agenda item) of the CPM Report.

Proposal:

NOC **Article 5** USA/ / 105

Reasons: No regulatory impediments have been identified to terrestrial wireless interactive multimedia applications. Study groups within ITU-R may prepare relevant Questions and continue their work under the normal activities in order to examine any issues related to the deployments of terrestrial wireless interactive multimedia applications.

SUP USA/ / 106

RESOLUTION 737 (WRC-2000)

Review of Spectrum and Regulatory Requirements to Facilitate Worldwide Harmonization of Emerging Terrestrial Wireless Interactive Multimedia Applications

Reasons: No regulatory impediments have been identified to terrestrial wireless interactive multimedia applications. Study groups within ITU-R may prepare relevant Questions and continue their work under the normal activities in order to examine any issues related to the deployments of terrestrial wireless interactive multimedia applications.

Agenda Item 1.22:

to consider progress of ITU-R studies concerning future development of IMT-2000 and systems beyond IMT-2000, in accordance with Resolution **228 (WRC-2000)**;

Background Information: WRC-2000 considered issues related to IMT-2000, resulting in the identification of additional spectrum for the terrestrial component of IMT-2000 in the Radio Regulations **5.317A** and **5.384A**. This spectrum was identified in addition to that initially identified for IMT-2000 at WARC-92 in footnote **5.388**. WRC-2000 also identified existing global MSS allocations as being available for use by the satellite component of IMT-2000, in accordance with Resolution **225**.

Resolution **228 (WRC-2000),** which is related to agenda item 1.22, invites ITU-R to continue studies on overall objectives, applications and technical and operational implementation for the future development of IMT-2000 and systems beyond. ITU-R Working Party 8F has developed a Draft New Recommendation on the vision, framework and overall objectives of the future development of IMT-2000 and systems beyond IMT-2000 [DNR-VIS], which is expected to be approved at the ITU-R Study Group 8 meeting in February 2003. Studies will continue to be carried out in WP 8F, and are scheduled to be completed before WRC-07. The results of these studies will indicate which requirements should be reviewed by WRC-07.

Proposal:

NOC USA/ / 107 For the purpose of adding additional provisions related to IMT-2000 under this Agenda Item

ARTICLE 5

Frequency Allocations

Reasons: For this agenda item ITU-R has not completed the studies on spectrum requirements and potential frequency ranges suitable for the future development of IMT-2000 and systems beyond IMT-2000. Therefore no changes are needed to Article 5.

MOD USA/ / 108

RESOLUTION 228 (REV. WRC-~~200~~03)

Studies to consider requirements and frequency matters related to ~~for~~ the future development of IMT-2000 and systems beyond IMT-2000 as defined by ITU-R

The World Radiocommunication Conference ~~(Istanbul, 2000)~~(Geneva, 2003),

considering

a) that International Mobile Telecommunications-2000 (IMT-2000) systems have started operation in some countries in ~~is scheduled to start service around~~ the year 2000~~, subject to market and other considerations~~;

~~b) that Question ITU-R 229/8 addresses the future development of IMT-2000 and systems beyond IMT-2000;~~

~~*c)*~~*b)* that the technical characteristics of IMT-2000 are specified in ITU-R and ITU-T Recommendations, including Recommendation ITU-R M.1457 which contains the detailed specifications of the radio interfaces of IMT-2000;

c) that Question ITU-R 229/8 addresses the future development of IMT-2000 and systems beyond IMT-2000;

d) that the ITU-R has adopted [Draft New] Recommendation ITU-R M.[DNR-VIS], which addresses the vision, framework, and overall objectives of the future development of IMT-2000 and systems beyond IMT-2000;

e) that [Draft New] Recommendation ITU-R M.[DNR-VIS] has identified the new elements of systems beyond IMT-2000 that are to be developed, and has stated that such systems will closely inter-work with the currently operating IMT-2000 and with future developments of IMT-2000;

f) that the technical characteristics of systems beyond IMT-2000 have not been specified in an ITU-R Recommendation, but remain under study within the ITU-R;

g) that it was eight years ahead of the IMT-2000 initial deployment that **WARC-92** identified the spectrum for IMT-2000 in No. **5.388** and under the provisions of Resolution **212 (WARC-92)**;

~~*d)*~~*h)* that telecommunication and information technologies evolve rapidly;

~~*c)*~~*i)* that, as it is with many other service and systems, adequate spectrum availability is a prerequisite for the technological and economic success of the future development of IMT-2000 and systems beyond IMT-2000;

~~*f)*~~*j)* that the demand for the provision of multimedia applications such as high-speed data, IP-packet and video by mobile communication systems will continue to increase;

~~*g)*~~*k)* that the future development of IMT-2000 and systems beyond IMT-2000 is foreseen to address the need for higher data rates than those of currently deployed ~~planned for~~ IMT-2000 systems;

~~*h)*~~*l)* that, for global operation and economy of scale, it is desirable to agree on common technical, operational and spectrum-related parameters of systems;

~~*i)*~~*m)* that it is therefore timely to study technical, spectrum and regulatory issues pertinent to the future development of IMT-2000 and systems beyond IMT-2000;~~,~~

n) that Question ITU-R 77-4/8 addresses adaptation of mobile radiocommunications technology to the needs of developing countries, including the optimum arrangements and technical characteristics needed to use mobile technology/equipment in urban, rural or remote areas;

o) that all existing services, some of which are also evolving to permit the use of higher data rates and throughput within their allocations in order to meet increasing user demands and requirements, should be taken into account in any studies evaluating potential spectrum for systems beyond IMT-2000,

noting

a) that the IMT-2000 radio interfaces as defined in Recommendation ITU-R M.1457 are expected to evolve within the framework of the ITU-R beyond those initially specified, to provide enhanced services and services beyond those envisaged in the initial implementation;

b) that the use of the spectrum identified for IMT-2000 does not preclude the use of these bands by any station in the services to which they are allocated and does not establish priority in the Radio Regulations,

recognizing

a) the time necessary to develop and agree on the technical, operational, spectrum and regulatory issues associated with the continuing enhancement of mobile services;

b) that service functionalities in fixed and mobile networks are increasingly converging;

c) that future mobile systems will ~~require the adoption of~~ employ more spectrum-efficient techniques than those used by current mobile systems;

d) the needs of developing countries for the cost-effective implementation of advanced mobile communication technologies and the propagation characteristics of lower frequency bands that result in larger cell sizes;

e) that the review of IMT-2000 spectrum requirements at WRC-2000 concentrated on the bands below 3 GHz and that these bands remain technically desirable for both IMT-2000 and systems beyond IMT-2000;

f) that, to the extent that they may not be the same, it would be preferable for the location in the radiofrequency spectrum of bands that support systems beyond IMT-2000 to be reasonably close to the location of bands already identified for IMT-2000 and predecessor services;

g) that many countries have not yet made available spectrum already identified for IMT-2000, due to various reasons, including the use of these bands by existing services;

h) that studies may show that the identification of certain bands for use by the future development of IMT-2000 and systems beyond IMT-2000 may be precluded by the use of these bands by existing services,

resolves

1 to invite ITU-R to further study, and develop Recommendations on, ~~continue studies on overall objectives, applications and~~ technical and operational issues relating to~~implementation, as necessary, for~~ the future development of IMT-2000 and systems beyond IMT-2000;

2 to invite ITU-R to complete studies, in time for WRC-[07], on ~~study~~ the spectrum requirements and potential frequency ranges suitable for the future development of IMT-2000 and systems beyond IMT-2000, taking into consideration the bands currently identified for IMT-2000 and the evolution of IMT-2000 and pre-IMT-2000 systems therein through advances in technology~~and in what time-frame such spectrum would be needed~~;

3 that, taking into account the *recognizing* above, the studies in *resolves 1* and *2*:

a) examine the compatibility of the future development of IMT-2000 and systems beyond IMT-2000 with existing services, including their future development;

b) indicate the extent to which the existing services and their future development would be affected and how they can be protected from interference from the future development of IMT-2000 and systems beyond IMT-2000,

~~3~~4 that WRC-[07] consider, as a matter of urgency, the results of ITU-R studies and review the requirements and frequency related matters related to~~for~~ the future development of IMT-2000 and systems beyond IMT-2000, ~~be reviewed by WRC-05/06, taking into consideration the results of ITU-R studies presented to WRC-03~~in accordance with this Resolution~~,~~;

5. that the studies contemplated in *resolves 1-3* above take into consideration the needs of developing countries,

urges administrations

to participate actively in the studies by submitting contributions to ITU-R.

Reasons: Appropriately modify Resolution **228 (WRC-2000)** for further studies to consider detailed requirements and ensure that the interests of existing services are taken into consideration

in these studies, and to enable WRC-07 to review these requirements. The Unites States is still considering what action should be taken concerning this issue as related to agenda item 7.2.

Agenda Item 1.24:

to review the usage of the band 13.75-14 GHz, in accordance with Resolution **733 (WRC-2000)**, with a view to addressing sharing conditions;

Background Information: At WARC-92, and as modified at WRC-95, WRC-97 and WRC-2000, Nos. **5.502** and **5.503** were added to the Table of Frequency Allocations to facilitate compatibility between the existing applications of the radio services in the 13.75-14 GHz band. It was agreed that any modifications to either of these provisions contemplated to accommodate new technology, requirements or applications of the FSS, must consider the overall interference environment in the 13.75-14 GHz band and be undertaken with great care in order to avoid upsetting the delicate balance previously achieved between the services. The constraints in the provisions are based on the planned use of the band by gateway earth stations operating with GSO satellites in the FSS and are intended to limit the number of FSS earth stations to the point where sharing is possible. The present operational constraints, that satisfy the protection criteria of current operational applications and technology in the band 13.75-14 GHz, are found in Nos. **5.502** and **5.503 (WRC-2000)**.

Studies that led to the development of provisions **5.502** and **5.503** did not account for non-geostationary-satellite orbit fixed-satellite service systems (non-GSO FSS). With the introduction of non-GSO FSS into this band at WRC-97, Resolution **130 (WRC-97)** was, among other things, drafted to focus attention on the need to re-examine the sufficiency of these provisions in maintaining the delicate balance between the services sharing the 13.75-14 GHz band. At WRC-2000 Resolution **733 (WRC-2000)** was developed to review the constraints in **5.502** regarding the minimum antenna diameter of GSO FSS earth stations, the e.i.r.p limits imposed on the radiolocation service, and to identify possible alternative sharing situations to those inherent to **5.502** and **5.503** in time for WRC-03.

The introduction of non-GSO FSS earth station transmitters in the band at WRC-2000 created a potential sharing issue with the space research service (space-to-space). Provision **5.503** was modified at WRC-2000 to include an e.i.r.p. density limit on non-GSO FSS earth stations transmitters to accompany the limit on GSO FSS earth station transmitters. It was understood that review of the minimum antenna diameter limit in **5.502** called for in Resolution **733** was only in regard to GSO FSS earth stations and not in regard to non-GSO FSS earth stations. Only limited modifications to **5.502** and **5.503** could be made while continuing to retain the delicate sharing balance between the allocated services.

Studies conducted since WRC-97 and WRC-2000 have shown several salient facts:

a. radiolocation services are already receiving interference from existing FSS earth stations, despite the small number that have been deployed.

b. that RR No. **5.502** maintains the delicate sharing balance between the radiolocation or radionavigation service and the fixed-satellite service only by limiting the number of FSS earth stations. In particular, studies have shown that sharing with radiolocation systems is significantly more difficult for non-GSO FSS systems than for GSO FSS systems, and that

if requirements for the minimum antenna diameter of the FSS earth station were relaxed, the deployment of a large number of low data rate earth stations would collectively significantly reduce the performance of radiolocation and radionavigation systems, both airborne and shipborne.

c. The feasibility of sharing between the space research service and the fixed-satellite service depends on limiting the number of FSS earth stations through RR No. **5.502** and by limiting the maximum power spectral density of each FSS earth station through RR No. **5.503**.

d. That there is no practical means for protecting airborne radiolocation systems from FSS earth station emissions, and that the current situation is tolerable only because the number of earth stations is limited by the 5.502 limitations on dish diameter.

e. ITU-R studies conducted in preparation for WRC-03, show that sharing between radiolocation systems and FSS earth stations with antennae smaller than 4.5 meters is not possible without the FSS operators employing mitigation techniques, and that current technology does not allow radar systems to mitigate interference from FSS earth stations. Mitigation techniques involving separation distance or percentage of time are neither practical nor enforceable, and no sharing proposals have been proposed that are enforceable by ITU regulations.

f. ITU studies thus far show that separation distances of greater than 50 km are required to protect maritime radiolocation systems from VSAT earth station transmissions. However, the technique of distance separation is not effective for protecting airborne radars or space science satellite systems from harmful interference by VSAT earth stations.

g. Studies conducted in preparation for WRC-03 show that the maximum allowable power spectral densities for FSS earth station antennae smaller than 4.5 meters, needed to ensure protection of space research operations, will not allow practical FSS VSAT implementations.

The concept of a separation distance to mitigate interference and promote sharing has been directed at using FSS earth station e.i.r.p. reductions and placing the VSAT terminals a specified distance inland from the coast. The reverse of this would be to restrict the radars a certain distance out to sea from the coast, or some combination of these approaches. Locating VSAT terminals well inland from coastlines would be the only solution that would allow maritime radiolocation systems to maintain operations close to shore. However, the enforceability of this approach is very questionable given the market needs to have VSATs placed without restrictions and noting that many population centers are located close to coasts. Requiring maritime radar systems to remain a significant distance from shore would impose severe restrictions on the ability of their host platforms to protect themselves during essential and routine operations. Therefore, the application of separation distance as a mitigation technique to protect shipborne radars against interference from VSAT earth stations is not feasible and thus it cannot be supported. Furthermore, such an approach would have no affect on protecting airborne radiolocation systems, or space science platforms.

Proposal:

SUP USA/ / 109

RESOLUTION 733 (WRC-2000)

Reasons: Studies completed in accordance with agenda item 1.24 and Resolution **733** have not determined an effective method of preventing FSS systems operating with earth stations with antennae smaller than 4.5 meters from creating harmful interference to other services in the 13.75-14.0 GHz band. Therefore Resolution **733 (WRC-2000)** no longer applies to **5.502** and can be suppressed.

(MOD) USA/ / 110

5.502: In the band 13.75-14 GHz, an earth station in the fixed-satellite service shall have a minimum antenna diameter of 4.5 m and the e.i.r.p. of any emission should be at least 68 dBW and should not exceed 85 dBW. In addition the e.i.r.p., averaged over one second, radiated by a station in the radiolocation or radionavigation services shall not exceed 59 dBW. The protection of assignments to receiving space stations in the fixed-satellite service operating with earth stations that, individually, have an e.i.r.p. of less than 68 dBW shall not impose constraints on the operation of the radiolocation and radionavigation stations operating in accordance with the Radio Regulations. No. **5.43A** does not apply. ~~See Resolution **733 (WRC-2000)**.~~

Reasons: Consequential, *No Change* (**NOC**) proposed to the text contained in **5.502** other than the removal of the reference to Resolution **733**.

NOC USA/ / 111

5.503

Reasons: Provisions **5.502** and **5.503** are integrally related in maintaining the delicate sharing balance between the radiolocation, radionavigation, space research and fixed-satellite services in the 13.75-14 GHz band. Maintaining these provisions in their current form will ensure that all services can continue to share the band in a compatible manner.

Agenda Item 1.25:

to consider, with a view to global harmonization to the greatest extent possible, having due regard to not constraining the development of other services, and in particular of the fixed service and the broadcasting-satellite service, regulatory provisions and possible identification of spectrum for high-density systems in the fixed-satellite service above 17.3 GHz, focusing particularly on frequency bands above 19.7 GHz;

Background Information: The demand for broadband services is increasing. Market research predicts substantial growth in demand for broadband multi-media access, both for residential and business applications. Satellite systems offer an attractive competitive alternative to terrestrial communication systems for providing such access.

High-density fixed-satellite systems (HDFSS) in the fixed satellite service (FSS) may use any orbital type (GSO or non-GSO) consistent with the FSS allocation. As envisioned in technical and

operational studies, HDFSS systems incorporate small, ubiquitous, low-cost earth stations that can be deployed rapidly and flexibly. As a consequence of these general characteristics, it is not practicable to coordinate HDFSS earth stations with terrestrial services on an individual, site-by-site basis.

While sharing between fixed service (FS) stations and non-ubiquitous FSS earth stations can typically be handled through proven case-by-case coordination procedures, the most effective use of the spectrum within a given country where high-density deployments of FSS stations are involved may be achieved by deploying HDFSS and FS systems separately. This enables both types of systems to provide the most efficient, least constrained, highest quality and lowest cost service to the greatest number of users.

Effective HDFSS earth station deployment is very difficult to achieve when site-by-site coordination between FS stations and HDFSS earth stations is required. Therefore, it is appropriate for administrations to authorize HDFSS earth stations under a regime whereby a large number of earth stations can be deployed without the need for individual earth station site coordination. Such authorization would not relieve an HDFSS network from the ITU requirements to coordinate with fixed service networks on a site-by-site basis, where required, across international borders, nor would it preclude coordination of specific earth stations within HDFSS deployments with fixed service networks.

A number of FSS systems with other characteristics, and with earth stations of types other than those used by HDFSS systems, have already been brought into use, or are planned to be brought into use, including some that use the 17.8–21.2 GHz (space-to-Earth) frequency band. Accordingly, it is essential that existing FSS allocations be retained and that non-HDFSS use of these FSS allocations not be subject to additional regulatory constraints in the Radio Regulations as a result of the HDFSS band identification. Further, identification of spectrum for HDFSS does not relieve an HDFSS network of the ITU requirement to coordinate with other satellite networks.

Consideration of candidate frequency bands for HDFSS identification

A number of frequency bands allocated to the fixed-satellite service are seen as good candidates for HDFSS identification. The 29.5–30.0 GHz and 19.7–20.2 GHz bands are allocated globally to the FSS in the Earth-to-space and space-to-Earth directions, respectively. Since there are no co-primary fixed service allocations in the ITU Table of Frequency Allocations in these bands, a major sharing issue is avoided.

The 28.6–29.1 GHz and 18.8–19.3 GHz frequency bands are allocated globally to the FSS in the Earth-to-space and space-to-Earth directions, respectively. These are the only bands considered for HDFSS where NGSO FSS systems are not subject to No. **22.2** of the Radio Regulations, and therefore represent the best opportunity for ubiquitously deployed NGSO FSS user terminals. In these two bands, some administrations in all Regions have planned for HDFSS and have adopted regulatory provisions for terrestrial systems in order to facilitate HDFSS. Some HDFSS systems are already in development in these bands and there are other filings for HDFSS-type systems.

Many administrations are also planning to use the 18.58–18.8 GHz (space-to-Earth) band and the 28.35–28.6 GHz and 29.25–29.5 GHz (Earth-to-space) bands for HDFSS applications. In the 18.6-18.8 GHz band, the FSS allocation is co-primary with the Earth exploration-satellite service (passive) with restrictions on power and orbit types as described in **5.522A** and **5.522B**.

Between 37.5 and 50.2 GHz, many administrations have submitted ITU filings for FSS systems in the 40.0–42.0 GHz (space-to-Earth) and 48.2–50.2 GHz (Earth-to-space) bands and propose to use these bands for global HDFSS. WRC-2000 advised administrations that may be contemplating the use of the 40.5–42 GHz band for high-density applications in the fixed service (HDFS) to take into account constraints to HDFS due to the potential deployment of high-density applications in the FSS. Further, Resolution **84 (WRC–2000)** urges administrations considering regulatory provisions relating to the 40.0–40.5 GHz band to take into account that there were a number of proposals to WRC–2000 to identify the band for HDFSS applications.

It is inappropriate to add or remove any fixed-satellite service allocations in the Table of Frequency Allocations under WRC–03 agenda item 1.25. This includes new FSS allocations in bands in which the fixed-satellite service is already allocated in another direction. In particular, new space-to-Earth FSS allocations in the 17.3–17.7 GHz, 21.4–22 GHz and 47.2–50.2 GHz bands, which have been discussed in working party meetings, should be rejected. Studies have shown that the latter band is not suitable for space-to-Earth links because of likely interference with both FSS gateway and HDFSS uplinks.

Description of proposal

This proposal identifies spectrum above 18.58 GHz for high-density systems in the fixed-satellite service without constraining the use of these bands by other FSS applications or other co-primary services. It specifically does not establish priority among the different uses of these bands. The proposal consists of a new footnote **5.[HDFSS]** to frequency bands identified for high-density FSS systems, consequential modifications to existing footnote **5.547**, and a new Resolution **[HDFSS]** providing guidance to administrations wishing to amend their national rules to implement high-density systems in the fixed-satellite service.

Proposal:

MOD USA/ / 112

15.63-18.6 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
18.4-18.6	FIXED FIXED-SATELLITE (space-to-Earth) 5.484A MOBILE **ADD** 5.[HDFSS]	

Reasons: To identify spectrum above 18.58 GHz for high-density systems in the fixed-satellite service without constraining the use of these bands by other FSS applications or other co-primary services.

MOD USA/ / 113

18.6-22.21 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
18.6–18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A 5.522C **ADD** 5.[HDFSS]	18.6–18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile SPACE RESEARCH (passive) 5.522A **ADD** 5.[HDFSS]	18.6–18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A **ADD** 5.[HDFSS]
18.8–19.3	FIXED FIXED-SATELLITE (space-to-Earth) 5.523A MOBILE **ADD** 5.[HDFSS]	
19.7–20.1 FIXED-SATELLITE (space-to-Earth) 5.484A Mobile-satellite (space-to-Earth) 5.524 **ADD** 5.[HDFSS]	19.7–20.1 FIXED SATELLITE (space-to-Earth) 5.484A MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528 5.529 **ADD** 5.[HDFSS]	19.7–20.1 FIXED SATELLITE (space-to-Earth) 5.484A Mobile-satellite (space-to-Earth) 5.524 **ADD** 5.[HDFSS]
20.1-20.2	FIXED SATELLITE (space-to-Earth) 5.484A MOBILE SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528 **ADD** 5.[HDFSS]	

Reasons: To identify spectrum above 18.58 GHz for high-density systems in the fixed-satellite service without constraining the use of these bands by other FSS applications or other co-primary services.

MOD USA/ / 114

24.75-29.9 GHz

Allocation to services		
Region 1	Region 2	Region 3
27.5–28.5	FIXED 5.537A FIXED-SATELLITE (Earth-to-space) 5.484A 5.539 MOBILE 5.538 5.540 **ADD** 5.[HDFSS]	
28.5–29.1	FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.523A 5.539 MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540 **ADD** 5.[HDFSS]	
29.1–29.5	FIXED FIXED-SATELLITE (Earth-to-space) 5.523C 5.523E 5.535A 5.539 5.541A MOBILE Earth exploration-satellite (Earth-to-space) 5.541	

5.540 **ADD** 5.[HDFSS]		
29.5–29.9 FIXED SATELLITE (Earth-to-space) 5.484A 5.539 Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space) 5.540 5.542 **ADD** 5.[HDFSS]	**29.5–29.9** FIXED-SATELLITE (Earth-to-space) 5.484A 5.539 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.525 5.526 5.527 5.529 5.540 5.542 **ADD** 5.[HDFSS]	**29.5–29.9** FIXED-SATELLITE (Earth-to-space) 5.484A 5.539 Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space) 5.540 5.542 **ADD** 5.[HDFSS]

Reasons: To identify spectrum above 18.58 GHz for high-density systems in the fixed-satellite service without constraining the use of these bands by other FSS applications or other co-primary services.

MOD USA/ / 115

29.9-34.2 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
29.9-30	FIXED-SATELLITE (Earth-to-space) 5.484A 5.539 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.543 5.525 5.526 5.527 5.538 5.540 5.542 **ADD** 5.[HDFSS]	

Reasons: To identify spectrum above 18.58 GHz for high-density systems in the fixed-satellite service without constraining the use of these bands by other FSS applications or other co-primary services.

MOD USA/ / 116

40.0–40.5 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
40-40.5	EARTH EXPLORATION-SATELLITE (Earth-to-space) FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth) **ADD** 5.[HDFSS]	

Reasons: To identify spectrum above 18.58 GHz for high-density systems in the fixed-satellite service without constraining the use of these bands by other FSS applications or other co-primary services.

MOD USA/ / 117

40.5-51.4 GHz

Allocation to services

Region 1	Region 2	Region 3
40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING-SATELLITE Mobile **MOD** 5.547 **ADD** 5.[HDFSS]	**40.5-41** FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING-SATELLITE Mobile Mobile-satellite (space-to-Earth) **MOD** 5.547 **ADD** 5.[HDFSS]	**40.5-41** FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING-SATELLITE Mobile **MOD** 5.547 **ADD** 5.[HDFSS]
41-42.~~5~~	FIXED FIXED-SATELLITE (space-to-Earth) 5.551AA BROADCASTING BROADCASTING-SATELLITE Mobile **MOD** 5.547 5.551F 5.551G **ADD** 5.[HDFSS]	
4~~1~~2-42.5	FIXED FIXED-SATELLITE (space-to-Earth) 5.551AA BROADCASTING BROADCASTING-SATELLITE Mobile **MOD** 5.547 5.551F 5.551G	
47.2-50.2	FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE 5.149 5.340 5.552A 5.555 **ADD** 5.[HDFSS]	

Reasons: To identify spectrum above 18.58 GHz for high-density systems in the fixed-satellite service without constraining the use of these bands by other FSS applications or other co-primary services.

NOC USA/ / 118
It is proposed that there be no change to the FSS allocation directions in the 47.2-50.2 GHz band. The FSS allocation in this band is to be retained for uplink use only

Reasons: Studies have shown that HDFSS uplinks and HDFSS downlinks cannot share the same spectrum, and there are interference concerns about FSS gateway uplinks and HDFSS downlinks.

MOD USA/ / 119

5.547 The bands 31.8-33.4 GHz, 37-40 GHz, 40.5-43.5 GHz, 51.4-52.6 GHz, 55.78-59 GHz and 64-66 GHz are available for high-density applications in the fixed service (see Resolutions **75 (WRC-2000)** and **79 (WRC-2000)**). Administrations should take this into account when considering regulatory provisions in relation to these bands. Because the band 40.5-42 GHz is identified for use by high-density applications in the fixed satellite service (see **No. 5.[HDFSS]** and Resolution **[HDFSS] (WRC-03)**), and thus is available for these applications, ~~Because of the~~

~~potential deployment of high density applications in the fixed satellite service in the bands 39.5-40 GHz and 40.5-42 GHz,~~ administrations should further take into account ~~potential~~ appropriate constraints to high-density applications in the fixed service when considering regulatory provisions in relation to the latter type of applications in the same band~~, as appropriate~~ [(see Resolution **84 (WRC-2000)**)].

Reasons: Consequential to the addition of No. **5.[HDFSS]** to the 40.5-42.0 GHz band, and the non-identification of 39.5-40.0 GHz for HDFSS use. *NOTE: The square brackets reflect that the fate of Resolution **84** has not yet been determined*.

ADD USA/ / 120

5.[HDFSS] The space-to-Earth fixed-satellite service bands 18.58-18.8 GHz, 18.8-19.3 GHz, 19.7-20.2 GHz, and 40.0-42.0 GHz and the Earth-to-space fixed-satellite service bands 28.35-28.6 GHz, 28.6-29.1 GHz, 29.25-29.5 GHz, 29.5-30.0 GHz and 48.2-50.2 GHz, are identified for use by high-density applications in the fixed-satellite service (HDFSS) in accordance with Resolution **[HDFSS] (WRC-03)**. This identification does not preclude the use of these bands by other fixed-satellite service applications or by other services to which these bands are allocated on a co-primary basis and does not establish priority among users of the bands in the Radio Regulations. Administrations should take this into account when considering regulatory provisions in relation to these bands.

Reasons: The identification of appropriate frequency bands for high-density applications in the fixed-satellite service can help administrations and HDFSS satellite system operators in deployment of HDFSS earth stations. This footnote will also inform administrations of those specific bands intended for deployment of HDFSS systems in all regions of the world, while specifying that the use of these bands for HDFSS applications does not preclude their use by other co-primary services or by other FSS applications.

ADD USA/ / 121

RESOLUTION [HDFSS] (WRC-03)

Guidelines for the Implementation of High-Density Applications in the Fixed Satellite Service in Frequency Bands Identified for HDFSS

The World Radiocommunication Conference (Geneva, 2003),

considering

a) that demand has been increasing steadily for global broadband communications services throughout the world;

b) that this demand for ubiquitous broadband communications services can be met in part through the use of high-density applications in the fixed-satellite service (HDFSS);

c) that HDFSS is an advanced broadband communications applications concept that enables telecommunications services to be provided on a flexible, wide-scale basis through standardized, relatively low-cost earth terminal equipment;

d) that HDFSS will provide users with access to a wide range of broadband telecommunications applications supported by fixed telecommunications networks (including the Internet) and thus will complement other telecommunications systems;

e) that HDFSS offers great potential to establish telecommunications infrastructure rapidly;

f) that HDFSS systems are characterized by flexible, rapid deployment, and ubiquitous deployment of large numbers of earth stations employing small antennas and having common technical characteristics;

g) that HDFSS applications can be provided by satellites of any orbital type, GSO or non-GSO;

h) that interference mitigation techniques have been studied in the ITU-R to facilitate sharing between HDFSS earth stations and terrestrial services;

i) that due to the large number and nature of terminals involved, it is not practicable for HDFSS earth stations to implement interference mitigation techniques,

noting

a) that No. **5.[HDFSS]** identifies bands for high-density applications in the fixed-satellite service (HDFSS);

b) that in some of these bands, the FSS allocations are co-primary with fixed and mobile service allocations as well as other services;

c) that this identification does not preclude the use of these bands by other co-primary services or by other fixed-satellite service applications, and does not establish priority among users of the bands in the Radio Regulations;

d) that in the band 18.6-18.8 GHz, the FSS allocation is co-primary with the Earth exploration-satellite service (passive) with the restrictions of **5.522A** and **5.522B**.

e) that radio astronomy observations are carried out in the 48.94-49.04 GHz band, and that such observations require protection at notified radio astronomy stations;

f) that, generally speaking, co-frequency sharing between HDFSS earth stations and terrestrial services is very difficult in the same geographical area;

g) that a number of FSS systems with other types of earth stations and characteristics have already been brought into use or are planned to be brought into use in some of the frequency bands identified for HDFSS in No. **5.[HDFSS]**;

h) that HDFSS stations in these bands are expected to be deployed in large numbers over urban, suburban and rural areas of large geographical extent;

i) that harmonized worldwide bands for HDFSS would facilitate the implementation of HDFSS and maximize the extent to which users in administrations around the world would be able to benefit from global access and economies of scale,

recognizing

a) that as a consequence of their general characteristics, it is difficult and may be a rather long process to coordinate HDFSS earth stations with fixed service stations on an individual site-by-site basis between Administrations;

b) that to minimize the burden for administrations, procedures and provisions can be implemented between Administrations for large numbers of HDFSS earth stations associated with a given satellite system,

recognizing further

a) that HDFSS applications implemented on FSS networks and systems are subject to all provisions of the Radio Regulations applicable to the fixed-satellite service, such as coordination and notification pursuant to Articles **9** and **11**, including any ITU requirements to coordinate with terrestrial services across international borders, and the provisions of Articles **21** and **22**;

b) that Article **21** contains power flux-density limits that protect fixed service receivers operating on a co-primary basis in the fixed-satellite service space-to-Earth bands identified in No. **5.[HDFSS]**, thereby ensuring that transmissions from fixed-satellite service satellites will not cause unacceptable interference to fixed service receivers operating in these same bands;

resolves

that administrations that implement HDFSS:

1 make some or all of the frequency bands identified in No. **5.[HDFSS]** available for HDFSS applications;

2 take into account that continued assignment of spectrum to or deployment of terrestrial stations in bands identified for HDFSS within the same geographical area could impede the introduction or development of HDFSS and reduce or eliminate the benefits that such FSS applications offer;

3 consider taking into account the relevant technical characteristics, as identified by ITU-R Recommendations (e.g., Recommendations ITU-R S.524-7 and [doc. 4/70]);

4 take into account other existing and planned fixed-satellite service systems having different characteristics in frequency bands where HDFSS is implemented in accordance with *resolves* 1 and the conditions specified in No. 5.[HDFSS]

invites administrations

1 to give due consideration to the benefits of harmonized utilization of the spectrum for HDFSS on a global basis, taking into account the use and planned use of these bands by all other services to which these bands are allocated, as well as other types of fixed-satellite service applications;

2 to consider implementing procedures and provisions that facilitate the deployment of HDFSS systems within their territory in some or all of the bands identified in No. **5.[HDFSS]**.

Reasons: Many administrations are currently in the process of determining how to appropriately provide for HDFSS services in their countries. Some of these administrations are looking to the ITU for guidance on spectrum management issues concerning the FS and HDFSS and this Resolution provides that guidance.

Agenda Item 1.26:

to consider the provisions, under which earth stations located on board vessels, could operate in fixed satellite networks, taking into account the ITU-R studies in response to Resolution **82**;

Background Information: Resolves 4 of Resolution **82** states that until WRC-03 takes further action, agreement between the administrations licensing Earth stations on board vessels (ESVs) and affected administrations should be reached on a bilateral or multilateral basis, in accordance with the guidelines in its Annexes 1 and 2. ESVs have been operating for over 10 years under national provisions (No. **4.4** of the Radio Regulations).

Several actions have taken place in ITU-R Study Groups to develop Recommendations or CPM text related to this agenda item. These include the development of:

a. Working Party 4A Recommendation on the Characteristics of ESVs, including those to be used for sharing studies at 6 GHz and 14 GHz;

b. a JWP 4-9S Draft New Recommendation identifying the 5 925-6 425 MHz and 14-14.5 GHz bands as suitable for ESV operations (Earth-to-space);

c. several Draft New Recommendations in Joint Working Party 4-9S on methods to be used for achieving agreement with fixed stations when ESVs are in motion near the shore, including determination of a distance beyond which no agreement is necessary;

d. CPM text which includes example footnotes to the Table of Frequency Allocations at 5 925-6 425 MHz and 14-14.5 GHz and two examples of a revised Resolution **82**. The first example footnote would make compliance with the modified Resolution **82** mandatory; the second example would require "all practical steps" to comply with the Resolution. Similarly, the first of the two modified example Resolution 82s would make the contact procedures mandatory, the second example Resolution **82** does not.

As administrations may assign frequencies for ESVs pursuant to No. **4.4** of the Radio Regulations and ESV systems are mobile, it is appropriate to inform administrations operating systems in accordance with the Radio Regulations of the operation of ESVs and to allow them to take steps to prevent the possibility of harmful interference from ESV systems to their systems.

In accordance with the 1982 United Nations Convention on the Law of the Sea (UNCLOS, 1982), the point to measure distances identified in the modification of Resolution **82** is the "low water mark" defined as the baseline from which the territorial sea is measured.

The proposed footnote and revisions of Resolution **82** provide for advance notice of the operation of ESV systems. A proposed Recommendation provides guidance on operational procedures to use with administrations whose systems might be affected by such ESV use. The bilateral procedure in the proposed revision of Resolution **82** will allow administrations to reach agreement on the use of ESVs so that other systems operating in accordance with the Radio Regulations are protected. Additionally, the proposed definition of ESVs is intended to clarify the status of ESVs operating within networks in the fixed-satellite service (FSS), and a proposed new footnote is intended to ensure the protection of adjacent satellites when ESVs are operating within FSS networks.

Proposal:

ARTICLE 1

Terms and definitions

SECTION IV – RADIO STATIONS AND SYSTEMS

ADD USA/ / 122

1.68 bis *earth station on board a vessel:* an earth station located on board a vessel operating in certain bands of the fixed-satellite service, as distinct from a ship earth station (see **1.78**), and intended to be used while in motion or during halts at unspecified points.

Reasons: Adding this definition will ensure that the class of station and the category of allocation of both earth and space stations will be matched to each other.

ARTICLE 5

Frequency allocations

MOD USA/ / 123

5 830 – 7 550 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
5 925 – 6 700	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.149 5.440 5.458 **ADD** 5.ESV **ADD** 5.ESV1	

Reasons: Footnotes **5.ESV** and **5.ESV1** are added to provide guidance to administrations wishing to allow the use of earth stations on board vessels in the bands 5 925-6 425 MHz while providing protection to existing users of the bands and ensuring efficient use of the GSO.

MOD USA/ / 124

11.7-14.25 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
14-14.25	FIXED-SATELLITE (Earth-to-space) 5.484A 5.506 RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) except aeronautical mobile-satellite Space research 5.505 **ADD** 5.ESV **ADD** 5.ESV2	

Reasons: Footnotes **5.ESV** and **5.ESV2** are added to provide guidance to administrations wishing to allow the use of earth stations on board vessels in the bands 5 925-6 425 MHz and 14-14.5 GHz while providing protection to existing users of the bands and ensuring efficient use of the GSO.

MOD USA/ / 125

14.25-15.63 GHz

Allocation to services		
Region 1	Region 2	Region 3
14.25-14.3	FIXED-SATELLITE (Earth-to-space) 5.484A 5.506	

	RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) except aeronautical mobile-satellite Space research 5.505 5.508 5.509 **ADD** 5.ESV **ADD** 5.ESV2	
14.3-14.4 FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.506 MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) except aeronautical mobile-satellite Radionavigation-satellite ADD 5.ESV, ADD 5.ESV2	**14.3-14.4** FIXED-SATELLITE (Earth-to-space) 5.484A 5.506 Mobile-satellite (Earth-to-space) except aeronautical mobile-satellite Radionavigation-satellite ADD 5.ESV, ADD 5.ESV2	**14.3-14.4** FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.506 MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) except aeronautical mobile-satellite Radionavigation-satellite ADD 5.ESV, ADD 5.ESV2
14.4-14.47	FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.506 MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) except aeronautical mobile-satellite Space research (space-to-Earth) ADD 5.ESV ADD 5.ESV2	
14.47-14.5	FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.506 MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) except aeronautical mobile-satellite Radio astronomy 5.149 ADD 5.ESV ADD 5.ESV2	

Reasons: Footnotes **5.ESV** and **5.ESV2** are added to provide guidance to administrations wishing to allow the use of earth stations on board vessels in the bands 5 925-6 425 MHz and 14-14.5 GHz while providing protection to existing users of the bands and ensuring efficient use of the GSO.

ADD USA/ / 126

5.ESV Administrations operating earth-stations on board vessels in the bands 5 925-6 425 MHz and 14-14.5 GHz shall take all practicable steps to comply with Resolution **82 (WRC-03)**. Such use shall not cause harmful interference to, claim protection from, or otherwise impose constraints on the operation or development of other radio services operating in the band 5 925-6 425 MHz and 14-14.5 GHz.

Reasons: To provide guidance to administrations wishing to allow the use of earth stations on board vessels in the bands 5 925-6 425 MHz and 14-14.5 GHz and provide protection to existing users of the bands.

ADD USA/ / 127

5.ESV1 For earth stations on board vessels (see 1.68 bis) operating in the 5 925-6 425 MHz band, at any angle φ specified below, off the main-lobe axis of an earth-station antenna, the maximum e.i.r.p. in any direction within 3° of the GSO shall not exceed the following values:

5925-6425 MHz

Angle off-axis	*Maximum e.i.r.p. per 4 kHz band*
$2.5° \le \varphi \le 7°$	(32 – 25 log φ) dB(W/4 kHz)
$7° < \varphi \le 9.2°$	11dB(W/4 kHz)
$9.2° < \varphi \le 48°$	(35 – 25 log φ) dB(W/4 kHz)
$48° < \varphi \le 180°$	– 7 dB(W/4 kHz)

Coordination agreements between fixed-satellite service networks under Article **9** may result in lower off-axis e.i.r.p. levels.

5.ESV2 For earth stations on board vessels (see 1.68 bis) operating in the 14.0-14.5 GHz band, at any angle φ specified below, off the main-lobe axis of an earth-station antenna, the maximum e.i.r.p. in any direction within 3° of the GSO shall not exceed the following values:

14.0-14.5 GHz

Angle off-axis	*Maximum e.i.r.p. in any 40 kHz band*
$2° \le \varphi \le 7°$	33 – 25 log φ dBW
$7° < \varphi \le 9.2°$	12 dBW
$9.2° < \varphi \le 48°$	36 – 25 log φ dBW
$\varphi > 48°$	– 6 dBW

Coordination agreements between fixed-satellite service networks under Article **9** may result in lower off-axis e.i.r.p. levels.

Reasons: In order to ensure that the off axis e.i.r.p. performance of ESVs operating in FSS networks is consistent with that of earth stations already operating in these networks in these bands, and to ensure efficient use of the GSO.

MOD USA/ / 128

RESOLUTION 82 (WRC-~~200~~03)

Provisions relating to earth stations located on board vessels ~~which~~ operate<u>ing</u> with fixed-satellite service networks in the bands ~~3 700-4 200~~ <u>5 925-6 425</u> MHz and ~~5 925-6 425 MHz~~ <u>14.0-14.5</u> GHz

The World Radiocommunication Conference (~~Istanbul, 2000~~ <u>Geneva, 2003</u>),

considering

a) that there is a demand for global wideband satellite communication services on vessels;

b) ~~that the technology exists that enables earth stations on board vessels (ESVs) to use fixed-satellite service (FSS) networks operating in the 3 700-4 200 MHz and 5 925-6 425 MHz bands;~~

that ESVs are currently operating through fixed-satellite service (FSS) networks in the bands 3 700-4 200 MHz, 5 925-6 425 MHz, 10.7-12.75 GHz, and 14.0-14.5 GHz;

c) that ESVs have the potential to cause unacceptable interference to other services in the ~~band~~ 5 925-6 425 MHz and 14.0-14.5 GHz (Earth-to-space) bands;

d) that ESVs operating in these bands require considerably less than the full bandwidth in this FSS allocation and only a portion of the visible geostationary arc;

~~e) that there are a limited number of geostationary FSS systems that have global coverage;~~

~~*f)*~~*e)* that the number of vessels equipped with ESVs may be such that the procedures could ~~as to~~ place a heavy processing ~~coordination~~ burden on some administrations, especially those in developing countries;

~~*g)*~~*f)* that in order to ensure the protection and future growth of other services, ESVs ~~shall~~ should operate with requisite technical and operational constraints;

~~*h)*~~*g)* that, ~~based on appropriate assumptions,~~ a minimum distance ~~can be calculated~~has been identified beyond which an ESV will not have the potential to cause unacceptable interference to other services in the~~is~~ bands 5 925 -6 425 MHz and 14 – 14.5 GHz,

noting

a) that ESVs may be assigned frequencies to operate in FSS networks in the bands 3 700-4 200 MHz, 5 925-6 425 MHz, 10.7-12.75 GHz, and 14-14.5 GHz ~~under~~ pursuant to No. **4.4** of the Radio Regulations and shall not claim protection from, nor cause harmful interference to, other services having allocations in these bands;

b) ~~that there is no need for new regulatory procedures~~ that existing regulatory procedures provide for ESVs operating at specified fixed points,

recognizing

~~a) that progress has been made within ITU-R in determining the technical and operational provisions under which ESVs could operate;~~that the reference to the distances in resolves 2 is solely for the purpose of facilitating avoidance of radio interference and does not confer any territorial rights on Administrations.

~~b) that further studies are needed,~~

resolves

1 that transmissions from ESVs within the distances identified in *resolves* 2 of this resolution be based upon the prior agreement of the concerned administrations; ~~to invite ITU-R to continue to study, as a matter of urgency, the regulatory, technical and operational constraints to be applied to ESV operations, having regard to the provisional guidelines for ESV use in Annex 1 and the provisional technical guidelines given in Annex 2and, in particular, to determine the appropriate value for the minimum distance from ESV stations beyond which these stations are assumed not to have the potential to cause unacceptable interference to stations of other services of any administration and beyond which no coordination would be required;~~

2 ~~to invite ITU-R, as a matter of urgency:~~

~~– to develop Recommendations on methods for coordination between terrestrial services and ESVs;~~

~~– to study the feasibility of mitigation techniques, such as various frequency arrangements or dual-band systems, as a way to avoid the need for detailed coordination of ESVs without constraining existing services;~~

~~to study, as a complement to the 3 700-4 200 MHz and 5 925-6 425 MHz bands, the use of other FSS allocations for ESVs transmitting in the 6 GHz and 14 GHz bands;~~

that the minimum distances from the baseline ("low water mark", as defined by the United Nations Convention on the Law of the Sea, 1982 (UNCLOS, 1982)) beyond which ESV stations will not have the potential to cause unacceptable interference to stations of other services of any administration and beyond which no agreement is necessary, are 300 km for the 5 925-6 425 MHz band and 125 km for the 14.0-14.5 GHz band;

~~3 to invite WRC-03 to assess, in the light of these studies, the provisions under which ESVs could operate in FSS networks in the bands 3 700-4 200 MHz and 5 925-6 425 MHz, without causing unacceptable interference to radiocommunication services operating in accordance with the Radio Regulations;~~

~~4 that, until a decision is adopted for ESVs by WRC-03, agreement between the administrations licensing ESVs and affected administrations should be reached on a bilateral or multilateral basis, in accordance with the guidelines in Annexes 1 and 2;~~

~~5 that, until a decision is adopted for ESVs by WRC-03, administrations licensing ESVs that enter into bilateral or multilateral agreements under resolves 4 above should ensure that, as part of the licensing process, ESVs operate in compliance with such agreements, taking into consideration the interests of concerned neighbouring countries;~~

encourages concerned administrations

to cooperate with administrations ~~which~~ that license ESVs ~~while~~ and seek~~ing~~ agreement ~~under resolves 4,~~ under the provisions of Recommendation FSS/ESV,

encourages ESV licensing administrations

to consider registering their ESV frequency assignments in the Master International Frequency Register, for information purposes only,

~~urges all administrations~~

~~to participate actively in the above-mentioned studies by submitting contributions,~~

instructs the Secretary-General

to bring this resolution to the attention of the Secretary-General of the International Maritime Organization ~~and to invite IMO to participate in the work on this issue.~~

SUP USA/ / 129

ANNEX 1 TO RESOLUTION 82 (WRC-2000)

SUP USA/ / 130

ANNEX 2 TO RESOLUTION 82 (WRC-2000)

ADD USA/ / 131

RECOMMENDATION [FSS/ESV]

Operational Procedures for ESV Use

The World Administrative Radio Conference (Geneva, 2003)

considering

a) That under the provisions of Res. **82 (Rev. WRC-03)** transmissions from ESVs within the distances of its resolves 2 be based upon prior agreement of concerned administrations;

b) that it is desirable to provide guidance on activities to achieve such prior agreement with concerned administrations;

c) that such guidance should include the operational procedures for ESV use.

recommends

1. That operation of ESVs follow the procedures set forth in Annex 1, including the typical characteristics in Annex 2.

ANNEX 1

Operational procedures for ESV use

A. Initiation of Contact

When ships equipped with ESVs intend to operate in the band 5 925-6 425 MHz within 300 kilometers and in the band 14-14.5 GHz within 125 km of the baseline ("low water mark" as defined by UNCLOS, 1982) of other administrations having terrestrial stations operating in the same band as the ESV, the ESV licensing administration should contact, in advance of ESV operations within those distances, the concerned administration(s) to obtain agreements that will establish the technical bases for avoiding unacceptable interference to the terrestrial facilities of the concerned administration or administrations.

B. Recommended Actions of Licensing Administrations, ESVs operators and Concerned Administrations:

Each Administration having terrestrial stations in these bands should have a point of contact for the ESV licensing Administration or the ESV operator to initiate discussions.

Licensing Administration or the ESV operator should provide the following information:

1. The technical and operational parameters, including the range of its frequency operation;

2. The proposed dates and ports to be visited and the routes of the ship(s) equipped with ESVs to reach those ports within the minimum distance from the baseline ("low water mark" as defined by UNCLOS, 1982) of the concerned Administration.

Concerned Administrations that have terrestrial stations that could be affected by ESV operations should do the following when contacted by the ESV licensing Administration or the ESV operator:

1. Determine if they have terrestrial stations in the same frequency band as the ESV;

2. Identify frequencies for ESV use that would avoid the potential for interference.

C. ESV Operating Agreements

A concerned Administration is encouraged to enter into an agreement with the ESV licensing Administration that describes the conditions for operation of the ESV when operating near the coast or in ports of the concerned Administration. These agreements should be concluded prior to the operation of the ESV stations near the coast or in the ports of the concerned Administration. The agreement should consider using the 5 925 – 6 425 MHz band outside certain limits and not using this band inside certain limits in countries that have fixed service stations in the same band and should include the possibility of switching to 14 – 14.5 GHz band if there are no terrestrial services in the band. The operating agreement may be revised at any time at the discretion of the concerned Administration, particularly whenever new terrestrial facilities are authorized that could potentially receive unacceptable interference.

D. Frequency Use Arrangements

National practices, as well as applicable recommendations of the ITU-R, may be used in reaching bilateral or multilateral frequency usage arrangements. Typical characteristics for ESV operations are contained in Annex 2.

E. Protection from Transmissions of Other Services

ESVs are not protected from the transmissions of other services operating in the 4 GHz and 11/12 GHz bands.

F. ESV Point of Contact

Each ESV operator should provide a point of contact to the Administration with which agreements have been reached for the purpose of reporting unacceptable interference caused by an ESV.

G. Avoidance of Unacceptable Interference

The ESV licensing Administration shall ensure that such stations do not cause unacceptable interference to the services of other concerned Administrations. In the event that unacceptable interference occurs, the ESV operator must eliminate the source of any interference from its station immediately upon being advised of such interference. Additionally, the ESV operator must immediately terminate transmissions at the request of either the concerned Administration or the ESV licensing Administration if either Administration determines that the ESV is causing unacceptable interference or is otherwise not being operated in compliance with the operating agreement.

Additionally, ESVs stations should have the following operational capabilities:

1. The ESV system should include a means of identification and location, and automatic mechanisms to terminate transmissions whenever the station operates outside its

authorized geographic area (see resolves 2 of Res. **82 (Rev. WRC-03)**) or operational limits.

2. The ESV system should be equipped so as to enable the ESV licensing Administration under the provisions of Article **18** to verify earth station performance and to terminate ESV transmissions immediately upon request by a concerned Administration whose services may be affected.

ANNEX 2

This annex contains typical characteristics of ESV earth stations on board vessels for the 5 925-6 425 MHz and 14-14.5 GHz bands.

5 925-6 425 MHz

Minimum diameter of ESV antenna:	2.4 m
Maximum necessary bandwidth per vessel:	2.4 MHz
Maximum ESV transmitter power spectral density at the input to the antenna:	17 dB(W/MHz)
Tracking Accuracy of ESV antenna	0.2º

14-14.5 GHz

Minimum diameter of ESV antenna:	1.2 m
Maximum necessary bandwidth per vessel:	2.4 MHz
Maximum ESV transmitter power spectral density at the input to the antenna:	12.5 dB(W/MHz)
Tracking Accuracy of ESV antenna	0.2º

Reasons: Provide protection to existing radio services, provide administrations operating systems in existing radio services with guidance on how to reach agreement with operators of ESV systems and provide administrations with the means to operate ESVs in the bands identified. Annex 2 is consistent with the ITU-R Study Group 4 Recommendation on ESV characteristics.

Agenda Item 1.28:

to permit the use of the band 108-117.975 MHz for the transmission of radionavigation satellite differential correction signals by ICAO standard ground-based systems;

Background Information: An aviation requirement has emerged for the transmission of differential correction (augmentation) data for the Global Navigation Satellite System (GNSS), to be used by aircraft receivers to satisfy the stringent accuracy and integrity requirements for GNSS applications. The new Ground-based Augmentation Systems (GBAS) are planned to operate in the band 108-117.975 MHz (initially, 112-117.975 MHz), which is currently used by Instrument Landing Systems (ILS) and VHF Omni-directional Ranging (VOR) systems.

The band is currently allocated to the aeronautical radionavigation service. Because the differential correction signals transmitted by augmentation systems such as GBAS do not fall within the definition of a radionavigation service (i.e., using the propagation properties of radio waves), amendment to the allocation is needed to allow for the transmission of GNSS augmentation data.

ICAO is developing compatibility and frequency planning criteria between the VOR/ILS, and the new service. Any standards adopted by ICAO will be binding on signatories to the Chicago Convention of 1944 and thus do not need to be referenced in ITU Radio Regulations. GBAS receiver performance will be compatible with FM broadcast services in the band 87.5-108 MHz, and compatibility will be assured without imposing further restrictions on FM broadcast stations.

Proposal:

MOD USA/ / 132

108-117.975 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
108-117.975	AERONAUTICAL RADIONAVIGATION 5.197 **ADD** 5.GBAS	

Reasons: The modification to the table is a consequential change from adding the new footnote.

ADD USA/ / 133

5.GBAS In the band 108 – 117.975 MHz, ground-based radionavigation-satellite-augmentation systems may transmit supplementary information intended for aircraft navigation.

Reasons: A footnote in the Radio Regulations is all that is necessary to permit the use of the band 108–117.975 MHz, on a worldwide basis, for the transmission of radionavigation satellite differential correction signals. The use of GBAS will increase the accuracy of satellite radionavigation systems and conform to the requirements for precision landing.

Agenda Item 1.29:

to consider the results of studies related to Resolutions **136 (WRC-2000)** and **78 (WRC-2000)** dealing with sharing between non-GSO and GSO systems;

Proposal for Article 15, 22 and Resolution 78

Background Information: WRC-2000 adopted a combination of single-entry validation, operational and, for 3 and 10 meter antennas in the 10.7-12.75 GHz band, single-entry additional operational epfd↓ limits contained in Article **22**, along with the aggregate epfd↓ limits in Resolution **76 (WRC-2000)**, which apply to non-GSO FSS systems to protect GSO networks in the bands 10.7-12.75 GHz, 17.8-18.6 GHz, and 19.7-20.2 GHz. The operational epfd↓ limits were adopted to protect *operational* GSO FSS networks from interference levels that may result in loss of synchronization, or loss of capacity, or severe degradation in performance. Resolution **78 (WRC-2000),** *Development of procedures in case the operational or additional operational limits in Article **22** are exceeded*, invites the ITU-R to undertake the appropriate regulatory studies to develop procedures in cases where the operational or additional operational epfd↓ limits are exceeded at an operational GSO earth station. Compliance with the operational epfd↓ and

additional operational epfd↓ limits is not subject to verification by the ITU-BR but by individual administrations.

No. **22.5I** stipulates that if a non-GSO FSS system subject to the operational or additional operational epfd↓ limits contained in Section II of Article **22** at an operational receiving earth station within a GSO network operating in accordance with the Radio Regulations, exceeds these limits then it is a violation of No. **22.2** except as otherwise agreed between concerned administrations. Article **15** (Section V) of the Radio Regulations contains the regulatory procedures to address infringements, which can be applied without modification when non-GSO FSS systems exceed the operational or additional operational epfd↓ limits given in Tables **22-4A**, **22-4A1**, **22-4B** and **22-4C**. Thus, the U.S. supports the intent of Method A1 for satisfying this agenda item (see Section 3.2.2 of the Conference Preparatory Meeting Report) to apply the existing provisions in Article **15**. Modification of No. **22.5I** is also proposed in order to point Administrations toward the procedures for resolving this case of interference. This is a slight revision of Method A1, which specified no change to either Article **15** or Article **22**.

Proposal:

NOC USA/ / 134

ARTICLE 15

Interferences

Reasons: The current procedures in Article **15** are adequate.

ARTICLE 22

Space services

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22.5I 6) An administration operating a non-geostationary-satellite system in the fixed-satellite service which is in compliance with the limits in Nos. **22.5C**, **22.5D** and **22.5F** shall be considered as having fulfilled its obligations under No. **22.2** with respect to any geostationary-satellite network, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite system and the geostationary-satellite network, provided that the epfd↓ radiated by the non-geostationary-satellite system in the fixed-satellite service into any operating geostationary fixed-satellite service earth station does not exceed the operational and additional operational limits given in Tables **22-4A**, **22-4A1**, **22-4B** and **22-4C**, when the diameter of the earth station antenna is equal to the values given in Table **22-4A**, **22-4A1** or **22-4C**, or the gain of the earth station is equal to or greater than the values given in Table **22-4B** for the corresponding orbital inclination of the geostationary fixed-satellite service satellite. Except as otherwise agreed between concerned administrations, an administration operating a non-geostationary-satellite system in the fixed-satellite service that is subject to the limits in Nos. **22.5C**, **22.5D** and **22.5F** and which radiates epfd↓ into any operating geostationary fixed-satellite service earth station at levels in excess of the operational or additional operational limits given in Tables **22-4A**, **22-4A1**, **22-4B** and **22-4C**, when the diameter of the earth station antenna is equal to the values given in Table **22-4A**, **22-4A1** or **22-4C**, or the gain of the

earth station is equal to or greater than the values given in Table **22-4B** for the corresponding orbital inclination of the geostationary fixed-satellite service satellite, shall be considered to be in violation of its obligations under No. **22.2** and the provisions of Article **15** (section V) apply.

Reasons: Article **15** of the Radio Regulations contain provisions that apply when non-GSO systems exceed the operational or additional operational epfd↓ limits contained in No. **22.5I**. In order to direct administrations toward the procedures for addressing infringements, it is helpful to refer administrations to Article **15** (section V) in No. **22.5I**.

SUP USA/ / 136

RESOLUTION 78 (WRC-2000)

Development of procedures in case the operational or additional operational limits in Article 22 are exceeded

Reasons: No further studies are needed to develop specific procedures in case the operational or additional operational limits in Article **22** are exceeded.

Proposal Concerning Resolution 136

Background Information: Resolution **136** invited the ITU-R to undertake the appropriate technical, operational, and regulatory studies on sharing arrangements in order to achieve an appropriate balance between GSO FSS networks and non-GSO FSS systems in the 37.5-50.2 GHz frequency range.

Both GSO FSS networks and non-GSO FSS systems are planned for operation within the 37.5-42.5 GHz and 47.2-50.2 GHz bands. FSS systems based on the use of new technologies associated with both geostationary and non-geostationary orbits are capable of providing both the most densely populated and the most isolated regions of the world with high capacity and low-cost means of communications. WRC-2000, recognizing that there had been little or no deployment of satellite systems in the band 37.5-50.2 GHz, correctly concluded in Resolution **136 (WRC-2000)** that both GSO FSS and non-GSO FSS operators should be expected to exhibit flexibility in achieving the appropriate balance in the sharing environment, and urged administrations, in the application of Article **22** to their GSO FSS networks and non-GSO FSS systems in this range prior to WRC-03, to seek balanced sharing arrangements. Since WRC-2000, progress was made in compiling information on the characteristics of both GSO networks and non-GSO FSS systems planned to operate in the 40/50 GHz bands. At the same time, it was recognized that if no techniques were employed to avoid direct coupling between the main beams of satellites in a non-GSO system and the main beams of earth stations in a GSO network, and vice versa, during the short periods when "in-line" transitions occur, the interference in both directions, which is likely to be modest for the majority of the time, would rise sharply by many dB for short periods aggregating to small percentages of time.

To date the ITU-R work done for the 40/50 GHz bands has been fairly limited. One new recommendation discusses the use of orthogonal polarizations and other techniques as potential means of sharing between GSO networks and non-GSO systems in this frequency range. However,

the levels of acceptable interference for GSO FSS networks and non-GSO systems were not fully assessed. Moreover potentially available mitigation techniques such as satellite diversity or arc avoidance, geographic isolation between earth stations, etc., cannot be easily translated into regulatory provisions that may require the development of a set of epfd masks to protect GSO FSS networks and of off-axis e.i.r.p. density masks to protect non-GSO FSS systems.

In most cases sharing between a GSO FSS network and a non-GSO FSS system of the LEO or MEO type will be feasible only if mitigation techniques to avoid main beam-to-main beam coupling of "in-line" interference are applied. Such techniques could include, for example:

Satellite diversity or arc avoidance;
Geographical isolation between earth stations;
Adaptive coding;
Link balancing
Use of orthogonal polarizations.

It is considered premature to conclude on the advantages and disadvantages of each technique until the further studies have been accomplished. There is no need for modifications in Article **22** at this time. Instead, modification of Resolution **136 (WRC-2000)** is required to reflect a new date for completion of studies and action by a future Conference, and the addition of an appropriate item to a future WRC agenda.

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RESOLUTION 136 (~~WRC-2000~~REVWRC-03)

Frequency sharing in the range 37.5-50.2 GHz between geostationary fixed-satellite service networks and non-geostationary fixed-satellite service systems

The World Radiocommunication Conference **(**~~Istanbul, 2000~~Geneva, 2003**)**

considering

a) that ~~this Conference has~~WRC-2000 made provisions for the operation of geostationary fixed-satellite service (GSO FSS) networks and non-GSO FSS systems in the 10-30 GHz frequency range;

b) that there is an emerging interest in operating GSO FSS networks and non-GSO FSS systems in the 37.5-50.2 GHz range;

c) that there is a need to provide for the orderly development and implementation of new satellite technologies in the 37.5-50.2 GHz frequency range;

d) that systems based on the use of new technologies associated with both GSO FSS networks and non-GSO FSS systems are capable of providing the most isolated regions of the world with high-capacity and low-cost means of communication;

e) that there should be equitable access to the radio frequency spectrum and orbital resources in a mutually acceptable manner that allows for new entrants in the provision of services;

f) that the Radio Regulations should be sufficiently flexible to accommodate the introduction and implementation of innovative technologies as they evolve;

g) that ~~the CPM Report to WRC-2000 stated that~~ in the bands 37.5-50.2 GHz, where there has been little or no deployment of satellite systems to date, both GSO FSS and non-GSO FSS operators should be expected to exhibit flexibility in achieving the appropriate balance in the sharing environment~~,~~;

h) that this Conference, having considered the outcome of ITU-R studies on this subject as summarized in the CPM Report to this Conference, decided that further studies are needed before the conditions for non-GSO FSS systems to share these bands with GSO FSS systems can reliably be determined,

resolves to urge administrations

in the application of Article **22** to their GSO FSS networks and non-GSO FSS systems in the 37.5-50.2 GHz frequency range prior to WRC-~~03~~06, to seek balanced sharing arrangements between these systems,

invites ITU-R

~~1~~ to undertake, as a matter of urgency, ~~the appropriate~~ further technical, operational and regulatory studies on sharing arrangements which achieve an appropriate balance between GSO FSS networks and non-GSO FSS systems in the frequency range 37.5-50.2 GHz. Such further studies should embrace, but not necessarily be limited to:

a) Techniques which individually or in combination avoid, or otherwise adequately mitigate, main beam-to-main beam coupling of interference in both directions between non-GSO FSS and GSO FSS systems at "in-line" instants. The studies should be based on the key parameters of systems firmly planned to operate in the bands concerned, and should be pursued sufficiently far to establish appropriate long-term and short-term interference criteria and to compute the time statistics of interference from non-GSO system to GSO network, and from GSO network to non-GSO system, to determine whether those criteria would be met. The computations and comparisons should be made firstly assuming no mitigation, and subsequently with each of the various mitigation techniques or combinations of mitigation techniques envisaged. The mitigation techniques thus investigated should include:

- Satellite diversity or arc avoidance.
- Geographical isolation between earth stations.
- Site diversity.
- Adaptive coding.
- Link balancing.
- Opposite polarizations for GSO and non-GSO systems.
- Other appropriate techniques, if any.

b) The development of technical, operational and regulatory guidance which would enable WRC-06 to decide whether or not to include, in the Radio Regulations, epfd limits on non-GSO FSS systems for the protection of GSO FSS networks, and off-axis e.i.r.p. density limits on earth stations in GSO FSS networks for the protection of non-GSO FSS systems, in the frequency range 37.5-50.2 GHz. Such guidance should include quantitative values for suitable epfd$_{\downarrow}$, epfd$_{\uparrow}$ and off-axis e.i.r.p. density limits;

~~2 to report the results of these studies to WRC-03.~~

instructs the Director of the BR

to report the results of these studies to WRC-07.

Reasons: To allow additional time for the completion of the necessary ITU-R studies.

Agenda Item 1.30:

to consider possible changes to the procedures for the advance publication, coordination and notification of satellite networks in response to Resolution **86 (Minneapolis, 1998)**;

Background Information: Resolution **86 (Minneapolis, 1998)** resolves to request WRC-2000 and subsequent WRCs to continually review and update the advance publication, coordination and notification procedures, including the associated technical characteristics, and the related Appendices of the Radio Regulations, so as to ensure that they reflect the latest technologies, as well as to achieve additional simplification and cost savings for the Radiocommunication Bureau and administrations.

Modification to Appendix **7** clarify that the procedure is applicable to cases where the two services are allocated on an equal basis including secondary services. Another modification is needed in Article **9** and Appendix **7** to reflect the intent of the Appendix **7** procedure to apply to any case where the space service earth station operates co-frequency with another service where the allocation status is equal for the two services. See Table 10 in Appendix **7**.

Proposal:

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9.17A *m)* for any specific earth station in respect of other earth stations, or typical mobile earth stations in respect of specific earth stations, operating in the opposite direction of transmission, in frequency bands allocated with equal rights to space radiocommunication services in both directions of transmission and where the coordination area of the earth station includes the territory of another country or the earth station is located within the coordination area of another earth station, with the exception of the coordination under No. **9.19**;

Reasons: To include the coordination mechanism to allow coordination between typical mobile earth stations in respect of specific earth stations.

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APPENDIX 5 (WRC-~~20~~03)

TABLE 5-1 (*continued*)

Reference of Article 9	Case	Frequency bands (and Region) of the service for which coordination is sought	Threshold/condition	Calculation method	Remarks
No. **9.17A** GSO, non-GSO/ GSO, non-GSO	A specific earth station in respect of other earth stations, or typical mobile earth stations in respect of specific earth stations, operating in the opposite direction of transmission in frequency bands allocated with equal rights to space radiocommunication services in both directions of transmission, where the coordination area of the earth station includes the territory of another country or the earth station is located within the coordination area of a coordinated earth station, with the exception of coordination under **9.19**	Any frequency band allocated to a space service	The coordination area of the earth station covers the territory of another administration or the earth station is located within the coordination area of an earth station	Appendix **7**	

Reasons: Consequential to modification of No. **9.17A** in Article **9**.

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APPENDIX 7 (WRC-~~20~~03)

Methods for the determination of the coordination area around an earth station in frequency bands between 100 MHz and 105 GHz.

1.4.4 Earth stations operating in bidirectional allocated frequency bands

For earth stations operating in some frequency bands there may be ~~co-primary~~ allocations to space services operating with equal rights in both the Earth-to-space and space-to-Earth directions. In this case, where two earth stations are operating in opposite directions of transmission it is only necessary to establish the coordination area for the transmitting earth station, as receiving earth stations will automatically be taken into consideration. Hence, a receiving earth station operating in a bi-directional allocated frequency band will only be involved in coordination with a transmitting earth station if it is located within the transmitting earth station's coordination area.

For a transmitting earth station operating with either geostationary or non-geostationary satellites in a bi-directional allocated frequency band, the coordination area is determined using the procedures described in § 3.

Reasons: Brings the text in line with existing No. **9.17A** and Appendix **5** provisions.

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APPENDIX 7

TABLE 10

Predetermined coordination distances

Frequency sharing situation		**Coordination distance (in sharing situations involving services allocated with equal rights) (km)**
Type of earth station	**Type of terrestrial or Earth station**	
.....		

Reasons: Allows predetermined distances to be used in the case of typical mobile earth stations in respect of specific earth stations operating in opposite directions of transmission.

Agenda Item 1.31:

to consider the additional allocations to the mobile-satellite service in the 1-3 GHz band, in accordance with Resolutions **226 (WRC-2000)** and **227 (WRC-2000)**;

Proposal Concerning Resolution 227 MSS and the Metaids and MetSat services

Background Information: WRC-2000 considered proposals for worldwide allocation of the band 1 683-1 690 MHz to the mobile-satellite service (MSS) (Earth-to-space) in response to Resolution **213 (WRC-95)**. The frequency band 1 675-1 710 MHz is allocated to the MSS (Earth-to-space) in Region 2 on a co-primary basis. However, the 1 683-1 690 MHz portion is used mainly by the meteorological-satellite (MetSat) and meteorological aids (MetAids) services. While there are only a limited number of MetSat earth stations operating in this band in Region 1, there are a large number of MetSat earth stations operating in Regions 2 and 3, and the locations of many of these

stations are not identified. Sharing between MetSat and MSS in the band 1 675-1 690 MHz is feasible only if appropriate separation distances are maintained.

Sharing between MetSat and MSS may not be feasible in those countries where a large number of MetSat stations are deployed. Recommendation ITU-R **SA.1158-2** indicates that additional studies are required in order to determine the criteria for coordination between MSS and the MetSat service for GVAR/S-VISSR stations operated in the band 1 683-1 690 MHz in Regions 2 and 3.

Other spectrum identified in Resolution **213** included 1 690-1 710 MHz. However, the ITU-R has concluded that co-channel sharing between MSS and MetAids is not feasible and that co-frequency sharing between MetAids and MetSat services is not feasible. Therefore, the World Meteorological Organization (WMO) has identified future spectrum requirements for MetAids operations as limited to the 1 675-1 683 MHz portion of the 1 675-1 700 MHz band, but some administrations will continue to require spectrum in the range 1 683-1 690 MHz for MetAids operations. Resolution **227** observed that no further study is required on sharing in the 1 675-1 683 MHz and 1 690-1 710 MHz bands, due to incompatibility between MSS and existing services in these bands.

The existing Region 2 allocation includes the provision that MSS operation should not constrain current and future development of the MetSat service, as specified in No. **5.377**. No MSS services have been implemented under the Region 2 allocation in this band.

Proposal:

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1 675-1 710 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
1 675-1 690 METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.341	**1 675-1 690** METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile ~~MOBILE-SATELLITE (Earth-to-space)~~ 5.341 ~~5.377~~	**1 675-1 690** METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.341
1 690-1 700 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) Fixed Mobile except aeronautical mobile 5.289 5.341 5.382	**1 690-1 700** METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) ~~MOBILE-SATELLITE (Earth-to-space)~~ 5.289 5.341 ~~5.377~~ 5.381	**1 690-1 700** METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) 5.289 5.341 5.381

1 700-1 710	**1 700-1 710**	**1 700-1 710**
FIXED	FIXED	FIXED
METEOROLOGICAL-SATELLITE (space-to-Earth)	METEOROLOGICAL-SATELLITE (space-to-Earth)	METEOROLOGICAL-SATELLITE (space-to-Earth)
MOBILE except aeronautical mobile	MOBILE except aeronautical mobile	MOBILE except aeronautical mobile
	~~MOBILE-SATELLITE (Earth-to-space)~~	
5.289 5.341	5.289 5.341 ~~5.377~~	5.289 5.341 5.384

Reasons: There are no MSS systems operating in this band, and none are currently planned, due to the incompatibility of MSS and the Metaids and MetSat services.

SUP USA/ / 143

5.377

Reasons: Consequential to the deletion of the allocation for MSS.

Proposal Pursuant to Resolution 226

Background Information: WRC-2000 considered proposals for an allocation to the mobile-satellite service (MSS) (space-to-Earth) in Regions 1 and 3 in the frequency band 1 518-1 525 MHz. This band is adjacent to the 1 525-1 559 MHz band in use by geostationary orbit (GSO) MSS operators.

WRC-2000 considered in Resolution **226** that the proposed allocation to the MSS (space-to-Earth) at 1 518-1 525 MHz due to potentially widespread emissions upon the Earth from either GSO or non-GSO systems, could have an impact on the mobile service, including aeronautical mobile and aeronautical mobile telemetry, in all three Regions. Resolution **226** also states there is a need to review the power-flux-density (pfd) values in Appendix **5** in order to ensure that they are adequate to protect new point-to-multipoint systems operating in the fixed service in the band, as well as, a need to study sharing between the MSS and aeronautical mobile telemetry in all the Regions in the band. Sharing studies have been performed, and a number of these studies lead to the conclusion that sharing between MSS and flight aeronautical mobile telemetry is not possible.

Recommendation ITU-R M.1459 gives the values needed for protection of the aeronautical mobile service for telemetry systems in the 1 452-1 525 MHz band from GSO satellites operating in the MSS. The validity of M.1459 has been affirmed in several sharing studies presented to and debated within ITU-R Working Parties 8B and 8D. The required separation distances between co-frequency telemetry and MSS operations prescribed by the levels in M.1459 are large, making the feasibility of use of the 1 518-1 525 MHz band by MSS questionable. This is true for co-frequency, co-coverage sharing and for co-frequency, non-co-coverage sharing, even when the mitigation techniques suggested in Recommendation M.1459 are considered.

There has been no MSS implemented in the 1 492-1 525 MHz band due to the incompatibility between aeronautical telemetry and MSS systems.

Proposal:

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1 452-1 525 MHz

Allocation to Services		
Region 1	Region 2	Region 3
1 452 - 1492 FIXED MOBILE except aeronautical mobile BROADCASTING 5.345 5.347 BROADCASTING-SATELLITE 5.345 5.347 5.341 5.342	1 452 - 1 492 FIXED MOBILE 5.343 BROADCASTING 5.345 5.347 BROADCASTING SATELLITE 5.345 5.347 5.341 **MOD** 5.344	
1 492 - 1 525 FIXED MOBILE except aeronautical mobile 5.341 5.342	1 492 - 1 525 FIXED MOBILE 5.343 ~~MOBILE-SATELLITE (space-to-Earth) 5.348A~~ 5.341 5.344 ~~5.348~~	1 492 - 1 525 FIXED MOBILE 5.341 ~~5.348A~~

Reasons: There has been no MSS implemented in the 1 492-1 525 MHz band due to the incompatibility between aeronautical telemetry and MSS systems. U.S. studies have shown that sharing between MSS and aeronautical telemetry in 1 492 - 1 525 MHz, even when the service area is in an adjacent ITU Region, is not feasible. Note; the U.S. proposes that there be no change to the Allocations to Services in Regions 1 and 3 in the band 1 492 - 1 525 MHz. The proposed deletion of **No. 5.348A** from Region 3 is a consequence of the proposed deletion of the mobile-satellite service (space-to-Earth) allocation in Region 2 (see the proposal above) and is shown here for sake of consistency.

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5.344 *Alternative Allocation*: in the United States, the band 1 452-1 492 ~~1 525~~ MHz is allocated to the fixed and mobile services on a primary basis (see also No. **5.343**).

Reasons: Consequential to the suppression of the mobile-satellite service from the Table of Frequency Allocations in the band 1 492-1 525 MHz in Region 2.

SUP USA/ / 146

5.348

Reasons: Consequential to the deletion of the mobile-satellite service from the Table of Frequency Allocations at 1492 - 1525 MHz in Region 2.

SUP USA/ / 147

5.348A

Reasons: Consequential to the deletion of the mobile-satellite service from the Table of Frequency Allocations at 1492 - 1525 MHz in Region 2.

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APPENDIX 5

ANNEX 1

TABLE 5-2

Frequency band (MHz)	**Terrestrial service to be protected**	**Coordination threshold values**				
		GSO space stations		**Non-GSO space stations**		
		pfd (per space station) calculation factors (NOTE 2)		**pfd (per space station) calculation factors (NOTE 2)**		**% FDP (in 1 MHz) (NOTE 1)**
		P	***r* dB/ degrees**	***P***	***r* dB/ degrees**	
~~1 492-1 525~~	~~Analogue FS telephony (NOTE 5)~~	~~-146 dB(W/m²) in 4 kHz and -128 dB(W/m²) in 1 MHz~~	~~0.5~~	~~-146 dB(W/m²) in 4 kHz and -128 dB(W/m²) in 1 MHz~~	~~0.5~~	
	~~All other cases (NOTE 4)~~	~~-128 dB(W/m²) in 1 MHz~~	~~0.5~~	~~-128 dB(W/m²) in 1 MHz~~	~~0.5~~	~~25~~

~~NOTE 4 – Exceptions for the band 1 492-1 525 MHz are as follows:~~

~~4.1 For the land mobile service on the territory of Japan (No. **5.348A**): –150 dB(W/m2) in 4 kHz at all angles of arrival is applicable to all satellite space-to-Earth emissions.~~

~~4.2 For the aeronautical mobile service for telemetry (No. 5.343), the requirement for coordination is determined by frequency overlap (No. 5.348).~~

Reasons: Consequential changes due to the deletion of MSS from the band 1 492- 1 525 MHz.

MOD USA/ / 149

Renumber notes 5, 6 and 7 editorially

Reasons: Consequential to deletion of Note 4

Agenda Item 1.37:

to consider the regulatory and technical provisions for satellite networks using highly elliptical orbits (HEOs);

Background Information: The ITU-R has been considering the sharing aspects of HEO satellite systems (occasionally referred to as "quasi-geostationary" systems) in a number of contexts over the last several years.

A subcategory of non-geostationary (non-GSO) systems, HEO systems are intended for operation or are already operational in several fixed-satellite service (FSS) bands above 3 GHz. In certain configurations, HEO systems potentially facilitate the introduction of large numbers of co-frequency non-GSO FSS systems and promote successful co-existence with GSO networks and terrestrial systems.

To date, several categories of orbits that are encompassed within the term "highly-elliptical" have been identified within the ITU-R. All highly-elliptical orbits, however, are non-geostationary orbits, and all HEO systems are non-geostationary systems. In this regard, recent studies in certain frequency bands between 10 and 30 GHz resulted in a series of new regulations in Articles **21** and **22** that were adopted at the 1997 and 2000 WRCs, including pfd limits on non-GSO FSS systems to protect terrestrial systems and epfd limits on non-GSO FSS systems to protect GSO FSS and broadcasting-satellite service (BSS) networks. The pfd and epfd limits and associated provisions that were imposed on non-GSO FSS systems in the applicable segments of the 10-30 GHz band apply to non-GSO FSS systems in highly-elliptical orbits.

Five of the six following proposals under agenda item 1.37 are intended to avoid any potential confusion regarding the applicability of regulations in Articles **21** and **22** that were adopted at WRC-2000 to all non-GSO systems, including those employing highly-elliptical orbits, and to confirm the ITU-R conclusion that no change is needed to Article **1,** Article **5,** or Article **22** in order to accommodate non-GSO systems using highly-elliptical orbits. The sixth proposal, for pfd limits at 3.7-4.2 GHz for non-GSO satellites, results from the fact that studies of the pfd values that adequately protect the FS in the 3.7-4.2 GHz band from satellites in highly-elliptical orbits are of sufficient maturity in the ITU-R to enable pfd limits to be established that would protect the FS from HEO emissions, as well as from other types of non-GSO FSS satellite emissions. No other changes to Section V of Article **21** are needed.

Proposals:

NOC USA/ / 150 For the purpose of adding a definition to Article 1 for HEOs under this Agenda Item.

ARTICLE 1

Terms and definitions

Reasons: Satellite networks using HEOs should continue to be considered as non-GSOs so there is no need to modify the terms and definitions in the Radio Regulations to accommodate HEO-type non-GSO operations.

NOC USA/ / 151 For the purpose of adding provisions in Artricle 5 for satellite networks using HEOs pursuant to this Agenda Item

ARTICLE 5

Frequency allocations

Reasons: Satellite networks using HEOs should continue to be considered as non-GSOs and these networks should continue to be considered to have the same regulatory standing as other types of non-GSOs, such as MEOs and LEOs.

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TABLE **21-4** (WRC-2000<u>3</u>)

Frequency band	**Service***	**Limit in dB(W/m²) for angle of arrival (δ) above the horizontal plane**			**Reference bandwidth**
		0°-5°	**5°-25°**	**25°-90°**	
* * *					
3 400-4 200 MHz 4 500-4 800 MHz 5 670-5 725 MHz (Nos. **5.453** and **5.455**) 7 250-7 850 MHz	Fixed-satellite (space-to-Earth, <u>geostationary-satellite orbit</u>) Meteorological-satellite (space-to-Earth) Mobile-satellite Space research	–152	–152 + 0.5(δ – 5)	–142	4 kHz
<u>3 700-4 200 MHz</u>	<u>Fixed-satellite (space-to-Earth, non-geostationary-satellite orbit)</u>	<u>–160</u>	<u>–160 + 0.5(δ – 5)</u>	<u>–150</u>	<u>4 kHz</u>
* * *					

Reasons: The FS in the 3.7-4.2 GHz band would be adequately protected by the adoption of limits on pfd produced by highly-elliptical orbit non-GSO satellites. As the levels would also adequately protect the FS from other types of non-GSO satellites, they are proposed for application to all non-GSO FSS satellites, in order to avoid having to introduce a definition of HEO satellites or otherwise subcategorize non-GSO satellites. The levels for non-GSO FSS satellites have been converted to a 4 kHz reference bandwidth from the levels of –126/–136 dB(W/m²) in 1 MHz that are reflected in the CPM Report.

<u>NOC</u> USA/ /153

TABLE **21-4** *(continued)*

Frequency band	**Service***	**Limit in dB(W/m²) for angle of arrival (δ) above the horizontal plane**			**Reference bandwidth**
		0°-5°	**5°-25°**	**25°-90°**	
* * *					
10.7-11.7 GHz	Fixed-satellite (space-to-Earth), non-geostationary-satellite orbit	–126	–126 + 0.5(δ – 5)	–116	1 MHz

11.7-12.5 GHz (Region 1) 12.5-12.75 GHz (Region 1 countries listed in Nos. **5.494** and **5.496**) 11.7-12.7 GHz (Region 2) 11.7-12.75 GHz (Region 3)	Fixed-satellite (space-to-Earth), non-geostationary-satellite orbit	–124	–124 + 0.5(δ – 5)	–114	1 MHz
* * *					
17.7-19.3 GHz [7, 8]	Fixed-satellite (space-to-Earth) Meteorological-satellite (space-to-Earth)	–115 [13] or –115 – *X* [12]	–115 + 0.5(δ – 5) [13] or –115 – *X* + ((10 + *X*)/ 20)(δ – 5) [12]	–105 [13] or –105 [12]	1 MHz

Reasons: The current limits and associated provisions in Section **V** of Article **21** that were finalized at WRC-2000 for all non-GSO FSS systems in certain bands between 10 and 30 GHz apply in full to non-GSO FSS systems in highly-elliptical orbits. No additional regulatory provisions are needed for HEO systems in these bands.

NOC USA/ /154 For the purpose of additional requirements for control of interference to GSO networks no change to Article 22 is proposed pursuant to this Agenda Item

ARTICLE 22

Space services[1]

Section II – Control of interference to geostationary-satellite systems

Reasons: The current limits and associated provisions in Section II of Article 22 that were finalized at WRC-2000 for all non-GSO FSS systems in certain bands between 10 and 30 GHz apply in full to non-GSO FSS systems in highly-elliptical orbits and are necessary for the protection of co-frequency GSO FSS and BSS systems. No additional regulatory provisions are needed for HEO systems in these bands, and no lessening of the protection required by GSO systems in the same bands should be considered at WRC-03.

NOC USA/ / 155

RESOLUTION 76 (WRC-2000)

Protection of geostationary fixed-satellite service and geostationary broadcasting-satellite service networks from the maximum aggregate equivalent power flux-density produced by multiple non-geostationary fixed-satellite service systems in frequency bands where equivalent power flux-density limits have been adopted

Reasons: The current provisions in Resolution **76 (WRC-2000)** for protection of GSO FSS and BSS networks from the maximum aggregate epfd produced by multiple non-GSO FSS systems in certain bands between 10 and 30 GHz apply in full to non-GSO FSS systems in highly-elliptical orbits and are necessary for the protection of co-frequency GSO FSS and BSS systems. No additional regulatory provisions are needed for HEO systems in these bands, and no lessening of the protection required by GSO systems in the same bands should be considered.

Agenda Item 1.38:

to consider provision of up to 6 MHz of frequency spectrum to the Earth exploration-satellite service (active) in the frequency band 420-470 MHz, in accordance with Resolution 727 (Rev.WRC-2000);

Background Information: A similar agenda item was debated at WRC-97 resulting in a decision not to adopt proposed allocations for EESS (active) in the band 420-470 MHz. The need for forest monitoring was emphasized at the United Nations Conference on Economic Development (UNCED) (Buenos Aires - 1992). Since that Conference, Recommendation ITU-R SA.577 established requirements for the operation of spaceborne synthetic aperture radars (SAR) at a frequency near 400 MHz to measure soil moisture, tropical biomass, Antarctic ice thickness, and for documentation of geological history and climate change. Studies performed by the EESS community have identified a minimum bandwidth requirement of up to 6 MHz to satisfy mission objectives.

As a result of studies prior to WRC-97, consideration of the potential use of the band 410-470 MHz by active spaceborne sensors was limited to 430-440 MHz due to sharing considerations with other services. Studies since WRC-97 have examined the range 420-470 MHz, and the conclusions regarding sharing with other services have been updated accordingly. A number of studies were conducted by various administrations leading to a draft revision of Draft Revised Recommendation ITU-R SA.1260, sharing criteria between active spaceborne sensors and other services in the range 420-470 MHz.

Sharing with the amateur and amateur-satellite services

In the band 430-440 MHz, amateur services have allocations on a co-primary basis in Region 1 and on a secondary basis in Regions 2 and 3 (except in countries listed in No. **5.278**, where it is primary). Further, in accordance with No. **5.282** the amateur-satellite service may operate in part of this band (435-438 MHz) subject to not causing harmful interference to other services operating in accordance with the Radio Regulations.

Studies leading to the draft revision of Recommendation ITU-R SA.1260 determined that there would likely be periods where SAR transmissions would have some impact on reception by

amateur services. One study indicates that there may be the potential for significant interference during periods of visibility of some high power SAR satellites to amateur and amateur-satellite services. Another study of a low power, low sidelobe SAR indicates that for a low sensitivity, low-resolution mode the average pfd could be lower than acceptable pfd levels in the amateur services.

It appears that the SARs and the amateur services could coexist if, and only if, the technical and operational constraints given in Draft Revised Recommendation ITU-R SA.1260 are met by EESS (active). Until the characteristics of EESS SARs are more clearly defined, the amateur community remains concerned about the potential for interference to amateur operations in the band 430-440 MHz and especially in the portion of the band 435-438 MHz.

Sharing with the radiolocation service

Airborne, shipborne, and land-based radars operate in the frequency band 420-450 MHz. Studies prior to WRC-97 concentrated on the very large aperture antenna radar systems used for space object tracking in the band 420-450 MHz. Studies since WRC-97 have included consideration of the compatibility of spaceborne SARs with the other types of radars operating in the band 420-450 MHz.

The ITU-R has determined that there is a potential for unacceptable interference from spaceborne SARs to a limited number (around ten worldwide) of terrestrial space object tracking radars operating in the frequency band 420-450 MHz if a SAR is within line-of-sight of these radars. It has been determined that the degree of compatibility is highly dependent upon the characteristics (and associated mission) of the spaceborne SARs, and that a spaceborne SAR intended for certain missions can be designed such that the compatibility situation is considerably improved. Field-testing would be required on a case-by-case-basis to confirm compatibility with specific systems.

The ITU-R has concluded that, taking into account the SAR processing gain; the interference to SARs caused by terrestrial radars is acceptable.

Operation by geographical separation (that is, spaceborne SAR operation beyond line-of-sight to the terrestrial radars) has been studied. Observation of significant portions of the landmass in the northern hemisphere will be denied to the spaceborne sensors under such a restriction. However, it does appear that if the SARs are limited to operations beyond line-of-sight of terrestrial radars an appreciable portion of the tropical forests or Antarctic ice sheets can still be observed, which are primary missions for active sensors at these frequencies.

Studies of the compatibility of spaceborne SARs with airborne and shipborne terrestrial radars have produced results that are quite similar to those for the land-based radars: a potential for significant interference (i.e. with regard to the likelihood and duration of interference events) exists for some of the SARs studied, but that the potential is highly dependent upon the characteristics of the SARs (orbits, transmitter power, antenna sidelobe characteristics). SAR design and operation in compliance with Recommendation ITU-R SA.1260 would greatly improve compatibility.

In addition to the terrestrial radars that operate in the 420-450 MHz band as addressed in the preceding paragraphs, a radar is located in Arecibo, Puerto Rico (United States) that is used for important atmospheric research programmes. It is an upward looking radar and there is a potential for interference from a spaceborne SAR. Wind profiler radars operate in the radiolocation service in the range 440-450 MHz unless compatibility cannot be achieved with existing services, in which case the bands 420-435 MHz and 438-440 MHz could be considered for use by wind profiler radars

in accordance with Resolution **217 (WRC-97)**. Operation in separate frequency bands may be necessary for spaceborne SARs and wind profiler radars in order to preclude interference to the SARs.

Sharing with fixed and mobile services

The frequency ranges 410-430 MHz and 440-470 MHz are allocated to the fixed and mobile services on a primary basis in all three Regions. The frequency range 430-440 MHz is allocated to the fixed service in over 40 countries on a primary basis, by footnotes to the Radio Regulations.

Draft new Recommendation ITU-R F. [Document 9/47] gives channel arrangements for digital radio systems operating in the frequency range 406.1-450 MHz. General guidance on the performance characteristics of FS systems in the band 420-470 MHz are available in Recommendation ITU-R [F.758 (9/131)].

The fixed service protection criteria to be applied is a Fractional Degradation of Performance (FDP) of 10% (which is equivalent to I/N = −10 dB in case of permanent interference) from a primary service, and 1% FDP (equivalent to I/N = −20 dB in case of permanent interference) from a secondary service. The pfd derived from this criterion should not be exceeded. Recommendation ITU-R F.758 provides the receiver thermal noise as −143 dBW in a 3.5 MHz IF bandwidth.

A design of some low power, low-side lobe, spaceborne SARs has been considered that may produce power flux-densities at the surface of the Earth lower than the levels imposed in frequency bands near 400 MHz allocated to the fixed and mobile services in order to protect fixed and mobile operations.

In the range 450-470 MHz, interference to land mobile receivers used for critical purposes is unacceptable if any interruption occurs, even for a brief period of time, as the interference could impact protection of life and property. It is essential that the pfd of any interference to the land mobile service from EESS be less than the level specified in Table 1 of the annex to the Draft Revised Recommendation ITU-R SA.1260.

The maritime mobile service may use some frequencies within the band 457-467 MHz for on-board communications stations (No. **5.287**). Receiver characteristics are similar to those of land mobile equipment listed in Recommendation ITU-R M.1174-1.

Sharing with Space operation service (range safety command receivers)

Range safety command receivers are used to send arm, destruct, and safe commands to an airborne missile or drone, as well as to launch vehicles. Terrestrial missile and drone operations are accomplished at all flight altitudes (from just above ground level up to maximum flight altitudes). Commands to space launch vehicles may need to be sent from nearly ground level (just after lift-off) up or approaching early parking orbit altitudes of 100 km or so (e.g. to send a final "safe" command).

Studies conducted within the ITU-R have demonstrated the potential for interference from spaceborne SARs operating in the EESS into launch vehicle range safety command receivers. Considering the safety implications of interference into range safety command receivers from SARs operating in the EESS, co-frequency sharing is not feasible during a launch window. Launch

vehicle range safety command destruct receivers operate in the band 449.75-450.25 MHz (No. **5.286**), as well as at 420-430 MHz and 440-445 MHz with a 600 kHz bandwidth in the United States, and, in the band 433.75-434.25 MHz in India on a primary basis and certain countries in Region 2 on a secondary basis (No. **5.281**).

Proposal:

NOC USA/ / 156 For the purpose of making an allocation to the EESS within the frequency range 420-470 MHz pursuant to this Agenda Item

ARTICLE 5

Frequency allocations

410 - 470 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
420-430 FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271		
430-440 AMATEUR RADIOLOCATION 5.138 5.271 5.272 5.273 5.274 5.275 5.276 5.277 5.280 5.281 5.282 5.283	**430-440** RADIOLOCATION Amateur 5.271 5.276 5.277 5.278 5.279 5.281 5.282	
440-450 FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271 5.284 5.285 5.286		
450-455 FIXED MOBILE 5.209 5.271 5.286 5.286A 5.286B 5.286C 5.286D 5.286E		
455-456 FIXED MOBILE 5.209 5.271 5.286A 5.286B 5.286C 5.286E	**455-456** FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.286A 5.286B 5.286C 5.209	**455-456** FIXED MOBILE 5.209 5.271 5.286A 5.286B 5.286C 5.286E
456-459 FIXED MOBILE 5.271 5.287 5.288		

459-460 FIXED MOBILE 5.209 5.271 5.286A 5.286B 5.286C 5.286E	**459-460** FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.286A 5.286B 5.286C 5.209	**459-460** FIXED MOBILE 5.209 5.271 5.286A 5.286B 5.286C 5.286E
460-470	FIXED MOBILE Meteorological-Satellite (space-to-Earth) 5.287 5.288 5.289 5.290	

Reasons: ITU-R studies have not shown compatibility between EESS and radiolocation, nor between EESS and the amateur service in the bands.

SUP USA/ /157

RESOLUTION 727 (REV.WRC-2000)

Reasons: Consequential, Resolution **727** is no longer required.

Agenda Item 1.39:

to examine the spectrum requirements in the fixed-satellite service bands below 17 GHz for telemetry, tracking and telecommand of fixed-satellite service networks operating with service links in the frequency bands above 17 GHz*;*

Background Information: WRC-03 agenda item 1.39 identifies the need to examine the spectrum requirements in the fixed-satellite service (FSS) service bands below 17 GHz for Telemetry, Tracking & Command (TT&C) of FSS networks operating in the frequency bands above 17 GHz.

Some FSS systems use the existing space operation service allocations (all of which are below 3 GHz) for TT&C while others use part of the FSS band allocations to perform this function (FSS (space-to-Earth) for space telemetry and tracking carriers, FSS (Earth-to-space) for telecommand). Propagation conditions and spectrum availability are primary considerations when implementing TT&C subsystems, which must meet high reliability criteria. Transmissions above 17 GHz experience higher free-space and rain attenuation losses than those below 17 GHz. Under the ITU regulatory structure, FSS systems may use any FSS allocation to perform TT&C functions.

Working Parties 4A and 4B have performed various studies in response to agenda item 1.39. WP 4B is investigating the reliability and availability requirements of TT&C systems operating with service links in frequency bands above 17 GHz. WP 4A has compiled technical and operational characteristics of TT&C subsystems, considered the TT&C spectrum requirements of systems operating above 17 GHz and evaluated the potential coordination implications.

The results of studies in WP 4A show that it may be difficult to implement in-band TT&C for service links above 17 GHz since these operations are required to be reliable and the performance of TT&C links above 17 GHz is limited by a number of factors. With respect to potential constraints on the bands below 17 GHz, the following factors facilitate the coordination of TT&C carriers and minimize constraints: TT&C carriers occupy a small portion of the satellite bandwidth and through appropriate frequency planning they are usually accommodated, and; TT&C earth stations usually employ large antennas that reduce interference susceptibility and the input power requirements. WP 4A determined that the bands below 17 GHz currently appear to offer the flexibility to accommodate spectrum requirements for TT&C.

Considering the above, the studies to-date do not indicate that any new regulatory provisions or procedures would be required to meet the spectrum requirements for the operation of TT&C below 17 GHz for FSS systems with service links above 17 GHz.

Proposal:

NOC USA/ / 158

ARTICLE 5

Frequency allocations

Reasons: The current regulatory situation provides sufficient and appropriate flexibility to accommodate the spectrum requirements for the TT&C of FSS systems with service links operating above 17 GHz. Therefore, no regulatory or procedural action is required under this agenda item. This proposal does not preclude modifications to Article **5** under agenda items other than agenda item 1.39.

Agenda Item 4:

in accordance with Resolution **95 (Rev.WRC-2000)**, to review the resolutions and recommendations of previous conferences with a view to their possible revision, replacement or abrogation;

Proposal for Resolution 63

Background Information: A proposal for the suppression of Resolution **63**, this resolution is being suppressed because the work of TG1/2 related to this resolution has been completed.

SUP USA/ / 159

RESOLUTION 63

Relating to the protection of radiocommunication services against interference caused by radiation from industrial, scientific and medical (ISM) equipment

Reasons: TG1/2 completed its work related to Resolution **63**.

Proposal for Recommendation 719

Background Information: Recommendation **719** was agreed at WARC-92. It concerned multi-service satellite networks using the geostationay-satellite orbit and it recognized that, at that time, some administrations had expressed an interest in developing multi-service satellite networks in certain portions of the Ka-band. Related studies on the technical characteristics and sharing criteria necessary for compatible operations between multi-service satellite networks and the fixed-satellite service were carried out by WP-4A in 1994 and the results of these studies indicated the difficulty associated with sharing between the multiple services of the FSS and the MSS in the same frequency allocation, e.g., 19.7-20.2 GHz/29.5-30.0 GHz.

Little work has been done within the ITU-R on this subject since that time. As a consequence of the initial ITU-R studies, there appears to be little ongoing interest on the part of administrations in continuing to pursue multi-service satellite networks. Considering all of this, it is appropriate to suppress Recommendation **719**.

SUP USA/ /160

RECOMMENDATION 719 (WARC-92)

Multi-service satellite networks using the geostationary-satellite orbit

Reasons: No longer needed.

Agenda Item 7.2:

to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, taking into account Resolution **801 (WRC-2000);**

Background Information: Resolution **801**, agenda item 2.15 reads, "to review, with a view to identifying necessary spectrum for global harmonization, spectrum and regulatory issues related to terrestrial wireless interactive multimedia applications in accordance with Resolution **737 (WRC-2000)**".

Agenda item 2.15 should be suppressed. During the period between WRC-2000 and WRC-03, Joint Task Group 1-6-8-9 conducted a thorough review of the issues relating to terrestrial wireless

interactive multimedia applications. It found no regulatory impediments to terrestrial wireless interactive multimedia applications, and did not recognize a need for identifying spectrum for global harmonization. No further action is necessary or appropriate.

Agenda item 3.1 reads: "to consider results of ITU-R studies on the feasibility of sharing in the band 2 700-2 900 MHz between the aeronautical radionavigation service, meteorological radars and the mobile service, and to take appropriate action on this subject;" This agenda item should be suppressed. Studies conducted in response to agenda item 3.1 indicate that sharing is not possible and therefore no further action is necessary or appropriate.

Proposal:

MOD USA/ /161

RESOLUTION 801 (WRC-2003)

A~~a~~genda for the 2007 World Radiocommunication Conference

The World Radiocommunication Conference ~~(Istanbul, 2000),~~ (Geneva, 2003),

Reasons: Editorial

resolves to give the view

SUP USA/ /162

2.15 to review, with a view to identifying necessary spectrum for global harmonization, spectrum and regulatory issues related to terrestrial wireless interactive multimedia applications in accordance with Resolution 737 (WRC-2000);

Reasons: Review of the issues associated with terrestrial wireless interactive multimedia applications has been completed. That review indicates that no regulatory impediments exist to terrestrial wireless interactive multimedia applications, and no spectrum needs to be identified.

SUP USA/ /163

3.1 to consider results of ITU-R studies on the feasibility of sharing in the band 2 700-2 900 MHz between the aeronautical radionavigation service, meteorological radars and the mobile service, and to take appropriate action on this subject.

Reasons: ITU-R Working Party 8B has considered several studies on the feasibility of sharing between IMT-2000 and radar systems operated in the band 2 700-2 900 MHz. Those studies indicate that sharing the band 2 700-2 900 MHz between the mobile service (IMT-2000) and aeronautical radionavigation service and meteorological radars is not feasible.