PUBLIC NOTICE

Federal Communications Commission
445 12th St., S.W.
Washington, D.C. 20554

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THE FCC'S ADVISORY COMMITTEE FOR THE 2003 WORLD RADIOCOMMUNICATION CONFERENCE APPROVES DRAFT PROPOSALS

On September 5, 2002, the World Radiocommunication Conference Advisory Committee (WRC-03 Advisory Committee) adopted recommendations to the Commission on numerous issues that the 2003 World Radiocommunication Conference (WRC-03) will address. The WRC-03 Advisory Committee was established by the Commission in January 2001 to assist it in the development of proposals for WRC-03. To that end, the WRC-03 Advisory Committee has forwarded the recommendations it has developed since the beginning of 2001 to the Commission for consideration. We have attached to this Public Notice the WRC-03 Advisory Committee's recommendations, which are in the form of recommended draft proposals to the WRC-03. We appreciate the substantial amount of work that the WRC-03 Advisory Committee has put into developing its recommendations. This Public Notice requests comments on all of these recommendations.

Based upon our initial review of the recommendations forwarded to the Commission, the International Bureau, in coordination with other Commission Bureaus and Offices, tentatively concludes that we can generally support all of the proposals recommended by the WRC-03 Advisory Committee. We do, however, have some reservations about the proposals reflected in documents WAC/144, WAC/146 and WAC/147. We also take note of differing views expressed by WRC-03 Advisory Committee participants in document WAC/144. We seek comment on the recommendations that appear in all of the WRC-03 Advisory Committee documents and on our tentative conclusions.

In addition, the National Telecommunications and Information Administration (NTIA) has submitted letters to the Commission containing draft proposals that have been developed by the Executive Branch Agencies. We also request comment on these draft proposals, which are attached hereto as well.

The FCC will consider the draft proposals and comments provided in its upcoming consultations with the U.S. Department of State and NTIA in the development of U.S. proposals to WRC-03. Once agreed by these agencies of the U.S. Government, proposals will be used by U.S. delegations at bilateral, regional and international meetings. The draft proposals attached to this Public Notice may evolve as we approach WRC-03 and during the course of interagency discussions. Therefore, they do not constitute the final national position on these issues.

The complete texts of these draft proposals are also available in the FCC's Reference Information Center, Room CY-A257, 445 12th Street, SW, Washington, DC 20554 and by accessing the FCC's WRC-03 world wide web site at http://www.fcc.gov/wrc-03. To comment on the proposals, please submit an original and one copy of your comments to the Office of the Secretary, Federal Communications Commission, 445 12th Street, SW, Washington, DC 20554 and provide a courtesy copy to Alex Roytblat, FCC WRC-03 Director, Room 6-A738. Comments should refer to specific proposals by document number. The deadline for comments on the draft proposals and NTIA letters is **October 18, 2002**.

I. Informal Working Group 1: IMT-2000 and Terrestrial Wireless Interactive Media

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Doc. WAC/139(05.09.02)

WRC-03 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-2003 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 Draft CPM Report.

Proposal:

USA/1.21/1
<u>NOC</u>

Reason: 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.

USA/1.21/2
SUP
Resolution 737 (WRC-2000)
Review of Spectrum and Regulatory Requirements to Facilitate Worldwide Harmonization of Emerging Terrestrial Wireless Interactive Multimedia Applications

Reason: 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.

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Doc. WAC/140(05.09.02)

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: 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**.

In Resolution **228** (WRC-2000), the ITU-R was invited to continue studies on overall objectives, applications and technical and operational implementation for the future development of IMT-2000 and systems beyond. These requirements are to be reviewed by WRC-05/06, taking into consideration the results of ITU-R studies presented to WRC-03.

Proposal:

USA/1.22/1
NOC
Article 5, Frequency Allocations

Reason: 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.

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Doc. WAC/141(05.09.02)

WRC-03 Agenda Item 1.33: to review and revise technical, operational and regulatory provisions, including provisional limits in relation to the operation of high altitude platform stations within IMT-2000 in the bands referred to in No. **5.388A**, in response to Resolution **221 (WRC-2000)**;

Background: Provisions for operation of HAPS were originally made at WRC-97, for HAPS providing FS operations in the 47.2–47.5 GHz and 47.9–48.2 GHz bands (5.552A). A definition of HAPS was also added to 1.66A. The use of HAPS as base stations to provide terrestrial IMT-2000 was approved at WRC-2000, resulting in provisions to facilitate this being added to the Radio Regulations (5.388A). In accordance with No. **5.388A**, HAPS may be used as base stations within the terrestrial component of IMT-2000 in the bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz in Regions 1 and 3 and 1 885-1 980 MHz and 2 110-2 160 MHz in Region 2; the use by IMT-2000 applications using HAPS as base stations 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.

Resolution 221 from WRC-2000 includes provisional co-channel and out-of-band power-flux density limits for HAPS operation, for the protection of other stations either sharing the same band or operating in adjacent bands and asked for additional technical, operational and regulatory studies to be conducted, in order to review and, if necessary, revised, these limits. Resolution 221 also asks for consideration of appropriate regulatory and technical provisions to allow bilateral co-ordination of HAPS in an IMT-2000 system with affected neighbouring administrations.

Based on updated information on typical noise figure of IMT-2000 mobile stations, WP-8F updated the protection requirement of other IMT-2000 stations operating co-frequency has been revised to –117 dB (W/(m^2·MHz)). This PFD threshold is appropriate to protect other IMT-2000 mobile stations from co-channel interference.

In order to adequately protect MMDS within IMT-2000 in some neighbouring countries in Region 2 in the band 2 150-2 160 MHz from co-channel interference, a HAPS operating as a base station to provide IMT-2000 shall not exceed the following co-channel pfd at the Earth's surface outside an administration's borders unless agreed otherwise by the administration of the affected neighbouring country:

– 127 dB(W/(m^2·MHz))for angles of arrival (θ) less than 7° above the horizontal plane;

– 127+ 0.666 (θ – 7) dB(W/(m^2·MHz))for angles of arrival between 7° and 22° above the horizontal plane; and

– 117 dB(W/(m^2·MHz)) for angles of arrival between 22° and 90° above the horizontal plane.

It is to be noted that the above is an issue concerning the protection from co-channel interference of certain stations in some neighbouring countries in Region 2 only.

Proposal:

USA/1.33/1
MOD

RESOLUTION 221(REV.WRC-03)

USE OF HIGH ALTITUDE PLATFORM STATIONS AS BASE STATIONS PROVIDING IMT-2000 IN THE BANDS 1 885-1 980 MHZ, 2 010-2 025 MHZ AND 2 110-2 170 MHZ IN REGIONS 1
AND 3 AND 1 885-1 980 MHZ AND 2 110-2 160 MHZ IN REGION 2

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

considering

a) that the bands 1 885-2 025 MHz and 2 110-2 200 MHz are identified in No. **5.388** as intended for use on a worldwide basis for ~~International Mobile Telecommunications-2000 (IMT-2000),~~IMT-2000, including the bands 1 980-2 010 MHz and 2 170-2 200 MHz for both the terrestrial and the satellite component of IMT-2000;

b) that a high altitude platform station (HAPS) is defined in No. **1.66A** as "a station located on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the Earth";

c) that HAPS may offer a new means of providing IMT-2000 services with minimal network infrastructure as they are capable of providing service to a large footprint together with a dense coverage;

d) that the use of HAPS as base stations within the terrestrial component of IMT-2000 is optional for administrations, and that such use should not have any priority over other terrestrial IMT-2000 use;

e) that in accordance with No. **5.388** and Resolution **212 (Rev.WRC-97**), administrations may use the bands identified for IMT-2000, including the bands referred to in this Resolution, for stations of other primary services to which they are allocated;

f) that these bands are allocated to the fixed and mobile services on a co-primary basis;

~~*g)* that ITU-R has studied sharing and coordination between HAPS and other stations within IMT-2000, has considered compatibility of HAPS within IMT-2000 with some services having allocations in the adjacent bands, and has established Recommendation ITU-R M.1456;~~

~~*h)* that ITU-R did not address sharing and coordination between HAPS and some existing systems, particularly PCS (personal communications service), MMDS (multichannel multipoint distribution system) and systems in the fixed service, which are currently operating in some countries in the bands 1 885-2 025 MHz and 2 110-2 200 MHz;~~

~~*i),*~~*g)* that in accordance with No. **5.388A**, HAPS may be used as base stations within the terrestrial component of IMT-2000 in the bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz in Regions 1 and 3 and 1 885-1 980 MHz and 2 110-2 160 MHz in Region 2; the use by IMT-2000 applications using HAPS as base stations 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*~~

h) ~~that the values in *resolves* 1 may not be appropriate for the protection of some stations operating in these bands in the fixed and mobile services,~~that ITU-R has studied sharing and coordination between HAPS and other stations within IMT-2000, has considered compatibility of HAPS within IMT-2000 with some services having allocations in the adjacent bands, and has established Recommendation ITU-R M.1456;

j) that ITU-R has addressed sharing and coordination between HAPS and some existing systems, particularly PCS (personal communications service), MMDS (multichannel multipoint distribution service) and systems in the fixed service, which are currently operating in some countries in the bands 1 885-2 025 MHz and 2 110-2 200 MHz;

k) that HAPS stations are intended to transmit in the band 2 110-2 170 MHz in Regions 1 and 3 and in the band 2110-2160 MHz in Region 2

resolves

1 that:

1.1 for the purpose of protecting~~certain~~ IMT-2000 mobile stations operating~~within IMT-2000~~ in neighbouring countries from co-channel interference, a HAPS operating as a base station to provide IMT-2000 shall not exceed a ~~provisional~~ threshold of co-channel power-flux density (pfd) of

~~−121.5 dB(W/(m^2 · MHz))~~ –117 dB (W/(m^2 • MHz)) at the Earth's surface outside an administration's borders unless agreed otherwise by the consulted administration of the affected neighbouring country;

~~1.2 a HAPS operating as a base station to provide IMT-2000, in order to protect fixed stations from interference, shall not exceed the following provisional values of out-of-band pfd at the Earth's surface in the bands 2 025-2 110 MHz:~~

1.2 for the purpose of protecting MMDS stations in some neighbouring countries in Region 2 in the band 2 150-2 160 MHz from co-channel interference, a HAPS operating as a base station to provide IMT-2000 shall not exceed the following co-channel power-flux density (pfd) threshold at the Earth's surface outside an administration's borders unless agreed otherwise by the consulted administration of the affected neighbouring country:

~~–165 dB(W/(m^2 · MHz))~~ –127 dB(W/(m^2 • MHz)) for angles of arrival (θ) less than ~~5°~~7° above the horizontal plane;

–127 + 0.666 (θ – 7) dB(W/(m^2 • MHz)) for angles of arrival between 7° and 22° above the horizontal plane; and

–117 dB(W/(m^2 • MHz)) for angles of arrival between 22° and 90° above the horizontal plane;

~~–165 1.75 (θ – 5) dB(W/(m^2 · MHz)) for angles of arrival between 5° and 25° above the horizontal plane; and~~

~~130 dB(W/(m^2 · MHz)) for angles of arrival between 25° and 90° above the horizontal plane;~~

1.3 a HAPS operating as a base station to provide IMT-2000, in order to protect fixed stations from interference, shall not exceed the following limits of out-of-band power-flux density (pfd) at the Earth's surface in the bands 2 025-2 110 MHz:

–165 dB(W/(m^2 • MHz))for angles of arrival (θ) less than 5° the horizontal plane;

–165 + 1.75 (θ– 5) dB(W/(m^2 • MHz)) for angles of arrival between 5° and 25° above the horizontal plane; and

–130 dB(W/(m^2 • MHz)) for angles of arrival between 25° and 90° above the horizontal plane;

~~2 that, as of the end of WRC-03, such a HAPS shall operate only in accordance with such limits as are confirmed or, if appropriate, revised by WRC-03, irrespective of its date of bringing into use;~~

2 that, as of the end of WRC-03, such a HAPS shall operate only in accordance with such power-flux density (pfd) values as are confirmed by WRC-03, irrespective of its date of bringing into use;

3 that the consultation with neighboring administrations, as mentioned in *Resolves* 1, be conducted taking into account ITU-R Rec.[(HAPS_CON)] under development;

~~4 that administrations wishing to implement HAPS within a terrestrial IMT-2000 system shall, prior to their bringing into use, take into account in their bilateral coordination with affected neighbouring administrations the operation and growth of existing and planned systems in the fixed and mobile services having allocations on a primary basis;~~

~~3~~**4** that administrations wishing to implement HAPS within a terrestrial IMT-2000 system shall comply with the following:

~~3~~4.1 for the purpose of protecting certain stations operating within IMT-2000 in neighbouring countries from co-channel interference, administrations using HAPS as base stations within IMT-2000 shall use antennas that comply with the following antenna pattern:

$G(\psi) = G_m - 3(\psi/\psi_b)^2$	dBi	for	0°	$\leq \psi \leq \psi_1$
$G(\psi) = G_m \; L_N$	dBi	for	ψ_1	$< \psi \leq \psi_2$
$G(\psi) = X - 60 \log(\psi)$	dBi	for	ψ_2	$< \psi \leq \psi_3$
$G(\psi) = L_F$	dBi	for	ψ_3	$< \psi \leq 90°$

where:

$G(\psi)$:gain at the angle ψ from the main beam direction (dBi)

G_m :maximum gain in the main lobe (dBi)

ψ_b : one-half of the 3 dB beamwidth in the plane considered (3 dB below G_m) (degrees)

L_N : near side-lobe level in dB relative to the peak gain required by the system design, and has a maximum value of –25 dB

L_F :far side-lobe level, G_m – 73 dBi

$\psi 1 = \psi b \sqrt{-L_N/3}$ degrees

$\psi 2 = 3.745\ \psi b$ degrees

$X = G_m\ L_N + 60 \log(\psi 2)$ dBi

$\psi 3 = 10^{(X - L_F)/60}$ degrees

The 3 dB beamwidth ($2\psi b$) is again estimated by:

$(\psi b)^2 = 7\ 442/(10^{0.1 G_m})$ degrees^2

where G_m is the peak aperture gain (dBi);

~~3~~4.2 for the purpose of protecting mobile earth stations within the satellite component of IMT-2000 from interference, a HAPS operating as a base station to provide IMT-2000, shall not exceed an out-of-band pfd of –165 dB(W/(m^2 · 4 kHz)) at the Earth's surface in the bands 2 160-2 200 MHz in Region 2 and 2 170-2 200 MHz in Regions 1 and 3;

~~4~~5 that administrations wishing to implement HAPS within a terrestrial IMT-2000 system shall, prior to their bringing into use, take into account in their bilateral coordination with affected neighbouring administrations the operation and growth of existing and planned systems in the fixed and mobile services having allocations on a primary basis;

~~5~~6 that, for the purpose of protecting fixed service stations operating in neighbouring countries from co-channel interference, administrations wishing to implement HAPS within a terrestrial IMT-2000 system shall~~, pending the review by WRC-03 of the studies mentioned below,~~ take full account of the relevant ITU-R Recommendations relating to protection values for fixed stations (see Recommendation ITU-R F.758),

~~*invites ITU-R*~~

~~1 to complete, as a matter of urgency, additional regulatory, operational and technical studies on sharing criteria for HAPS with other systems in the bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz in Regions 1 and 3 and 1 885-1 980 MHz and 2 110-2 160 MHz in Region 2, and in adjacent bands, so as to allow revision of the values in *resolves* 1;~~

~~2 to develop appropriate regulatory and technical provisions to allow the coordination mentioned in *resolves* 4;~~

~~3 to report on the results of these studies in time for consideration by WRC-03.~~

Reason: The ITU-R has addressed sharing and coordination between HAPS and existing systems, particularly IMT-2000 stations operating in adjacent countries and MMDS (multichannel multipoint distribution service) which are currently operating in the bands 1 885-2 025 MHz and 2 110-2 200 MHz. The Resolution is being modified to reflect the conclusions of the studies and the PFD thresholds required updating. Some of the proposed "block" edits to Resolution 221 are merely to re-organize the text into a more logical manner.

II. IWG-3: Fixed-Satellite Service/Broadcasting Satellite Service

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Doc. WAC/142(05.09.02)

WRC-03 Agenda Item 1.27: to review, in accordance with Resolutions **540 (WRC-2000)** and **735 (WRC-2000)**, the ITU-R studies requested in those resolutions, and modify, as appropriate, the relevant regulatory procedures and associated sharing criteria contained in Appendices **30** and **30A** and in the associated provisions;

Background : Resolution **540 (WRC-2000)** among other things invited the ITU-R to undertake, as a matter of urgency, additional studies and complete them by WRC-03 on the sharing criteria in Annexes 1, 3, 4, and 6 to Appendix **S30** and Annexes 1 and 4 to Appendix **S30A,** taking into account

- that the sharing criteria in Appendices **S30** and **S30A** should provide appropriate protection to the BSS, FSS and terrestrial services whilst not unduly constraining the services involved (considering g);
- that, worldwide, in various sub-bands of the frequency range 11.7-12.7 GHz, FSS networks as well as BSS networks are in operation, and others will be operated in the near future and, consequently, difficulties may be experienced in modifying their characteristics (considering h);
- that there are differing geographic situations between the ITU Regions and that this may have an impact on the sharing criteria…(recognizing a)

The relevant ITU-R study groups have conducted the requested studies and the results are presented in Section 3.2 of the CPM Report. The proposals contained herein take into account these results, noting that the question of the minimum size of BSS and FSS earth station receiving antennas to be protected in Region 3 was left open. In that regard, the proposals contained herein are based on the following general considerations.

- Adequate protection should be provided to the BSS and FSS assignments in all three Regions,taking into account the characteristics of deployed systems as well as the Plan assignments. For instance, in Region 2, there are over 17 million 45-cm BSS receive antennas deployed, in the coterminous U.S. alone, and BSS antennas of up to 240 cm diameter are used in northern Canada, Alaska and Hawaii. FSS systems employ an even wider range of receive earth station antennas, including some with diameters as large as 11 m. Similarly, it is necessary to take the requirements of the different services and their deployment in Regions 1 and 3 into account when developing appropriate inter-Regional sharing criteria. And precisely because the protection requirements of a service in one Region can differ from those in another Region, it is not appropriate to require strict inter-Regional reciprocity; i.e., there is no need to constrain a service in one Region by requiring that it provide more protection than the same service in another Region requires. The application of inter-Regional reciprocity without an operational or technical basis may lead to inefficient use of the limited orbital spectrum resources and unnecessary contraints on services.

Based on the above considerations, these proposals outline sharing criteria designed to protect BSS receive antennas of 45 cm to 2.4 m in Region 2, 60 cm to 2.4 m in Regions 1 and 3 and FSS receive antennas of 60 cm to 11m in all ITU Regions. As previously noted, the antenna patterns and protection objectives are consistent with those outlined in Section 3.2 of the CPM Report.

It is noted that there is still debate on minimum antenna sizes for BSS and FSS receive antennas in Regions 1 and 3 and the US will continue to monitor studies/data with respect to this issue and update its proposals as necessary.

APPENDIX 30

ANNEX 1 (WRC-2000)

Limits for determining whether a service of an administration is affected by a proposed modification to the Region 2 Plan or by a proposed new or modified assignment in the Regions 1 and 3 List or when it is necessary under this Appendix to seek the agreement of any other administration[14]

(See Article 4)

USA/xx/1
NOC

2 Limits to the change in the overall equivalent protection margin for frequency assignments in conformity with the Region 2 Plan

Reason : ITU-R studies did not identify a need to modify this section. Therefore the current OEPM degradation limit is appropriate and should be maintained.

[14] With respect to this Annex, except for Section 2, the limits relate to the power flux-density which would be obtained assuming free-space propagation conditions.

With respect to Section 2 of this Annex, the limit specified relates to the overall equivalent protection margin calculated in accordance with § 2.2.4 of Annex 5.

USA/xx/2
MOD

3 Limits to the change in the power flux-density to protect the broadcasting-satellite service in Regions 1 and 2 in the band 12.2-12.5 GHz and in Region 3 in the band 12.5-12.7 GHz

With respect to § 4.1.1 *c)* of Article 4, an administration in Region 2 shall be considered as being affected if the proposed new or modified assignment in the Regions 1 and 3 List would result in exceeding the power flux-densities given below, at any test point in the service area affected.

–147 dB(W/(m^2 · 27 MHz))	for 0°	≤ θ < 0.23°
–135.7 + 17.74 log θ dB(W/(m^2 · 27 MHz))	for 0.23°	≤ θ < 1.8°
–134.0 + 0.89 θ² dB(W/(m^2 · 27 MHz))	for 1.8°	≤ θ < 5.0°
–129.2 + 25 log θ dB(W/(m^2 · 27 MHz))	for 5.0°	≤ θ < 10.57°
–103.6 dB(W/(m^2 · 27 MHz))	for 10.57°	≤ θ

With respect to § 4.2.3 *a)*, 4.2.3 *b)* or 4.2.3 *f)* of Article 4, as appropriate, an administration in Region 1 or 3 shall be considered as being affected if the proposed modification to the Region 2 Plan would result in exceeding the power flux-densities given below, at any test point in the service area affected:

~~–147 dB(W/(m^2 · 27 MHz))~~	~~for 0°~~	~~≤ θ < 0.44°~~
~~–138 + 25 log θ dB(W/(m^2 · 27 MHz))~~	~~for 0.44°~~	~~≤ θ < 19.1°~~
~~–106 dB(W/(m^2 · 27 MHz))~~	~~for~~	~~θ ≥ 19.1°~~
–147 dB(W/(m^2 · 27 MHz))	for 0°	≤ θ < 0.23°
–135.7 + 17.74 log θ dB(W/(m^2 · 27 MHz))	for 0.23°	≤ θ < 2.0°
–136.7 + 1.66 θ² dB(W/(m^2 · 27 MHz))	for 2.0°	≤ θ < 3.59°
–129.2 + 25 log θ dB(W/(m^2 · 27 MHz))	for 3.59°	≤ θ < 10.57°
–103.6 dB(W/(m^2 · 27 MHz))	for 10.57°	≤ θ

where θ is:

– the difference in degrees between the longitudes of the broadcasting-satellite space station in Region 1 or 3 and the broadcasting-satellite space station affected in Region 2 taking into account the East West station keeping accuracies, *or*

– the difference in degrees between the longitudes of the broadcasting-satellite space station in Region 2 and the broadcasting-satellite space station affected in Region 1 or 3 taking into account the East West station keeping accuracies.

Reason : ITU-R studies determined this mask was appropriate for inter-regional protection of BSS networks from BSS networks utilizing receive antenna sizes between 45 cm to 2.4 m for Region 2 and 60 cm to 11 m for Regions 1 and 3.

USA/xx/3

NOC

4 Limits to the power flux-density to protect the terrestrial services of other administrations[18], [19], [20]

USA/xx/4

MOD

6 Limits to the change in the power flux-density of assignments in the Regions 1 and 3 Plan or List to protect the fixed-satellite service (space-to-Earth) in the band 11.7-12.2 GHz in Region 2 or in the band 12.2-12.5 GHz in Region 3, and of assignments in the Region 2 Plan to protect the fixed-satellite service (space-to-Earth) in the band 12.5-12.7 GHz in Region 1 and in the band 12.2-12.7 GHz in Region 3

With respect to § 4.1.1 *e)* of Article 4, an administration ~~in Region 2 or Region 3~~ shall be considered as being affected if the proposed new or modified assignment in the Regions 1 and 3 List would result in an increase in the power flux-density over the service area of a fixed-satellite service network in Region 2 or Region 3 with overlapping frequency assignments ~~on its territory~~ of 0.25 dB or more above that resulting from the frequency assignments in the Plan or List for Regions 1 and 3 as established by WRC-2000.

With respect to § 4.2.3 *e)*, an administration ~~in Region 1 or 3~~ shall be considered as being affected if the proposed modification to the Region 2 Plan would result in an increase in the power flux-density over the service area of a fixed-satelite service network in Region 1 or Region 3 with overlapping freqeuncy assignments ~~on its territory~~ of 0.25 dB or more above that resulting from the frequency assignments in the Region 2 Plan at the time of entry into force of the Final Acts of the 1985 Conference.

With respect to § 4.1.1 *e)* of Article 4, where a proposed new or modified assignment in the Regions 1 and 3 List would result in not exceeding the~~gives a~~ power flux-densities~~y~~ given below ~~of~~

[18] See § 3.18 of Annex 5.

[19] In the band 12.5-12.7 GHz in Region 1, these limits are applicable only to the territory of administrations mentioned in Nos. **5.494** and **5.496**.

[20] See Resolution **34**.

~~less than –138 dB(W/(m^2 · 27 MHz))~~ [21] over the service area of a fixed-satellite service network ~~anywhere in the territory of an administration of~~ in Region 2 or Region 3 with overlapping frequency assignments, that administration shall be considered as not being affected.

With respect to § 4.2.3 *e)* of Article 4, where a proposed modification to the Region 2 Plan would result in not exceeding the ~~gives a~~ power flux-densities~~y~~ given below ~~of less than –160 dB (W/(m^2 · 4 kHz))~~[21] over the service area of its fixed-satellite service network ~~anywhere in the territory of an administration of~~ in Region 1 or 3 with overlapping frequency assignments, that administration shall be considered as not being affected.

–186.5 dB(W/(m^2 · 40 kHz))	for 0° ≤ θ < 0.054°
–164.0 + 17.74 log θ dB(W/(m^2 · 40 kHz))	for 0.054° ≤ θ < 2.0°
–165.0 + 1.66 θ² dB(W/(m^2 · 40 kHz))	for 2.0° ≤ θ < 3.59°
–157.5 + 25 log θ dB(W/(m^2 · 40 kHz))	for 3.59° ≤ θ < 10.57°
–131.9 dB(W/(m^2 · 40 kHz))	for 10.57° ≤ θ

where θ is:

– the difference in degrees between the longitudes of the broadcasting-satellite space station in Region 1 or 3 and the affected fixed-satellite space station in Region 2 or 3 taking into account the East West station keeping accuracies, *or*

– the difference in degrees between the longitudes of the broadcasting-satellite space station in Region 2 and the affected fixed-satellite space station in Region 1 or 3 taking into account the East West station keeping accuracies.

Reason: ITU-R studies determined this mask was appropriate for inter-regional protection of FSS networks from BSS networks utilizing receive antenna sizes between 60 cm and 11 m. The regulatory changes to the text is to align the Radio Regulations with how the Radiocommunication Bureau currently treats filings in these bands through Rules of Procedures.

USA/xx/5
MOD

7 Limits to the change in equivalent noise temperature to protect the fixed-satellite service (Earth-to-space) in Region 1 from modifications to the Region 2 Plan in the band 12.5-12.7 GHz

[21] ~~In place of these values, the values given in the Annex to Resolution **540 (WRC-2000)** shall be applied by administrations and the Bureau until this section is revised by a subsequent conference.~~

With respect to § 4.2.3 *e)* of Article 4, an administration of Region 1 shall be considered as being affected if the proposed modification to the Region 2 Plan would result in:

– the value of $\Delta T / T$ resulting from the proposed modification is greater than the value of $\Delta T / T$ resulting from the assignment in the Region 2 Plan as of the date of entry into force of the Final Acts of the 1985 Conference; *and*

– the value of $\Delta T / T$ resulting from the proposed modification exceeds ~~4~~6%,

using the method of Appendix **8** (Case II).

Reason: ITU-R studies determined that 6% provided adequate protection and are consistent with the agreed method used to derive other pfd levels in this Annex.

USA/xx/6
MOD

ANNEX 4 (WRC-2000)

Need for coordination of a transmitting space station in the fixed-satellite service or in the broadcasting-satellite service where this service is not subject to a Plan: in Region 2 (11.7-12.2 GHz) with respect to the ~~Regions 1 and 3~~the Plan, the List or proposed new or modified assignments in the List for Regions 1 and 3; in Region 1 (12.5-12.7 GHz) and in Region 3 (12.2-12.7 GHz) with respect to the ~~Region 2~~ Plan or proposed modifications to the Plan for Region 2; in Region 3 (12.2 – 12.5 GHz) with respect to the Plan, the List or proposed new or modified assignments in the List for Region 1

(See Article 7)

With respect to § 7.1 and 7.2 of Article 7, coordination of a space station in the fixed-satellite service of Region 2 is required with another administration when, under assumed free-space propagation conditions, the power flux-density ~~on the territory~~ over the service area of a space station in the broadcasting-satellite service of Regions 1 or 3 with~~the~~ overlapping frequency assignments ~~in the broadcasting-satellite service of an administration in Region 1 or Region 3~~ exceeds the value derived from the expressions given below.

–147 dB(W/(m^2 · 27 MHz)) for 0° ≤ θ < 0.23°

–135.7 + 17.74 log θ dB(W/(m^2 · 27 MHz))	for 0.23° ≤ θ < 2.0°
–136.7 + 1.66 θ² dB(W/(m^2 · 27 MHz))	for 2.0° ≤ θ < 3.59°
–129.2 + 25 log θ dB(W/(m^2 · 27 MHz))	for 3.59° ≤ θ < 10.57°
–103.6 dB(W/(m^2 · 27 MHz))	for 10.57° ≤ θ

where θ is:

– the difference in degrees between the longitude of the interfering fixed-satellite service space station in Region 2 and the longitude of the affected broadcasting-satellite service space station in Regions 1 and 3 taking into account the East West station keeping accuracies

With respect to § 7.1 and 7.2 of Article 7, coordination of a space station in the fixed-satellite service of Region 3 is required with another administration when, under assumed free-space propagation conditions, the power flux-density over the service area of a space station in the broadcasting-satellite service in Region 1 with overlapping frequency assignments exceeds the value derived from the expressions given below:

–147 dB(W/(m^2 · 27 MHz))	for 0° ≤ θ < 0.23°
–135.7 + 17.74 log θ dB(W/(m^2 · 27 MHz))	for 0.23° ≤ θ < 2.0°
–136.7 + 1.66 θ^2 dB(W/(m^2 · 27 MHz))	for 2.0° ≤ θ < 3.59°
–129.2 + 25 log θ dB(W/(m^2 · 27 MHz))	for 3.59° ≤ θ < 10.57°
–103.6 dB(W/(m^2 · 27 MHz))	for 10.57° ≤ θ

where θ is:

– the difference in degrees between the longitude of the interfering fixed-satellite service space station in Region 3 and the longitude of the affected broadcasting-satellite service space station in Region 1 taking into account the East West station keeping accuracies

With respect to § 7.1 and 7.2 of Article 7, coordination of a space station in the fixed-satellite service (space-to-Earth) in Region 1 or 3 or broadcasting-satellite service not subject to a Plan in Region 3 is required with another administration when, under assumed free-space propagation conditions, the power flux-density ~~on the territory~~ over the service area of a space station in the broadcasting-satellite service of Region 2 with~~of the~~ overlapping frequency assignments ~~in the broadcasting-satellite service of an administration in Region 2~~ exceeds the value derived from the ~~same~~ expressions given below:

~~–147 dB(W/(m^2 · 27 MHz))~~	~~for 0° ≤ θ < 0.44°~~
~~–138 + 25 log θ dB(W/(m^2 · 27 MHz))~~	~~for 0.44° ≤ θ < 19.1°~~
~~–106 dB(W/(m^2 · 27 MHz))~~	~~for θ ≥ 19.1°~~
–147 dB(W/(m^2 · 27 MHz))	for 0° ≤ θ < 0.23°
–135.7 + 17.74 log θ dB(W/(m^2 · 27 MHz))	for 0.23° ≤ θ < 1.8°
–134.0 + 0.89 θ² dB(W/(m^2 · 27 MHz))	for 1.8° ≤ θ < 5.0°

$-129.2 + 25 \log \theta$ dB(W/(m^2 · 27 MHz))	for	$5.0° \leq \theta < 10.57°$
-103.6 dB(W/(m^2 · 27 MHz))	for	$10.57° \leq \theta$

where θ is:

– ~~the difference in degrees between the longitude of the interfering fixed-satellite service space station in Region 2 and the longitude of the affected broadcasting-satellite service space station in Regions 1 and 3, *or*~~

– the difference in degrees between the longitude of the interfering fixed-satellite service space station in Region 1 or 3 or the interfering broadcasting-satellite service space station in Region 3 and the longitude of the affected broadcasting-satellite service space station in Region 2 taking into account the East West station keeping accuracies.

Reason: ITU-R studies determined that these power flux densities provide adequate protection to the BSS. The regulatory changes to the text is to align the Radio Regulations with how the Radiocommunication Bureau currently treats filings in these bands through Rules of Procedures.

USA/xxx/7

MOD

ANNEX 6[39]

Criteria for sharing between services

ADD

Part A Technical bases for the criteria for sharing between space services in Annexes 1 and 4 of this Appendix

The revised inter-Regional sharing criteria involving the fixed-satellite service and the broadcasting-satellite service in the bands governed by Appendix 30 are based on the following assumptions.

1 Reference antenna patterns

1.1 For earth station antennas in the fixed-satellite service or in the broadcasting-satellite service with diameters between 45 cm and 240 cm, the gain of the side lobes is given by [Recommendation ITU-R BO.1213].

1.2 For earth station antennas in the fixed-satellite service with diameters greater than 240 cm, the gain of the side lobes is given by Recommendation ITU-R S.580-5, with 29-25log θ side-lobe envelope, complemented in the main lobe by Annex III to Appendix 8, which is equivalent to Section 3 of Annex 3 to Appendix 7 (WRC-2000).

1.3 For the broadcasting-satellite service and fixed-satellite service earth stations an antenna efficiency of 65% was used at a freqeuncy of 11.7 GHz.

2 Antenna sizes and noise temperatures

The range of antenna sizes and associated noise temperatures considered for the protection of the fixed-satellite service and the broadcasting-satellite service are given in the following table:

[39] Sections 1 and 2 of Part B of this Annex are applicable when the services of Regions 1 or 3 are involved. Section 3 of Part B is applicable to all Regions.

Receive earth station antenna diameter (m)	0.45	0.60	0.80	1.20	2.4	5.0	8.0	11.0
Receive earth station noise temperature (K)	110	110	125	150	150	200	250	250
Total link noise temperature (K)	174	174	198	238	238	317	396	396

The total link noise temperature was calculated from the receive earth station noise temperature (which includes the antenna temperature, the receive amplifier temperature and the noise increase resulting from feeder losses), and adding 2 dB for all other sources of noise (uplink noise, GSO interference, cross polarization isolation and frequency reuse interference).

3 Protection Criteria

Pfd masks developed in Sections 3 and 6 of Annex 1 and in Annex 4 to Appendix 30 have been determined by specifying to 6% the allowable relative noise increase ($\Delta T/T$) into the range of earth station antennas given in the above table.

The allowable interfering pfd was calculated by the following expression:

$$PFD_{all}(\theta) = 10Log(\Delta T/T) + 10Log(kT\, b_{rf}) + G_m - G_a(\varphi)$$

where:

$PFD_{all}(\theta)$ = allowable level of interfering PFD for an orbital separation of θ degrees

$\Delta T/T$ = allowable relative increase in receiver link noise = 6%

k = Boltzmann's constant (1.38×10^{-23} Watt·sec/°K)

T = Receive link noise temperature (see the above Table)

b_{rf} = Reference bandwidth (27 MHz in Regions 1 and 3; 24 MHz in Region 2)

G_m = Gain of a 1 m^2 effective aperture

$G_a(\varphi)$ = Receive antenna gain for topocentric angle of φ degrees ($\varphi = 1.1\ \theta$) using the reference antennas defined in Section 1

4 Power flux-density for FSS and BSS with specific antenna diameters

The table below contains power flux-density levels derived for FSS and BSS earth stations with specific antenna diamaters assuming the characteristics defined in Sections 1,2 and 3 above. These levels were used to develop the pfd masks in Sections 3 and 6 of Annex 1 and in Annex 4 of Appendix 30 by taking the envelope of the individual pfd masks for the relevant antenna sizes.

Power flux-density (pfd) in dB (W/m^2/27 MHz) corresponding to different antenna diameters								
Orbital separation between wanted and interfering space stations	**45 cm**	**60 cm**	**80 cm**	**120 cm**	**240 cm**	**500 cm**	**800 cm**	**1 100 cm**
0°	–134.2	–136.7	–138.7	–142.2	–147.4	–152.5	–155.6	–158.2
θ>0	For any value of the orbital separation θ between the wanted and interfering space stations, the applicable pfd should be relaxed from the value corresponding to 0° orbital separation by adding the off-axis antenna discrimination, as calculated under the assumptions in Section 1 above.							

Reasons: The proposed revisions to the sharing criteria in Sections 3 and 6 of Annex 1 and in Annex 4 to Appendix 30 are based on assumptions on antenna patterns, transmission characteristics (antenna sizes and associated noise temperatures) and protection criteria that should be explained in this Annex.

USA/xx/8

ADD

Part B Sharing criteria used in establishing the WARC–77 Plan

USA/xx/9

NOC

Sections 1 to 3 of Annex 6

Reasons: These sections are maintained for historical purposes since they explain the sharing criteria which were used in establishing the original WARC-77 Plan.

USA/xx/10
ADD
Editorial note: the text provided should be added to the end of Section 3.4

ANNEX 5

Technical data used in establishing the provisions and associated Plans and the Regions 1 and 3 List, which should be used for their application[22] (WRC-200~~0~~3)

3.4 Protection ratio between television signals

In Region 2, the following protection ratios have been adopted for the purpose of calculating the overall equivalent protection margin[1]:

28 dB for co-channel signals;

13.6 dB for adjacent-channel signals;

–9.9 dB for second adjacent-channel signals.

In Region 2, as a guide for planning, the reduction in the overall *C/I* ratio due to co-channel interference in the feeder link is taken as equivalent to a degradation in the down-link co-channel *C/I* ratio of approximately 0.5 dB not exceeded for 99% of the worst month, but the feeder-link and downlink Plans are evaluated on the basis of the overall equivalent protection margin, which includes the combined downlink and feeder-link contributions.

In Region 2, an overall equivalent protection margin of 0 dB, or greater, indicates that the individual protection ratios have been met for the co-channel, the adjacent channels and the second adjacent channels.

[1] The definitions in §§ 1.7, 1.8, 1.9, 1.10 and 1.11 of the Annex apply to these calculations.

USA/xx/10
MOD

3.9.4 The guardbands at both the lower and upper edges may be used ~~for transmission in the space operation service~~ to provide space operations functions in accordance with No. 1.23 in support of thte operation of geostationary-satellite networks in the broadcasting-satellite service.

[22] In revising this Annex at WRC-97 and at WRC-2000, no changes have been made to the technical data applicable to the Region 2 Plan. However, for all three Regions, it should be noted that some of the parameters of networks proposed as modifications to the Region 2 Plan and the Regions 1 and 3 List may differ from the technical data presented herein. (WRC-2000)

[1] The definitions in §§ 1.7, 1.8, 1.9, 1.10 and 1.11 of the Annex apply to these calculations.

USA/xx/11
NOC

ANNEX 7 (WRC-2000)

Orbital position limitations

Reason: The ITU-R studies lead to the conclusion that the proposed changes to the sharing criteria did not warrant changing the §A3 limitations.

APPENDIX 30A

ANNEX 1

Limits for determining whether a service of an administration is considered to be affected by a proposed modification to the Region 2 feeder-link Plan or by a proposed new or modified assignment in the Regions 1 and 3 feeder-link Lists or when it is necessary under this Appendix to seek the agreement of any other administration **(WRC-2000)**

USA/xx/12

NOC

3 Limits to the change in the overall equivalent protection margin with respect to frequency assignments in conformity with the Region 2 feeder-link Plan[18] (WRC-2000)

Reason: There was a consensus among Region 2 administrations participating in the ITU-R studies, that the current OEPM degradation limit was appropriate and should be maintained.

[18] With respect to § 3 the limit specified relates to the overall equivalent protection margin calculated in accordance with § 1.12 of Annex 3.

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Doc. WAC/143(05.09.02)

Draft Proposal for Resolution 136 (WRC-2000)

WRC-03 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;

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.

Proposal:

USA/1.29(136)/1
MOD

RESOLUTION 136 (~~WRC-2000~~REV WRC-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;

instructs the Director of the BR

~~2~~ to report the results of these studies to WRC-~~03~~06.

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

III. Informal Working Group 4: Fixed Service/Fixed-Satellite Service Sharing

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Doc. WAC/144(05.09.02)

WRC-03 Agenda Item 1.13: to consider regulatory provisions and possible identification of existing frequency allocations for services which may be used by high altitude platform stations, taking into account No. **5.543A** and the results of the ITU-R studies conducted in accordance with Resolutions **122 (Rev.WRC-2000)** and **734 (WRC-2000)**;

Background: At WRC-97, the bands 47.2-47.5 GHz and 47.9-48.2 GHz (which were already allocated for the fixed service) were designated within the fixed service for High-Altitude Radio-Relay Platform Stations (HAPS). WRC-2000 confirmed this designation and under Resolution **122 (Rev.WRC-2000)** requested that studies continue on regulatory and sharing issues in these bands. While this designation does not limit the use of a band by types of services for which it is already allocated, it does give guidance to administrations wishing to implement specific service types.

WRC-2000, through Resolution **122**, requested that the ITU-R conduct studies, taking into account the requirements of other Fixed Service systems and other services, on the feasibility of identifying suitable frequencies for the use of HAPS in the Fixed Service in the range 18 – 32 GHz in Region 3. These studies were requested by several Region 3 countries specifically because the previously identified 47 GHz band is highly susceptible to rain attenuation, and therefore a suitable 2x300 MHz identification in a lower band was needed for HAPS in those countries. The studies are to focus particularly, but not exclusively, on the bands 27.5 – 28.35 GHz and 31.0 – 31.3 GHz. In addition, country footnote **5.537A** was adopted to permit the use of HAPS (HAPS-to-ground) in the fixed service allocation in the band 27.5-28.35 GHz on a non-interference, non-protected basis in certain Region 3 countries and one Region 1 country. This band, by country footnote **5.543A**, was paired with the 31-31.3 GHz band for use by HAPS (ground-to-HAPS), also on a non-interference, non-protected basis. Additionally, use of the 31 – 31.3 GHz band is subject to not causing harmful interference to EESS (passive) and RAS services operating in the 31.3-31.8 GHz band. The footnote urged the identified administrations to utilize only the 31.0-31.15 GHz band until studies were completed.

<u>47 GHz Band</u>

With regard to the bands 47.2-47.5 GHz and 47.9-48.2 GHz, Resolution **122 (Rev. WRC-2000)** indicated that sharing studies remain to be completed between the fixed-satellite service (FSS) and HAPS operations in the fixed service (FS). Pending the completion of studies, Resolution **122** instructs the Radiocommunication Bureau "that from 22 November 1997, and pending review of the sharing studies in considering h) and review of the notification process by WRC-99, the Bureau shall accept notices in the bands 47.2-47.5 GHz and 47.9-48.2 GHz only for high altitude platform stations in the fixed service and for feeder links for the broadcasting-satellite service, shall continue to process notices for fixed-satellite service networks (except for feeder links for the broadcasting-satellite service) for which complete information for advance publication has been received prior to

27 October 1997, and shall inform the notifying administrations accordingly." In other words, notices received after 22 November, 1997 from non-BSS feeder link FSS networks in the 47.2-47.5 GHz and 47.9-48.2 GHz bands have not been accepted.

The studies in this band have been completed and the results are contained in Recommendation ITU-R SF.1481. With the exception of interference to and from FSS spacecraft, and border area coordination matters in the FS, the deployment of HAPS is a national issue. The issue of interference between the FSS satellite and HAPS networks – in particular, if HAPS networks in this band are not used to provide ubiquitous service and if FSS earth stations utilize antennas with diameters of at least 2.4 m or other types of antennas with similar performance – can be addressed through coordination using Articles 9 and 11 of the Radio Regulations. As a result, all portions of Resolution 122 dealing with the 47 GHz band can be suppressed, provided that reference to the use of Article 9 for HAPS is included in the Radio Regulations.

27 and 31 GHz Bands

To date, all sharing studies in the 18-32 GHz range under Resolution 122 within the ITU-R have focused exclusively on the bands 27.5-28.35 GHz and 31.0-31.3 GHz.

No. **5.543A** of the Radio Regulations provides that the allocation to the fixed service in the band 31.0-31.3 GHz may also be used by HAPS in the ground-to-HAPS direction in certain countries. In such cases, HAPS uplinks in the band 31.0-31.3 GHz shall not cause harmful interference to, nor claim protection from, other fixed-service systems or other co-primary services, as indicated in No. **5.543A**. In addition, the use of HAPS in the band 31.0-31.3 GHz shall not cause harmful interference to the passive services having a primary allocation in the band 31.3-31.8 GHz. The ITU-R has not yet developed Recommendations regarding the compatibility between HAPS and the EESS (passive) and RAS.

No. **5.537A** of the Radio Regulations provides that the allocation to the fixed service in the band 27.5-28.35 GHz may also be used by HAPS in certain countries listed in No. **5.537A**. The use of the fixed service allocation at 27.5-28.35 GHz by HAPS is limited to operation in the HAPS-to-ground direction and shall not cause harmful interference to, nor claim protection from, other types of fixed-service systems or other co-primary services. The ITU-R has adopted a new Recommendation [Doc. 4/89-9/148] containing a methodology for evaluating interference from HAPS-to-ground transmissions to FSS earth-to-space transmissions, however specific protection criteria have not yet been agreed.

The same concerns expressed at WRC-00 by many Administrations, including the U.S., with respect to identifying HAPS use in the fixed service in the 18 – 32 GHz band are still valid today. Internationally the FSS is allocated on a global basis in the 17.7 – 21.2 GHz and 27.5 – 31.0 GHz bands and the FSS community has invested large amounts of resources and time in the development of global FSS systems that operate or are planned to operate in these bands. The FSS community remains very concerned about their ability to deploy already planned global FSS satellite systems in these bands without hindrance from HAPS deployment in the same bands. Additionally, there is concern regarding compatibility of HAPS with existing global FSS systems that operate in these bands. Given that the original intent of these studies was to find a suitable alternative to the 2x300 MHz of spectrum identified for FS HAPS at 47 GHz in Region 3, and the fact that the 27.5-28.35

GHz range is the only range that has been considered for the HAPS-to-ground direction for this alternative, narrowing the frequency range of consideration for potential HAPS services to a specific and common 300 MHz band within the 27.5-28.35 GHz range in all of the countries listed in No. **5.537A** would help to ease the concerns of the FSS in this regard and would bring any final allocation decision in line with the original intent of WRC-2000. Identification of a specific and common 300 MHz band within this frequency range would also facilitate the design and implementation of HAPS systems in this band.

The EESS (passive) and RAS service communities are also very concerned about the possibility of interference from HAPS FS stations in the 31–31.3 GHz band, which is adjacent to the 31.3-31.5 GHz passive band allocated on a primary basis to the Earth exploration-satellite (passive) and space research (passive) services for passive remote sensing of the Earth. This passive sensing band is of vital importance in Earth observation and weather forecasting because it is the reference band used in conjunction with the unique oxygen absorption bands from 50.2–59.3 GHz. Unwanted interference in this band from out-of-band emissions from HAPS would be particularly harmful to the remote sensing use of the band. The 31.3-31.8 GHz band is also allocated to the RAS on a primary basis, and is extensively used, e.g. for studies of the Cosmic Microwave Background.

For the case of HAPS compatibility with passive services (both passive sensing and radio astronomy service), studies have indicated that certain types of HAPS systems may be compatible with these passive services. HAPS uplinks may have to operate with certain constraints in order to limit unwanted emissions; however, experimental hardware has been developed to demonstrate the feasibility of such operation. The results of these studies leading to compatible operation between HAPS and passive services should be incorporated in an ITU-R Recommendation(s).

Proposal:

USA/1.13/1

MOD

5.537A In Bhutan, Indonesia, Iran (Islamic Republic of), Japan, Maldives, Mongolia, Myanmar, Pakistan, the Dem. People's Rep. of Korea, Sri Lanka, Thailand and Viet Nam, the allocation to the fixed service in the band 27.5-28.35 GHz may also be used by high altitude platform stations (HAPS). The use of HAPS within the band 27.5-28.35 GHz ~~by HAPS~~ is limited within the territory of each Administration to a single 300 MHz sub-band. Such use of 300 MHz of the FS allocation by HAPS in the above countries is further limited to operation in the HAPS-to-ground direction and shall not cause harmful interference to, nor claim protection from, other types of fixed-service systems or other co-primary services. See Resolution **HAPS 28-31 (WRC-03)**. (WRC-2003~~0~~)

Reason: The identification of 300 MHz of spectrum within the band 27.5-28.35 GHz, along with the 300 MHz at 31-31.3 GHz, is intended to be an alternative for the 2x300 MHz that is problematic in the specified countries due to excessive rain attenuation at 47 GHz. This proposal implements that intent by limiting use of HAPS in the named Administrations to 300 MHz within the identified 850 MHz frequency range identified at WRC-2000. The second 300 MHz band is

found at 31-31.3 GHz (see proposal **USA/1.13/2** below). This proposal also incorporates the provisions of new Resolution **HAPS 28-31 (WRC-03)** into the Radio Regulations.

USA/1.13/2

MOD

5.543A In Bhutan, Indonesia, Iran (Islamic Republic of), Japan, Maldives, Mongolia, Myanmar, Pakistan, the Dem. People's Rep. of Korea, Sri Lanka, Thailand and Viet Nam, the allocation to the fixed service in the band 31-31.3 GHz may also be used by high altitude platform stations (HAPS) in the ground-to-HAPS direction. The use of the band 31-31.3 GHz by systems using HAPS shall not cause harmful interference to, nor claim protection from, other types of fixed-service systems or other co-primary services, taking into account No. **5.545**. The use of HAPS in the band 31-31.3 GHz shall not cause harmful interference to the passive services having a primary allocation in the band 31.3-31.8 GHz, taking into account the interference criteria given in Recommendations ITU-R SA.1029 and ITU-R RA.769~~. The administrations of the countries listed above are urged to limit the deployment of HAPS in the band 31-31.3 GHz to the lower half of this band (31-31.15 GHz) until WRC-03.~~ See Resolution **HAPS 28-31 (WRC-03)**. (WRC-2003~~0~~)

Reason: ITU-R studies conducted to date have demonstrated that certain HAPS system designs, operating with certain constraints, could operate on a non-interference basis and appropriately protect other systems and services. In addition, these studies have shown that HAPS can operate without the need for claiming protection. Given that HAPS applications in the FS and the adjacent services are of different status and operate in different bands, the results of studies should remain within the ITU-R and not result in specific limits within No. **5.543A**. There is, however, a need to modify No. **5.543A** to incorporate new Resolution **HAPS 28-31 (WRC-03)** into the Radio Regulations.

USA/1.13/3

SUP

~~RESOLUTION 122 (Rev.WRC-2000)~~

~~Use of the bands 47.2-47.5 GHz and 47.9-48.2 GHz by high altitude platform stations (HAPS) in the fixed service and by other services and the potential use of bands in the range 18-32 GHz by HAPS in the fixed service~~

Reason: Studies called for in relation to HAPS at 47 GHz have been completed. The Resolution 122 application of the provisions of Article 9 is proposed for incorporation into the Radio Regulations (see **USA/1.13/5** below). All Resolution 122 issues relating to HAPS operation in the 18-32 GHz range would be addressed in a new WRC Resolution (see **USA/1.13/7** below).

USA/1.13/4

MOD

5.552A The allocation to the fixed service in the bands 47.2-47.5 GHz and 47.9-48.2 GHz is designated for use by high altitude platform stations. The use of the bands 47.2-47.5 GHz and 47.9-48.2 GHz by high altitude platforms in the fixed service is subject to the provisions of Nos. **9.15**, ~~and~~ **9.16**, and **9.22** of the Radio Regulations. ~~Resolution **122 (WRC-97)**.~~ See Resolution **HAPS 28-31 (WRC-03)**.

Reason: Consequential to the SUP of Resolution 122. While studies have been completed, HAPS systems still need to be subject to the provisions of Article 9 to ensure coordination with the FSS at 47 GHz. The reference to Resolution **HAPS 28-31** reflects the intent of WRC-2000 that the identification of 2 x 300 MHz of FS spectrum at 27.5-28.35 GHz and 31-31.3 GHz in certain countries is intended as an alternative for the HAPS designation at 47 GHz which is problematic in those countries due to excessive rain attenuation. Nos. **9.15** and **9.16**, which apply to coordinations regarding non-GSO FSS earth stations and terrestrial stations (including HAPS) need to be called out specifically in Article **5** in order to be applicable. Nos. **9.17** and **9.18**, which apply to the same cases for all but non-GSO FSS earth stations, are currently applicable without having to be called out in the Radio Regulations. No. **9.22** is a new provision (see **USA/1.13/5** below) that is intended to address the previously unaddressed coordination case of HAPS ground-based stations appearing in the coverage area of a satellite network.

USA/1.13/5

MOD

9.22 ~~Not used.~~ *q)* for a transmitting station which is part of a high altitude platform station network in a terrestrial service, for which the requirement to coordinate is included in a footnote to the Table of Frequency Allocations referring to this provision, in respect of a satellite network or system having overlapping service areas with the high altitude platform station network and for which the coordination or notification information, as appropriate, for the satellite network or system was received by the Bureau prior to the date on which notice relating to assignments of the HAPS network was received by the Bureau.

Reason: Addresses a coordination scenario (for HAPS terrestrial stations appearing in the coverage area of a satellite network) that is not currently addressed.

USA/1.13/6

MOD

[9] **9.5B.1** The only terrestrial stations to be taken into account are those for which the requirement to coordinate is under Nos. **9.11**, **9.11A**, ~~and~~ **9.21**, and **9.22**.

Reason: Consequential to the addition of No. **9.22** (see **USA/1.13/5** above).

USA/1.13/7

ADD

RESOLUTION HAPS 28-31 (WRC-03)

Potential use of 300 MHz of spectrum within the band 27.5-28.35 GHz and 300 MHz of spectrum at 31.0-31.3 GHz by high altitude platform stations (HAPS) in the fixed service

The World Radiocommunication Conference (Geneva, 2003),

considering

a) that WRC-97 made provision for operation of HAPS, also known as stratospheric repeaters, within a 2x300 MHz portion of the fixed service allocation in the bands 47.2-47.5 GHz and 47.9-48.2 GHz;

b) that WRC-97 adopted No. **4.15A** specifying that transmissions to or from high altitude platform stations shall be limited to bands specifically identified in Article **5**;

c) that at WRC-00, several countries in Region 3 and one country in Region 1 expressed a need for an alternative band pairing for HAPS in a lower frequency range due to the excessive rain attenuation that occurs at 47 GHz in these countries;

d) that, in order to accommodate the need expressed by the countries referred to in *considering c),* WRC-03 adopted Nos. **5.537A** and **5.543A** to permit the use of HAPS in the fixed service within 300 MHz of spectrum in the band 27.5-28.35 GHz and/or in the band 31.0-31.3 GHz in certain Region 3 countries and in one Region 1 country on a non-interference, non-protection basis;

e) that the bands 27.5-28.35 GHz and 31.0-31.3 GHz are already heavily used or planned to be used by a number of different services and a number of other types of applications in the fixed service;

f) that the 31.3-31.8 GHz band is allocated to the radio astronomy, Earth exploration-satellite (passive) and space research (passive) services, and the 31.8-32.3 GHz band is allocated to the space research (deep space) service, and that there is a need to appropriately protect these services from unwanted emissions, taking into account No. **S5.340** and the interference criteria given in Recommendations ITU-R SA.1029 and ITU-R RA.769,

g) that technical, sharing and regulatory issues should continue to be studied in order to determine appropriate criteria for the operation of HAPS on a non-interference, non-protection basis in or within the bands referred to in *considering d)* above;

h) that pending the completion of studies, it may be appropriate for administrations that wish to consider deployment of HAPS systems in the fixed service within 300 MHz of spectrum at 27.5-28.35 GHz and/or in 300 MHz of spectrum at 31-31.3 GHz to have some provisional means by

which to authorize such use of HAPS in their territories without being in derogation of the Radio Regulations,

resolves

1 "to invite WRC-06 to review the results of the studies specified below with a view to considering appropriate revisions of the regulations affecting high altitude platform systems, within 300 MHz. of spectrum within the bands 27.5-28.35 GHz and/or 300 MHz of spectrum at 31.0-31.3 GHz

2 that pending the completion of the studies specified in *requests ITU-R* 1 below, and notwithstanding the applicability of No. **4.15A** of the Radio Regulations, the use by HAPS stations of 300 MHz of the fixed service allocation within the band 27.5-28.35 GHz and/or in the 31-31.3 GHz band, within the territory of any Administration that so desires but that is not listed in Nos. **5.537A** and **5.543A**, is permissible under No. **4.4** of the Radio Regulations;[2]

3 that any use by HAPS of the fixed service allocation at 27.5-28.35 GHz pursuant to *resolves 2* above shall be limited to operation in the HAPS-to-ground direction, and that any use by HAPS of the fixed service allocation at 31-31.3 GHz pursuant to *resolves 2* above shall be limited to operation in the ground-to-HAPS direction,

requests ITU-R

1 to continue to conduct studies, as a matter of urgency, and taking into account the requirements of other fixed-service systems and other services, on the feasibility of identifying a suitable and common 300 MHz segment of the band 27.5-28.35 GHz, in addition to the 300 MHz band at 31-31.3 GHz, as an alternative to the 2x300 MHz paired band at 47 GHz, for the use by HAPS in the countries listed in Nos. **5.537A** and **5.543A**;

2 to incorporate in an ITU-R Recommendation(s) technical sharing criteria or HAPS system design constraints that are necessary to ensure that HAPS applications in the fixed service are able to be operated successfully on a non-interference, non-protection basis with other fixed service systems and with stations, systems, and networks of co-primary services.

invites

Administrations planning to implement HAPS systems within the band 27.5-28.35 GHz and/or in the band 31.0-31.3 GHz, whether in countries listed in Nos. **5.537A** and **5.543A** or not, to advise the Radiocommunication Bureau as soon as practicable of their intention to do so and of what specific frequencies (up to 300 MHz each within the 27.5-28.35 GHz and 31-31.3 GHz bands) are intended to be used for such systems;

[2] See Annex for minority view on this *resolves*

requests the Radiocommunication Bureau

to publish within 90 days after the end of WRC-03 a list of administrations who have so advised, and thereafter to publish within 90 days updates containing the names of administrations who advise subsequently.

Reason: ITU-R studies conducted to date have demonstrated that certain HAPS system designs, operating with certain constraints, could operate on a non-interference basis in the bands identified by WRC-00 and appropriately protect other systems and services. Appropriate interference allowances would have to be developed and agreed within the ITU-R for such cases. In addition, these studies have shown that HAPS can operate without the need for claiming protection. The technical details and constraints of such systems would need to be incorporated in ITU-R Recommendations(s) to ensure that other systems and services are protected. Pending completion of the studies, it would be acceptable to suspend the operation of No. **4.15A**, thereby allowing provisional operation of HAPS on a non-interference basis under No. **4.4** of the Radio Regulations, in 300 MHz of the 27.5-28.35 GHz band and/or in the 31-31.3 GHz band. The Bureau would maintain and publish a list (to be updated periodically) of countries where HAPS systems are planned for implementation, and the precise frequencies to be used. Finally, a specific 300 MHz portion of the 27.5-28.35 GHz band needs to be identified for pairing with 31.0-31.3 GHz.

Annex

Minority view for "*resolves* 2"

2 that pending the completion of the studies specified in *requests ITU-R* 1 below, No. **4.15A** of the Radio Regulations shall be provisionally suspended in 300 MHz of the fixed service allocation within the band 27.5-28.35 GHz and/or in the 31-31.3 GHz band within the territory of any Administration that so desires, provided that a HAPS station, when using an assignment in these bands, shall not cause harmful interference to, nor claim protection from, other types of fixed-service systems or other co-primary services;

This wording requires consequential changes to the **Reason** for Resolution 28-31 (WRC-03)

Reason: ITU-R studies conducted to date have demonstrated that certain HAPS system designs, operating with certain constraints, could operate on a non-interference basis in the bands 27 and 31 GHz bands identified by WRC-00, and can appropriately protect other systems and services from harmful interference. These studies have also shown that HAPS can operate without the need to claim protection from other systems and co-primary services. Provisional suspension of No. **4.15A**, would allow other countries to authorize HAPS operations within their territories on a non-interference basis in 300 MHz of the 27.5-28.35 GHz band and/or the 31-31.3 GHz band. The ITU Radiocommunication Bureau would maintain and publish a list (to be updated periodically) of countries where HAPS systems are planned for implementation, their frequencies and operational characteristics.

SkyTower Comments and Rationale in Support of the Minority View

The Sky Tower version of the US proposal for agenda item 1.13 (HAPS) differs from the majority proposal in only one respect: the regulatory status to be accorded HAPS in additional countries after WRC-03. Identical to the majority version, it proposes that HAPS operation in additional countries be subject to the same prohibition against causing harmful interference, and against claiming protection from interference from fixed service systems, and other primary services, that applies to the countries now named in the existing footnote Radio Regulations. In contrast, the majority proposal would permit new countries to operate HAPS systems only in "derogation" of the Radio Regulations under Article 4.4 That is a stultifying, handicapping, anti-competitive, difference which is harmful to the development of HAPS systems.

No service that has an allocation in the Table of Frequency Allocations looks forward to the prospect of having to share its allocation with other users. But sharing with new users that have either demonstrated that sharing is feasible, or who are obliged to operate in a band under the conditions that no harmful interference shall be caused, and that no protection from interference shall be claimed, is the only way that new services can come in to operation.

The concerns of existing services over the possibility of interference from a new user of their band are real and justified. But the essential question that must be answered by the allocating authorities -- international and domestic – is whether the reasons advanced by the incumbent service or services are real, justified, and reasonable. Do the objections have technical and regulatory merit, or are they simply negative NIMBY reactions to sharing with a new service, or are they the consequence of anti-competitive motivations?

SkyTower is in complete and total agreement with the "majority view" that HAPS operations should not cause harmful interference to nor claim protection from interference from other FS systems or other services sharing the band. Within the IWG 4, all parties have agreed that HAPS operations within 300 MHz of the band 27.5-28.35 GHz is acceptable under these conditions and the difference between the participants is in the regulatory status to be accorded HAPS in additional countries under the modified Radio Regulations.

During the months of deliberations of IWG-4, consensus was reached among all participants on the fundamental aspects of a US Proposal for HAPS: countries in addition to those now named in the existing footnote Regulations could authorize HAPS in 300 MHz out of the 850 MHz bandwidth of the 27.5-28.35 GHz band; and a specific, common 300 MHz would eventually be designated.

However, to achieve that consensus SkyTower was forced to make many costly concessions, including:

- redesign of its 850 MHz system to be able to operate within 300 MHz: this was a major and costly concession as it involved the introduction of multiple spot beams for frequency re-use and the consequent costly weight and power limitations;
-
- agreeing to restrictive limitations on both aggregate and single entry pfd at the orbit;
-
- giving assurances to FS interests within the US that any domestic use would be through appropriate arrangements with them, recognizing their rights to the spectrum and notwithstanding that the likelihood of interference from the HAPS stations to FS stations is small,
-
- agreeing to accept any interference into its system and to design it accordingly, and
-
- agreeing to the removal of the advantage given to HAPS at 47 GHz by WRC 97 so that the BR would be able to accept filings from the FSS after WRC 03.

All of these were major concessions on the part of SkyTower, since they had not been incorporated in the already advanced design stages of the system. In exchange for these concessions, all parties agreed to the suspension of Radio Regulation 4.15A in the relevant bands. Initially this suspension was to be stated within footnotes 5.537A and 543A. However, because of several last minute difficulties with introducing technical constraints (i.e. PFD limits) in RR footnotes (which would have implied a specific definition of the term “harmful interference), and especially because these constraints had not been the result of ITU-R studies, it was decided not to modify the footnotes but rather to include the proposals for use by additional countries in a modification of existing ITU

Resolution 28-31. In so doing, SkyTower expected, and was led to believe, that the elements that had been proposed for inclusion in 5.537A would be incorporated in the modified Resolution.

<u>The development of HAPS in additional countries would be seriously handicapped if required to operate under Radio Regulation 4.4</u>

The current majority wording would throw HAPS back to operation under Article 4.4 of the Regulations. Article 4.4 status is no status at all. It makes all such operations pariahs outside all of the other Regulations. Even the word used in that Regulation make operation under 4.4 an outcast: such stations may operate "*in derogation"* of the Table of Frequency Allocations" etc., etc. But what comes after the etc. , etc., is exactly the same protection to services sharing the bands with HAPS that are contained in SkyTower's *resolves 2*

But the difference between status that mandates protection to other services, and a no-status status, is crucial to prospective investors, operators, and customers. If SkyTower is to have a chance to interest investors, and to sell its goods and services to operators and customers around the world – and to create jobs for American, revenue from overseas to American companies, and taxes to the US Treasury --, it must be given the minimal recognition implied by status as an "essentially secondary" operation.

IV. Informal Working Group 7: Regulatory Issues and Future Agendas

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Doc. WAC/145(05.09.02)

WRC-03 Agenda Item 1.30e: 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

Even where agreement between concerned administrations is reached, the existing Radio Regulations have no provisions that allow for the notification of typical earth stations in the fixed satellite service (FSS) and typical stations in the fixed (FS) service for bands allocated above 100 MHz with equal rights to the FSS and the FS services.

Both these services are implementing large numbers of stations under single authorizations and they would both benefit from regulations that would facilitate the introduction of such stations through the elimination of the need for specific site coordination and notification of every station in such a group.

Fixed-Satellite Service Stations

A large number of Fixed Satellite Service (FSS) earth stations are frequently authorized by an administration as a group under a single license. Such authorizations may encompass hundreds or even thousands of such stations to be used in the area of a particular administration. Under the current Radio Regulations, to be recorded in the International Frequency List, each and every one of these stations would require individual site notification in bands where the FSS is co-primary with the FS. Such a situation would be triggered under No. 9.17, in relation to 9.6 and 9.27 (ref. to Appendix 5).

No. 9.17 states inter alia; that coordination is required:

"for any specific earth station or typical mobile earth station in frequency bands above 100 MHz allocated with equal rights to space and terrestrial services in the territory of another country, with the exception of the coordination under 9.15."

Coordination under this regulation for a large group of FSS earth stations would be a long and cumbersome process, as it would require coordination to be carried out on a site-by-site basis. Under the current regulations, if such coordination were not carried out:

- Receiving FSS earth stations would not be protected from harmful interference from terrestrial stations or earth stations operating in the opposite direction of transmissions;
- Transmitting FSS earth stations would have to take steps to eliminate harmful interference caused to existing and future terrestrial stations, or earth stations operating in the opposite direction of transmission;
- FSS receive/transmit earth stations would not be required to coordinate if their coordination area does not overlap with the territory of another country.

Fixed Service Stations

A large group of fixed stations can similarly be authorized as a group under a single license in bands shared with space services. These stations may be low density or high density systems, or a hybrid of low density and high density configurations. Such fixed systems may be implemented under a geographic area authorization within which the operator is permitted to manage interference margins and deploy links with minimal coordination requirements. In addition, operators may be authorized to add, remove or relocate facilities within the geographic area without prior authorization. Maintaining this minimal requirement for coordination is critical to allow the operator the necessary flexibility to meet the ever changing user needs characteristic of these high density networks which are premises located. These types of fixed service networks have characteristics similar to temporary fixed and mobile uses. Recommendation ITU-R F.1498 states that in service areas where there is dense deployment of fixed service stations, coordination with and by fixed satellite service earth stations should be carried out on an area basis rather than a station to station basis. Such system deployments can undergo substantial deployment changes, even in short periods of time due to additional network link deployments, their shut down, or movement during day-to-day operations. Accordingly, these systems are substantially similar to area-wide mobile service systems when subjected to coordination requirements, especially if those coordination requirements include coordinating with other services whose systems require multi-year deployment planning.

Under the current Radio Regulations, each and every fixed station would require individual site coordination with Earth stations in bands where the FSS is co-primary with the FS. Such a situation would be triggered under RR 9.18 which states that coordination is required for any transmitting station of a service, in the bands referred to in No. 9.17, within the coordination area of an Earth station. RR 11.17 states "Frequency assignments relating to a number of stations or earth stations may be notified in the form of characteristics of a typical station or typical earth station and the intended geographical area of operation. Except for mobile earth stations, individual notices of frequency assignments are however necessary in the following cases:". One of the cases listed is RR 11.20, terrestrial stations within the coordination area of an Earth station.

This case would require typical fixed stations which may have been in operation for many years to now be notified with specific site characteristics and for the operator to project what changes and additions may occur, either within three months under RR 9.52, if the administration does not agree to the request for coordination or three years under RR 9.52B, if there is an agreement on coordination.

This is a difficult and onerous requirement that should be addressed through modifications in the Radio Regulations for the particular bands where there is the deployment of a high density of Fixed Service stations.

Approaches to Regulation of Groups of FS/FSS Stations

Below are descriptions of concepts on how to facilitate the coordination of FSS earth stations and FS stations that have similar technical characteristics, and are authorized in large groups under a single license.

There are several approaches that could be used, some of which were identified in WP 4-9S CPM text for agenda 1.30. These are described below:

A. No change to the Radio Regulations

This method would keep the current relation of sharing between FSS and terrestrial services, allowing to take due account of the actual and expected (within the next 3 years) terrestrial deployment and of the geographical situation. However, applying the procedure for specific earth stations to a large group of FSS earth stations would be a long process.

It was noted that this long process could be alleviated at the coordination stage, by the use of any new or existing methodology in bilateral discussions between the administrations concerned. This methodology could be made available through an ITU-R Recommendation. This methodology would rely on the availability of a database where terrestrial stations and earth stations would be recorded. This database, to serve its purpose, would need to contain accurate updated information. Moreover, its availability for neighboring countries would need to be ensured.

The usefulness of this approach is highly dependent on availability of the referenced new methods and an accurate database.

B. Changes affecting the coordination and notification of Typical Stations

Typical Earth Stations

This approach would entail modification of the Radio Regulations to provide for typical FSS earth stations in specific frequency bands through regulations which provide for the coordination and notification of such stations as a consequence of agreements between administrations concerned. On this basis, the coordination area around these types of earth stations would be incorporated into Appendix 7.

This would address the need to provide protection to FSS earth stations deployed in large groups, and avoid the situation where such stations would have to be coordinated and/or notified as specific earth stations or operate on a "non-interference" or "non-protected" basis.

Typical Fixed Stations

A similar modification of the Radio Regulations could be made to provide for typical fixed stations to be notified within a specific geographic area and within certain frequency bands without the further requirement for specific site notification and coordination when there is a future request for coordination with an FSS Earth station, where the frequency bands of the Earth Station and the terrestrial station overlap and the coordination area of the Earth station covers the territory of another administration.

Such regulations would address the need to avoid the situation where such stations would have to be coordinated and/or notified as specific stations or operate on a "non-interference" or "non-protected" basis.

Proposals

USA/1.30/TES-1

MOD 9.17 *l)* for any specific earth station or typical mobile earth station in frequency bands above 100 MHz allocated with equal rights to space and terrestrial services, in respect of terrestrial stations, where the coordination area of the earth station includes the territory of another country, with the exception of the coordination under No. **9.15**. In the following specific frequency bands allocated to the fixed and fixed-satellite services: 17.7-18.8 GHz (space-to-Earth), 27.5-28.6 GHz (Earth-to-space), and 37.5-42.5 GHz (space-to-Earth), typical earth stations in the fixed-satellite service may also be coordinated under this provision with stations of the fixed service based on agreements between the concerned administrations, and the agreements notified to the Radiocommunication Bureau.

USA/1.30/TES-2

MOD 9.17A *m)* for any specific earth station, in respect of other 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.** In the bi-directional FSS frequency bands 17.7-18.4 GHz and 19.3-19.7 GHz typical earth stations may also be coordinated under this provision based on agreements between concerned administrations and the agreements notified to the Radiocommunication Bureau.

USA/1.30/TES-3

MOD 9.18 *n)* for any transmitting station of a terrestrial service in the bands referred to in No. **9.17** within the coordination area of an earth station, in respect of this earth station, with the exception of the coordination under Nos. **9.16** and **9.19.** In the following specific frequency bands allocated to the fixed and fixed-satellite services: 27.5-28.35 (Earth-to-space), and 37.5-42.5 GHz (space-to-Earth), typical stations in the fixed service may also be coordinated under this provision with earth stations in the fixed-satellite service based on agreements between the concerned administrations, and the agreements notified to the Radiocommunication Bureau.

USA/1.30/TES-4

MOD 11.20.1, 11.21.1, 11.21A.1, 11.22.1 and 11.23.1 In such cases, individual notices of frequency assignments are required for frequency bands allocated with equal rights to terrestrial and space services where coordination is required under Appendix 5, Table 5-1; however, in the frequency bands mentioned in Nos. **9.17** and **9.18,**notifications for typical earth stations in the fixed-satellite service and typical stations in the fixed service may include indication of coordination agreements under Nos. **9.17** and **9.18** based on agreements between concerned administrations.

USA/1.30 TES-5

MOD 11.22.2 In such cases, individual notices of frequency assignments are required for frequency bands allocated with equal rights to space services, in the opposite direction of transmission, where coordination is required under Appendix 5, Table 5-1; however, in the frequency bands mentioned in No. **9.17A**, notifications for typical earth stations in the fixed-satellite service may include indication of coordination agreements under No. **9.17A** based on agreements between concerned administrations.

USA/1.30/TES-6

ADD Section 1.4.8 in Appendix 7

1.4.8 Typical FSS Earth Stations

For a group of FSS earth stations under a single authorization, the coordination area is determined by extending the periphery of the specified service area within which such earth stations are operating by the coordination distance of 100 Km (pre-determined).

Reason: The modifications to the RR proposed in USA/1.30/TES1-6 will provide a basis for typical earth station and fixed stations to be coordinated and notified in identified allocations where the space and fixed services have equal status, and will not upset the balance between the services.

There will be enormous benefit to such stations when they are part of a large group of such stations authorized under a single license as they will be relieved of the regulatory burden of having to coordinate and notify each station in such a group on the basis of individual sites.

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Doc. WAC/146(05.09.02)

WRC-03 Agenda Item 1.30f: 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:

Recently the RRB clarified the application of Resolution 539, "Use of the band 2630 – 2655 MHz in certain Region 3 countries by non-geostationary satellite systems in the broadcasting-satellite service (sound)". The band addressed in Resolution 539 has been allocated to various services for some time and the regulatory provisions that apply between the satellite and terrestrial systems in this band have been long established.

WRC-2000 adopted (i) regulations that allow coordination between NGSO BSS(S) systems and GSO systems in the 2630 – 2655 MHz band; (ii) a footnote that identifies that band, among others, for possible use by IMT-2000 systems; and (iii) Resolution 539 which includes certain technical limitations on the NGSO BSS(S) systems that can be deployed and power flux density thresholds for the Bureau to identify administrations whose terrestrial service may be affected by the proposed NGSO BSS(S) network.

There has been some debate on the interpretation of Resolution 539 however the applicable procedures have been clarified in a ROP, which decided that the coordination requests of such systems will be subject to the application of Resolution 539 within the existing procedure of No. 9.11 of the Radio Regulations. In order to clarify this in the Radio Regulation the following modifications to the Radio Regulations are proposed.

The importance of the proposal below lies in enforcing the concept that « seeking agreement» means have coordination, and that this in turn becomes an « implicit » rather than an « explicit » requirement.

USA/xx/1
MOD

5.418 *Additional allocation:* in Bangladesh, Belarus, Korea (Rep. of), India, Japan, Pakistan, Singapore, Sri Lanka and Thailand, the band 2 535-2 655 MHz is also allocated to the broadcasting-satellite service (sound) and complementary terrestrial broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to the provisions of Resolution **528 (WARC-92)**. The provisions of No. **5.416** and Table **21-4** of Article **21**, do not apply to this additional allocation. ~~Use of n~~Non-geostationary-satellite systems in the broadcasting-satellite service (sound) shall be operated such that the minimum elevation angle over the service area is not less than 40°~~is subject to Resolution **539 (WRC-2000)**~~.

USA/xx/2
MOD

5.418A In certain Region 3 countries listed in No. **5.418**, use of the band 2 630-2 655 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound) for which complete Appendix **4** coordination information, or notification information, has been received after 2 June 2000, is subject to the application of the provisions of No. **9.12A**, in respect of geostationary-satellite networks for which complete Appendix **4** coordination information, or notification information, is considered to have been received after 2 June 2000, and No. **22.2** does not apply. No. **22.2** shall continue to apply with respect to geostationary-satellite networks for which complete Appendix **4** coordination information, or notification information, is considered to have been received before 3 June 2000. ~~Use of the band by n~~Non-geostationary-satellite systems in the broadcasting-satellite service (sound) shall be operated such that the minimum elevation angle over the service area is not less than 40°~~is subject to the provisions of Resolution **539 (WRC-2000)**, and such systems shall be in accordance with Resolution **528 (WARC-92)**~~.

USA/xx/3
MOD

5.418B Use of the band 2 630-2 655 MHz by non-geostationary-satellite systems for which complete Appendix **4** coordination information, or notification information, has been received after 2 June 2000, is subject to the application of the provisions of No. **9.12**. Non-geostationary-satellite systems in the broadcasting-satellite service (sound) shall be operated such that the minimum elevation angle over the service area is not less than 40°. ~~Resolution **539 (WRC-2000)** applies.~~

Reason: To include technical limitations of the non-GSO BSS(S) from Resolution 539 in the footnotes to the Table of Allocations and relevant portions of Resolution 539 in Appendix 5.

USA/xx/4
MOD
5.418C Use of the band 2 630-2 655 MHz by geostationary-satellite networks for which complete Appendix **4** coordination information, or notification information, has been received after 2 June 2000 is subject to the application of the provisions of No. **9.13** with respect to non-geostationary-satellite systems in the broadcasting-satellite service (sound), and No. **22.2** does not apply. ~~Resolution **539 (WRC-2000)** applies.~~

Reason: Consequential to the suppression of Resolution 539.

USA/xx/5
SUP Resolution 539 (WRC-2000)

Use of the band 2 630-2 655 MHz in certain Region 3 countries by non-geostationary satellite systems in the broadcasting-satellite service (sound)

Reason: Relevant portions of Resolution 539 have been include in the Radio Regulations.

USA/xx/6
MOD

TABLE 5-1 (*continued*)

Reference of Article S9	**Case**	**Frequency bands (and Region) of the service for which coordination is sought**	**Threshold/condition**	**Calculation method**	**Remarks**
No. **S9.11** GSO, non-GSO/ terrestrial	A space station in the broadcasting-satellite service (BSS) in any band shared on an equal primary basis with terrestrial services and where the BSS is not subject to a Plan, in respect of terrestrial services	620-790 MHz 1 452-1 492 MHz 2 310-2 360 MHz 2 520-2 655 MHz 2 655-2 670 MHz 12.5-12.75 GHz (Region 3) 17.3-17.8 GHz (Region 2) 21.4-22 GHz (Region 1 and 3) 74-76 GHz	i) Bandwidths overlap, and; ~~Resolution **539 (WRC-2000)** also applies~~ ii) in the band 2630-2655 MHz, the pfd from a non-GSO space station calculated under free-space propagation condition exceeds at any point of the territory of an Administration in Regions 1, 2 or 3 the following : [-128 dB(W/m^2/MHz) for $0° \leq \delta \leq 5°$ $-128 + 0.75(\delta - 5)$ dB(W/m^2/MHz) for $5° \leq \delta \leq 25°$ -113 dB(W/m^2/MHz) for $25° \leq \delta \leq 90°$ where δ is the angle of arrival above the horizontal plane.]	i) Check by using the assigned frequencies and bandwidths	

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Doc. WAC/147(05.09.02)

Advisory committee revision of NTIA proposal (Doc. WAC/137(05.09.02))

WRC-03 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)**,

Resolution 801 (WRC-2000), Agenda Item 2.12: to consider spectrum requirements for wideband aeronautical telemetry in the band between 3 GHz and 30 GHz;

Background Information: The World Radiocommunication Conference 2000 included item 2.12 in the preliminary agenda for the World Radiocommunication Conference 05/06. The 2000 Radiocommunication Assembly approved Question ITU-R 231/8, titled: *Operation of wideband aeronautical telemetry in bands above 3 GHz*. The 2000 Radiocommunication Assembly directed that Question ITU-R 231/8 studies be completed by 2005. ITU-R Circular letter CA/109 requested administrations and Sector Members to supply data on existing and planned wideband aeronautical telemetry systems operating at frequencies above 3 GHz. In this circular letter Wideband Aeronautical Telemetry is defined as ~~: Emerging Telemetry Systems With Large Data Transfer Requirements to Support New and Different Telemetry Capabilities (such as high resolution video and associated data for remotely piloted aeronautical vehicles). It is further defined as telemetry~~ emerging telemetry systems with large data transfer requirements generally requiring a bandwidth of 20 MHz or greater.

The wideband requirements addressed under this WRC-06 proposal are in addition to those presently operating in the existing aeronautical telemetry allocations below 3 GHz (in the 1 429-1 525 and 2 300-2 390 MHz bands.) The requirement for these allocations will continue. Rather, the allocation addressed in this proposal is for new wideband requirements.

The responses to ITU-R Circular letter CA/109 indicated that there are requirements for additional telemetry spectrum, up to 300 MHz contiguous, for wideband aeronautical telemetry. There has been a trend toward cooperation and multi-platform testing that is leading to a need for identification of additional harmonized band(s) for aeronautical telemetry. As airframe speed, ~~missions~~ applications, and technology increase there is an expanding need for new and more numerous telemetry points for real-time ~~testing of aircraft to ensure each platform is rigorously tested and evaluated to ensure safety on these high technology platforms~~ evaluation to ensure the safety and integrity of each aircraft. Numerous Administrations have a need for advanced telemetry ~~testing of multiple~~ involving platforms in complex environments; this ~~testing~~ is often carried out on a cooperative basis with other Administrations. By designating a harmonized wideband aeronautical telemetry band between 3 and 30 GHz, the need for this type of ~~testing can be met.~~ application can be met. It is anticipated that a draft resolution on this matter will be prepared for WRC-03.

Proposal:

USA/ /1 **MOD**

RESOLUTION 801 (WRC-2003)

Agenda for the 2006 World Radiocommunication Conference

The World Radiocommunication Conference (Geneva, 2003),

Reasons: Editorial

resolves to give the view

USA/ / 2 **~~NOC~~MOD**

2.12 To consider spectrum requirements and allocations for wideband aeronautical telemetry in the band between 3 and 30 GHz.

Reasons: To provide an agenda item to study spectrum requirements and allocations for wideband aeronautical telemetry.

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Doc. WAC/148(05.09.02)

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).

Summary:

Item 2.15 reads:

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);

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.

Proposal:

USA/7.2/ZZZ

MOD

RESOLUTION 801 (WRC-2000)

~~Preliminary a~~Agenda for the 2005/2006 World Radiocommunication Conference

SUP

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);

Reason: 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.

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Doc. WAC/149(05.09.02)

WRC-03 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)**,

Summary:

Item 3.1 reads:

3.1 to consider results of ITU-R studies on the feasibility of sharing in the band 2700-2900 MHz between the aeronautical radionavigation service, meteorological radars and the mobile service, and to take appropriate action on this subject;

The 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:

USA/7.2/XXX

MOD

RESOLUTION 801 (WRC-2000)

~~Preliminary a~~Agenda for the 2005/2006 World Radiocommunication Conference

SUP 3.1

Reason: 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.

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Doc. WAC/151(05.09.02)

WRC-03 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: The Table of Frequency Allocations currently extends to 275 GHz. Footnote **5.565,** which was modified by WRC-2000 to identify bands for passive service, states:

> **5.565** The frequency band 275-1 000 GHz may be used by administrations for experimentation with, and development of, various active and passive services. In this band a need has been identified for the following spectral line measurements for passive services:
>
> - radio astronomy service: 275-323 GHz, 327-371 GHz, 388-424 GHz, 426-442 GHz, 453-510 GHz, 623-711 GHz, 795-909 GHz and 926-945 GHz;
>
> - Earth exploration-satellite service (passive) and space research service (passive): 275-277 GHz, 294-306 GHz, 316-334 GHz, 342-349 GHz, 363-365 GHz, 371-389 GHz, 416-434 GHz, 442-444 GHz, 496-506 GHz, 546-568 GHz, 624-629 GHz, 634-654 GHz, 659-661 GHz, 684-692 GHz, 730-732 GHz, 851-853 GHz and 951-956 GHz.
>
> Future research in this largely unexplored spectral region may yield additional spectral lines and continuum bands of interest to the passive services. Administrations are urged to take all practicable steps to protect these passive services from harmful interference until the date when the allocation Table is established in the above-mentioned frequency band.

The science services have made extensive use of the spectrum above 275 GHz for several decades now, mostly through passive applications. A number of radio astronomy observatories operate in this area of the spectrum. Several major new instruments are planned, or are under construction and expect to begin operating in this range in the next few years. Foremost among these is ALMA, an international collaboration between the United States and a consortium of European countries, to build and operate a millimeter wavelength telescope that will be comprised of 64 antennas located in the Chajnantor region of the Chilean Andes.

Likewise, there are already spaceborne passive sensors utilizing frequency bands in the above 275 GHz region of the spectrum, and many more are planned for other bands. Among these is the Microwave Limb Sounder (MLS) planned for launch on the Aura satellite in July 2003. The MLS, which is an enhanced version of the payload currently operating on the Upper Atmospheric Research Satellite (UARS), will provide data vital to the understanding of ozone depletion, transformation of greenhouse gases, and radiative forcing of climate change.

In addition to science-related passive service applications, research and experiments in use of the 275 to 1 000 GHz band for various active service applications has also been underway for some time. Although the propagation characteristics of the band within the earth's atmosphere (i.e., absorption and scattering) limit the usable range of most active systems compared to their use in lower frequency bands, there are also some benefits. These include an increase in range and angular resolution for radiolocation applications, resulting in the ability to discriminate "targets"

that are much closer together than could be achieved in lower bands. For terrestrial communications, the severe propagation path loss conditions in this band facilitate frequency reuse and increases privacy for those that need it. Also, the bandwidth available in these higher frequency regions provides the opportunity for extremely high data rate communications and high processing gains for spread spectrum systems. Active applications in space are not impacted by the atmosphere and therefore receive the full benefit associated with the use of these higher bands.

Additionally, the Plenipotentiary Conference will be considering Inter American Proposals (IAPs) to remove the 3 000 GHz limit from the note to the definition of "radiocommunication" in the ITU and an accompanying Resolution inviting future World Radiocommunication Conferences to revise the terms and definitions in the Radio Regulations, with a view towards harmonization.

Proposal:

USA/ / 1
MOD

RESOLUTION 801 (WRC-~~200~~03)

~~Preliminary~~ Aagenda for the ~~2005/~~2006 World Radiocommunication Conference

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

Reasons: Editorial

resolves to give the view

USA/ / 2 MOD

2.3 to ~~review studies and consider allocations in~~ consider issues related to the frequency bands above 275 GHz~~;~~;

Reasons: To review the issues related to the current and future use of this portion of the frequency spectrum.

USA/ / 3 ADD

2.3.1 to review studies and consider allocations in the frequency bands between 275 GHz and 1 000 GHz taking account of the needs of the passive science services, the amateur service and other services;

Reasons: Passive science sensors and radio astronomy are already utilizing frequency bands in the 275 - 1000 GHz region and in the past, the amateur service has often proven to be compatible with these services. These bands might also be used by active services which require high frequency reuse and high data rates for short range applications or applications above the atmosphere.

USA/ / 4 ADD

2.3.2 to review studies with a view to identifying future requirements for applications in the frequency bands above 1 000 GHz;

Reasons: Both active and passive services have demonstrated operations above 1000 GHz, and even above the 3 000 GHz limit contained in **1.5** of the Radio Regulations. The proposed change to the ITU Convention (Marrakech, 2002) also necessitates a review of studies addressing spectrum above 3 000 GHz in order to align definitions in the Radio Regulations and by doing so establish a mechanism through which future spectrum issues of an international character can be addressed.

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Doc. WAC/131(22.07.02)

WRC-03 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)**,

HAPS at 2 GHz

Background: The identification of certain frequency bands for HAPS operating as base stations to provide terrestrial IMT-2000 was made at WRC-2000, resulting in provisions to facilitate this being added to the Radio Regulations (5.388A). Resolution 221 from WRC-2000 includes provisional co-channel and out-of-band power-flux density limits for HAPS operation, for the protection of other stations either sharing the same band or operating in adjacent bands.

Resolution 221 asked for additional technical, operational and regulatory studies to be conducted, in order to review and, if necessary, revise, these limits. Resolution 221 also asked for consideration of appropriate regulatory and technical provisions to allow bilateral co-ordination of HAPS in an IMT-2000 system with affected neighboring administrations.

Based on the results of ITU-R studies, WRC-2003 is expected to adopt technical and operational provisions, including revised PFD thresholds for the operation of high altitude platform stations (HAPS) within IMT-2000 in the bands referred to in No. **5.388A**. The technical factors that should be considered during such a consultation are the subject of a PDNR at Working Party 8F (WP8F/TEMP/277). Provisional regulatory provisions for HAPS are also expected to be adopted.

Proposal for WRC-2006 Agenda

USA/7.2/1 ADD

Agenda Item X.X

"to review the provisional regulatory provisions, notification and the consultation process in relation to the operation of high altitude platform stations (HAPS) within IMT-2000 in the bands referred to in No. **5.388A**, in response to Resolution **221 ([WRC-2003]**) with a view toward incorporating the provisions into the Radio Regulations."

Reason: Provisional regulatory provisions for HAPS within IMT-2000 are likely to be adopted by WRC-2003. These procedures are likely to be contained in a modification to Resolution 221 and will define a notification and consultation process. Neighboring administrations will be consulted if the power-flux density (pfd) thresholds are exceeded on their territory.

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Doc. WAC/150(05.09.02)

WRC-03 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;

Background:

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 multiservice satellite networks in certain portions of the Ka-band. Related studies on the technical characteristics and sharing criteria necessary for compatible operations between mutiservice 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 multiservice satellite networks. Considering all of this, it is appropriate to suppress Recommendation 719.

Proposal

SUP Recommendation 719 (WARC-92) Multi-service satellite networks using the geostationary-satellite orbit.

Reason

No longer needed.

V. Draft Proposals Approved by the National Telecommunications and Information Administration (NTIA)

DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

Doc. WAC/138(05.09.02)

WRC-03 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:

USA/ /1 **NOC**

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.

DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

Doc. WAC/138(05.09.02)

WRC-03 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.

Proposal:

ARTICLE 19

Identification of stations

Section II – Allocation of international series and assignment of call signs

USA/ /1 ADD

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.

USA/ /2 MOD

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 is consequential to **MOD 19.36** shown below.

USA / /3 MOD

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**).

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

USA/ /4 MOD

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.

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[2] ~~**19.35.1**In no circumstances may an administration claim more MIDs than the total number of its ship stations shown in the ITU List of Ship Stations (List V) divided by 1000.~~

[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.

19.108 *B – Maritime identification digits (MIDs)*

USA/ /5 **ADD**

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.

USA/ /6 **SUP**

~~**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**

USA/ /7 **MOD**

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.

USA/ / 8 **MOD**

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.

USA/ / 9 **SUP**

19.115 *d)* ~~assign one-trailing-zero or two-trailing-zero identities to vessels when they require automatic access only on a national or regional level, as defined in the relevant ITU-T Recommendations;~~

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.

USA/ / 10 SUP

19.116 *e)* ~~assign ship station identities without trailing zeros to all other vessels requiring a numerical identification.~~

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.

USA / / 11 MOD

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

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

The World Radiocommunication Conference (~~Geneva, 1997~~ Geneva, 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;

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 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.

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Doc. WAC/136(05.09.02)

Agenda Item 1.16: To consider allocations on a worldwide basis for feeder links in bands around 1.4 GHz to the non-GSO MSS with service links operating below 1 GHz, taking into account the results of ITU-R studies conducted in response to Resolution **127 (Rev.WRC-2000)**, provided that due recognition is given to the passive services, taking into account No. **5.340**;

Background Information: Service allocations to the little LEO MSS were first made at WARC-92. Since 1995, additional allocations were sought by the little LEOs for feeder links without success. **Resolution 127** (**WRC-97**) identified the bands 1 390-1 400 MHz and 1 427-1 432 MHz for studies to be carried out to accommodate up and downlinks, respectively, provided sharing with services using these bands was feasible and that the passive services operating in the 1 400-1 427 MHz band can be fully protected. Subsequent to WRC-97, little LEO requirements have been restricted to the 1 390-1 393 MHz and 1 429-1 432 MHz bands, for up and downlinks, respectively, and this narrower scope is reflected in **Resolution 127 (Rev. WRC-2000)**. More recently, the need for new allocations seems to have disappeared altogether. Draft CPM-02 text, prepared by WP 8D states: " However, during WRC-03 preparation, no evidence of spectrum congestion of MSS service links below 1 GHz has been shown in ITU-R. Furthermore, the experience of MSS below 1 GHz has demonstrated that the growth of the traffic could be accommodated in the existing frequency bands without requirement for an additional allocation. In addition, it has to be noted that several frequency bands are already allocated in upper frequency bands (for example 5 091-5 250 MHz) for non-GSO MSS feeder links and could provide an alternative solution for feeder links of MSS systems with service links below 1 GHz."

The 1 400-1 427 MHz band is allocated on a primary, exclusive basis to the passive services, worldwide. It is arguably the most important, and certainly the most frequently and extensively observed radio astronomy band below 70 GHz. Observations in the band are conducted at a large number of sites in the U.S. and worldwide, to study the distribution, kinematics and dynamics of neutral hydrogen (the most commonly occurring element in the Universe) in our own as well as in other galaxies. Ocean and soil salinity and other measurements are conducted in the band under the EESS allocation. Full retention and unconstrained access to the 1 400-1 427 MHz band is considered crucial by both the radio astronomy and EESS communities. For this reason, it is essential to conclude the studies mandated in Resolution **127,** before an allocation can be made.

Some theoretical work was done in SG 7 during the previous ITU-R cycle towards showing that by using certain modulations the planned little LEO feeder links could meet the unwanted emission level required in the band 1 400-1 427 MHz, for no impact on the operation of the passive services in this band. Resolution **127 (WRC-2000)** invited the ITU-R, as a matter of urgency to carry out additional studies, tests and demonstrations, *including the measurement of emissions from equipment that would be employed in operational systems to protect passive services in the band 1 400- 1427 MHz from unwanted emissions from feeder links near 1.4 GHz* for non-GSO systems with service links operating below 1 GHz. However, no such work has been initiated in any of the ITU-R study groups during the present cycle. There has been a complete lack of new studies undertaken or even known to be in progress, particularly towards *invites 3* of Resolution **127**: "to carry out additional studies *including the measurement of emissions from equipment that would be employed in operational systems to protect passive services in the band 1 400- 1 427 MHz from unwanted emissions from feeder links on a worldwide basis..."*

Resolution 127 recommends that WRC-03 consider additional allocations for feeder links on the basis of completed studies referred to in its invites 1, 2 and 3. Since no such studies were conducted, consideration of any allocation is premature and it is proposed that **Resolution 127** be suppressed.

Proposal:

Article 5

Frequency Allocations

USA/ /1 **NOC**

1 350-1 525 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
1 350-1 400 FIXED MOBILE RADIOLOCATION 5.149 5.338 5.339	**1 350-1 400** RADIOLOCATION 5.149 5.334 5.339	
1 400-1 427	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	
1 427-1 429	SPACE OPERATION (Earth-to-space) FIXED MOBILE except aeronautical mobile 5.341	
1 429-1 452 FIXED MOBILE except aeronautical mobile 5.341 5.342	**1 429-1 452** FIXED MOBILE 5.343 5.341	
1 452-1 492 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 5.344	

1 492-1 525	**1 492-1 525**	**1 492-1 525**
FIXED	FIXED	FIXED
MOBILE except aeronautical mobile	MOBILE 5.343	MOBILE
	MOBILE-SATELLITE (space-to-Earth) 5.348A	
5.341 5.342	5.341 5.344 5.348	5.341 5.348A

Reasons: None of the studies called for in ITU-R **Resolution 127** have been carried out.

USA/ /2 SUP

Resolution 127

Reasons: Since no such studies were conducted, consideration of any allocation is premature and it is proposed that **Resolution 127** be suppressed.

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Doc. WAC/135(05.09.02)

NTIA Revision of Doc. WAC/113(04.06.02)

WRC Agenda Item 1.32*(Resolution 84)*: to consider technical and regulatory provisions concerning the band 37.5-43.5 GHz, in accordance with Resolutions **128 (Rev.WRC-2000)** and **84 (WRC-2000)**;

Background Information: Various segments of the 37.5 - 43.5 GHz band are allocated to the FS, FSS, BSS and MSS on a co-primary basis. Segments of this band are being used or planned for high-density applications in the FS ("HDFS"), and other segments of the band are planned for deployment of high-density applications in the FSS ("HDFSS"). Co-frequency sharing is not feasible between HDFS and HDFSS systems, but sharing situations where only one of the services operates with ubiquitously deployed small terminals may be practicable.

Significant actions were taken at WRC-2000 with respect to the 37.5 - 43.5 GHz band. Among other things, WRC-2000 adopted provisional power flux-density (pfd) limits for geostationary and non-geostationary satellites in the fixed-satellite service (FSS), in the broadcasting-satellite service (BSS), and in the mobile-satellite service (MSS) in this frequency range. WRC-2000 also called for study of the criteria and techniques to address interference from transmitters of FS into earth station receivers in high-density applications in the FSS in the bands 39.5 - 40.0 GHz and 40.5 – 42.0 GHz intended to operate in the same geographic area.

The ITU-R has now completed its study of the provisional pfd limits adopted for satellites of the FSS, BSS, and MSS in the 37.5-42.5 GHz range, and has concluded that in the 37.5 - 42.0 GHz range the provisional pfd limits can be confirmed at their current values. In so doing, the ITU-R noted the position of some Region 2 administrations that, to protect certain sensitive FS links in the 37.5-40 GHz band, it would be necessary for a GSO FSS satellite providing service on their territory to reduce the pfd levels that are produced during clear-sky operation by 12 dB from the respective levels in Table 21-4 of Article 21. The ITU-R also acknowledged that these pfds may constrain the FSS to the use of only large coordinated earth stations in this band. Nevertheless, for both GSO and non-GSO FSS satellites, the ITU-R concluded that it was appropriate to maintain the pfd values in Table 21-4 of Article 21, with the exception of the 42.0 - 42.5 GHz band. The ITU-R concluded that, based on current technology, it may not be possible for NGSO FSS systems operating in the 42.0 - 42.5 GHz band to limit their unwanted emissions to the detrimental interference level needed to protect single dish radio astronomy observations in the in the 42.5 - 43.5 GHz band [-137 dB (W/m^2/1GHz) for continuum observation and -153 dB(W/m^2/500 kHz) for spectral line observations]. It is proposed to remove the FSS and BSS allocations in the 42.0 - 42.5 GHz band, as shown in Table 21-4. It is expected that a combination of the 500 MHz guard band (42.0 - 42.5 GHz) and some restrictions on the number of FSS antenna beams incident on the Earth's surface in the 41.5 - 42.0 GHz band will be sufficient to protect the radio astronomy service in the 42.5 - 43.5 GHz band, as called for in Resolution **128**. The confirmation of the provisional pfd limits would provide satisfactory closure to a complex and difficult set of issues that has been intensively studied within the ITU-R for more than five years.

The ITU-R, however, did not complete its study of the criteria and techniques for addressing interference from transmitters of the fixed service into earth station receivers in high-density applications in the bands 39.5-42 GHz and intended for operation in the same geographic area. This aspect of Resolution **84 (WRC-2000)** formed an essential part of the overall arrangement between the FSS and the FS in the 37.5-42.5 GHz range. Although study of the pfd-related elements of sharing in the 37.5-42.5 GHz range has been completed and regulations on the subject are able to be finalized at WRC-03, the ITU-R should continue the studies called for in "*Invites 6*" of Resolution **84** regarding means of addressing interference from transmitters of the FS into earth station receivers in high-density applications in the 40-42 GHz portion of the 39.5-42 GHz band.

Proposals[3] of the United States to implement the conclusions reached by the ITU-R in its studies under Resolution **84**, as well to reflect the ITU-R's identification of the area where further study still is needed, are provided below:

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[3] The RCS revised the FCC WAC version of this proposal, the following is a summary of the changes:

In background information, paragraph 3, 10th sentence, text was added after the words "Article 21"

In USA 1 Table 21-4 –The two rows that contain data for 42-42.5 and 42-42.5 GHz were suppressed

In USA 5 the band 42-42.5 GHz was modified to read 40.5-42 GHz

In USA 7 the following changes were made

The site for the conference was changes to Geneva

Under considering

a) The band 40.5-42.5 was modified to read 40.5-42 GHz

d) The band 40-41.2 was modified to read 40-41.5 GHz

Under resolves to invite the ITU-R

1. The band 37.5-42.5 GHz was modified to read 37.5-42.0 GHz

In the *Reasons* for USA/ /7, the reference to band 37.5-42.5 was modified to read 37.5-42 GHz.

In USA/ /8 the strike through lines were removed from the text. The strike through lines are not required when a complete document is being suppressed. In the Reasons, the band 37.5-42.5 was modified to read 37.5-42 GHz.

Proposals

USA/ /1 MOD

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°**	
37.5-40 GHz	Fixed-satellite (non-geostationary-satellite orbit) Mobile-satellite (non-geostationary-satellite orbit)	–120 [10, ~~16, 17~~]	–120 + 0.75(δ – 5) [10, ~~16, 17~~]		–105 [10, ~~16, 17~~]	1 MHz
37.5-40 GHz	Fixed-satellite (geostationary-satellite orbit) Mobile-satellite (geostationary-satellite orbit)	–127 ~~–16, 17~~	**5°-20°**	**20°-25°**	–105 ~~16, 17~~	1 MHz
			–127 + (4/3) (δ – 5) ~~16, 17~~	–107 + 0.4 (δ – 20) ~~16, 17~~		
40-40.5 GHz	Fixed-satellite	–115	–115 + 0.5(δ – 5)		–105	1 MHz
40.5-42 GHz	Fixed-satellite (non-geostationary-satellite orbit) Broadcasting-satellite (non-geostationary-satellite orbit)	–115 [10, ~~16, 17, 18~~]	–115 + 0.5(δ – 5) [10, ~~16, 17, 18~~]		–105 [10, ~~16, 17~~ 18]	1 MHz
40.5-42 GHz	Fixed-satellite (geostationary-satellite orbit) Broadcasting-satellite (geostationary-satellite orbit)	–120 ~~16, 17, 18~~	**5°-15°**	**15°-25°**	–105 ~~16, 17, 18~~	1 MHz
			–120 + (δ – 5) ~~16, 17, 18~~	–110 + 0.5 (δ – 15) ~~16, 17, 18~~		
~~42-42.5 GHz~~	~~Fixed-satellite (non-geostationary-satellite orbit)~~ ~~Broadcasting-satellite (non-geostationary-satellite orbit)~~	~~–120~~ [10, ~~16, 17, 18~~]	~~–120 + 0.75(δ – 5)~~ [10, ~~16, 17, 18~~]		~~–105~~ [10, ~~16, 17, 18~~]	~~1 MHz~~
~~42-42.5 GHz~~	~~Fixed-satellite (geostationary-satellite orbit)~~ ~~Broadcasting-satellite (geostationary-satellite orbit)~~	~~–127~~ [16, ~~17, 18~~]	~~**5°-20°**~~	~~**20°-25°**~~	~~–105~~ [16, ~~17, 18~~]	~~1 MHz~~
			~~–127 + (4/3) (δ – 5)~~ [16, ~~17, 18~~]	~~–107 + 0.4 (δ – 20)~~ [16, ~~17, 18~~]		

Reasons: On the basis of its studies under Resolution **84 (WRC-2000)**, the ITU-R has confirmed the pfd values for FSS, MSS, and BSS satellites in the 37.5-42.0~~5~~ GHz range. As a result, it is appropriate to remove the provisional status that was placed on these limits by WRC-2000. It is proposed to remove the FSS and BSS allocations in the 42.0- 42.5 GHz band. A combination of the 500 MHz guard band (42.0 - 42.5 GHz) and some restrictions on the number of FSS antenna beams incident on the Earth's surface in the 41.5 - 42.0 GHz band is expected to be sufficient to protect the radio astronomy service in the 42.5 - 43.5 GHz band, called for in Resolution **128**.

USA/ /2 SUP

~~[16] **21.16.11** Except to the extent provided in No. **21.16.12**, these values are provisional and shall be applied subject to Resolution **84 (WRC-2000)**. (WRC-2000)~~

Reasons: Consequential to proposal USA/ /1.

USA/ /3 SUP

~~[17] **21.16.12** In the bands 37.5-40 and 40.5-42.5 GHz, notwithstanding any further studies, the power flux-density limits in this table shall be applied to stations in the fixed-satellite service for which complete coordination (geostationary-satellite orbit) or notification information (non-geostationary-satellite orbit), as appropriate, has been received by the Bureau after 2 June 2000 and before the end of WRC-03. (WRC-2000)~~

Reasons: Consequential to proposal USA/ /1.

USA/ /4 SUP

~~[18] **21.16.13** The values given for the broadcasting-satellite service are provisional and need review by a future conference. (WRC-2000)~~

Reasons: Consequential to proposal USA/ /1.

USA/ /5 MOD

5.551AA ~~In the bands 37.5-40 GHz and 42-42.5 GHz, non-geostationary-satellite systems in the fixed-satellite service should employ power control or other methods of downlink fade compensation of the order of 10 dB, such that the satellite transmissions are at power levels required to meet the desired link performance while reducing the level of interference to the fixed service. The use of downlink fade compensation methods are under study by the ITU-R (see Resolution **84 (WRC-2000)**). (WRC-2000)~~In the bands 37.5-40 GHz and 40.5-42 GHz, the power flux-density at the Earth's surface from any FSS space station should be at the level(s) required to meet the FSS link availability and performance objectives of the subject applications, but no greater than the relevant power flux-density limits in Table **21-4**, while addressing the sharing conditions with the fixed service. (WRC-03)

Reasons: Even with the confirmation of the provisional pfd levels pursuant to ITU-R studies under Resolution **84 (WRC-2000)**, it is important to the sharing conditions with the FS that the satellite pfds be only at the level required to meet link availability and performance objectives.

USA/ /6 MOD

40.5-51.4 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) **MOD** 5.551AA BROADCASTING BROADCASTING-SATELLITE Mobile 5.547	**40.5-41** FIXED FIXED-SATELLITE (space-to-Earth) **MOD** 5.551AA BROADCASTING BROADCASTING-SATELLITE Mobile Mobile-satellite (space-to-Earth) 5.547	**40.5-41** FIXED FIXED-SATELLITE (space-to-Earth) **MOD** 5.551AA BROADCASTING BROADCASTING-SATELLITE Mobile 5.547

Reasons: Consequential to inclusion of 40.5-42 GHz band in No. **5.551AA**, as proposed to be modified in Proposal No. USA/ /5 above.

USA/ /7 ADD

RESOLUTION BSA (WRC-~~20~~03)

Means to address interference from transmitters of the fixed service into earth station receivers in high-density applications in the FSS having allocations in the band 40-42 GHz and intended for operation in the same geographic area

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

considering

a) that this Conference has established power flux-density (pfd) limits for the fixed-satellite service (FSS) (space-to-Earth) in the bands 37.5-40.0 GHz and 40.5-42.0~~5~~ GHz, and the mobile-satellite service (MSS) (space-to-Earth) in the band 39.5-40 GHz;

b) that, in the band 37.5-42.5 GHz, Recommendation ITU-R SF.1484-1 recommends maximum pfd levels for non-geostationary (non-GSO) FSS satellites and Recommendation ITU-R SF.[4-9S/BL/3] recommends maximum pfd levels for geostationary (GSO) FSS satellites;

c) that, although sharing is feasible between FSS earth stations and terrestrial stations provided that appropriate coordination procedures and/or operational techniques are employed, sharing may in practice become difficult when high geographic densities of such stations are deployed in bands heavily used by either service;

d) that, within the range 40-41.5~~2~~ GHz, many administrations plan to deploy FSS systems using ubiquitous very small aperture terminals;

e) that WRC-2000 invited the ITU-R to undertake, as a matter of urgency, studies on the appropriate criteria and techniques for addressing interference from transmitters of the fixed service into earth station receivers in high-density applications in the FSS having allocations in the bands 39.5-40 GHz and 40.5-42 GHz and intended for operation in the same geographic area;

f) that the ITU-R has not yet completed the studies described in *considering e)* above;

resolves to invite the ITU-R

1 to undertake, as a matter of urgency, studies on the appropriate criteria and techniques for addressing interference from transmitters of the fixed service into earth station receivers in high-density applications in the FSS having allocations in the band 40-41.5~~2~~ GHz and intended for operation in the same geographic area;

2 to report on the results of these studies in time for WRC-06,

recommends

that WRC-06 take appropriate action based on the results of these studies.

Reasons: Work was not completed on *invites 6* from WRC-2000 Resolution **84**. This is important work in the overall sharing arrangements for FSS and FS in the 37.5-42.0~~5~~ GHz frequency range, and should be completed within the interval between WRC-03 and WRC-06. The band under consideration for these studies should be concentrated on the 40-42 GHz band.

USA/ /8 SUP

RESOLUTION 84 (WRC-2000)

Power flux-density limits in the bands 37.5-42.5 GHz for the fixed-satellite service, broadcasting-satellite service and mobile-satellite service

Reasons: Consequential to the confirmation of the power flux-density levels within the 37.5-42.0~~5~~ GHz band pursuant to ITU-R study, and the capture in new Resolution BSA of the holdover point from invites 6 of Resolution **84 (WRC-2000)**.

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Doc. WAC/135(05.09.02)

NTIA counter proposal to Doc. WAC/114(04.06.02)

Agenda Item 1.32a *(Resolution 128)*: to consider technical and regulatory provisions concerning the band 37.5-43.5 GHz, in accordance with Resolutions **128 (Rev.WRC-2000)** and **84 (WRC-2000);**

Background Information: The band 42.5 - 43.5 GHz is allocated to the Radio Astronomy (RA) service on a co-primary basis, while the frequency bands immediately below 42.5 GHz are allocated to the FSS and BSS (both space-to-Earth) on a co-primary basis with each other and with terrestrial services. Prior to WRC–2000, Resolution 128 prevented administrations from implementing the fixed-satellite service in the 41.5–42.5 GHz band until the Radiocommunication Bureau could identify and agree to technical and operational measures to protect radio astronomy operations in the 42.5–43.5 GHz. WRC–2000 modified Resolution 128 and added a footnote to the Table of Frequency Allocations (No. 5.551G) to protect radio astronomy stations. The footnote contains a provisional PFD limit - not to exceed -167 dB(W/m^2) in any 1 MHz band at the site of a radio astronomy station for more than 2% of the time - on emissions produced into the 42.5 - 43.5 GHz band by non-GSO FSS or BSS systems operating in the 41.5 - 42.5 GHz band. A similar limit was imposed on emissions that GSO FSS or BSS satellites operating in the 42.0 - 42.5 GHz band may produce at the sites of RA stations operating in the 42.5 - 43.5 GHz band.

Pursuant to Resolution **128 (Rev. WRC-2000)**, the ITU-R was to conduct studies to review these provisional PFD limits; to identify technical and operational measures in the band 41.5 – 42.5 GHz, including possible mitigation techniques to protect RA operations; and to propose measures that may be implemented to reduce the susceptibility of stations in the RA to harmful interference. Issues to be addressed included:

- Adequacy of provisional limits on power flux-density (PFD) produced into the sites of radio astronomy service (RAS) stations operating in the band 42.5 - 43.5 GHz by non-GSO satellites operating in the space-to-Earth direction in the fixed-satellite service (FSS) or broadcasting-satellite service (BSS) in the band 41.5 - 42.5 GHz, and by GSO FSS or BSS satellites operating in the space-to-Earth direction in the band 42.0 - 42.5 GHz.

- Identification of technical and operational measures that FSS/BSS satellite networks can take to protect RA operations in the 42.5 - 43.5 GHz band, including geographical separation and out-of-band emission limits to be applied to BSS and FSS space stations, and of measures that may be implemented by RA service users to reduce the susceptibility of stations in the RA service to harmful interference.

Results of studies indicate that the unwanted emission levels of the GSO FSS and BSS systems operating in the 42.0-42.5 GHz band meet the detrimental interference threshold for VLBI RAS stations operating in the 42.5-43.5 GHz band. As a rule, VLBI observations are conducted at most single dish telescopes for a fraction of the time, except for one dedicated VLBI instrument worldwide.

The detrimental interference threshold for a single dish telescope, -137 dB (W/m^2/1GHz) for continuum observation and -153 dB(W/m2/500 kHz) for spectral line observation, may not be met by a GSO FSS or BSS system by implementing transmit filters, because based on current technology, it is difficult to design and implement such filter.

It is expected that a combination of a 500 MHz guard band (42.0 - 42.5 GHz) between the space services and radio astronomy allocations along with some restrictions on the number of satellite antenna beams incident on the Earth's surface for the fixed-satellite service allocation in the 41.5 - 42.0 GHz band will be sufficient to protect the radio astronomy service in the 42.5 - 43.5 GHz band.

The proposal described herein removes the fixed-satellite service (space-to-Earth) and broadcasting-satellite service allocations from the 42–42.5 GHz frequency band. The limits on the power flux-density of space services emissions in the radio astronomy band, have been relaxed somewhat, by adopting as detrimental threshold level, the spectral line power flux density in the 500 kHz reference bandwidth used for spectral line observations in this band (see Table 2 of Recommendation ITU-R RA.769). Footnote RR 5.551G, as provisionally adopted by WRC-2000 combined the more restrictive continuum pfd threshold level with a 1 MHz reference bandwidth. The proposal also limits the fixed-satellite service use of the 41.5–42 GHz band to [gateway] links and subjects geostationary systems to the relaxed PFD limits in that sub-band.

ARTICLE 5

Frequency allocations

USA/ /1 MOD

41-42.5 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
41-42.~~5~~	FIXED FIXED-SATELLITE (space-to-Earth) **MOD** 5.551AA **ADD** 5.551x BROADCASTING BROADCASTING-SATELLITE Mobile 5.547 5.551F **MOD** 5.551G	
4~~1~~2-42.5	FIXED ~~FIXED-SATELLITE (space-to-Earth) 5.551AA~~ ~~BROADCASTING~~ ~~BROADCASTING-SATELLITE~~ Mobile 5.547 5.551F ~~5.551G~~	

Reasons: The proposal establishes a 500 MHz guard band between the space services and radio astronomy allocations. The guard band should contribute significantly towards the meeting the

detrimental interference level to reduce the level of unwanted space services emissions in the radio astronomy band.

USA/ /2 MOD

5.551AA ~~In the bands 37.5-40 GHz and 42-42.5 GHz, non-geostationary-satellite systems in the fixed-satellite service should employ power control or other methods of downlink fade compensation of the order of 10 dB, such that the satellite transmissions are at power levels required to meet the desired link performance while reducing the level of interference to the fixed service. The use of downlink fade compensation methods are under study by the ITU-R (see Resolution **84 (WRC-2000)**). (WRC-2000)~~In the bands 37.5-40 GHz and 40.5-42 GHz, the power flux-density at the Earth's surface from any FSS space station should be at the level(s) required to meet the FSS link availability and performance objectives of the subject applications, but no greater than the relevant power flux-density limits in Table **21-4**, while addressing the sharing conditions with the fixed service. (WRC-03)

Reasons: This modification is consequential to the allocation change.

USA/ /3 MOD

5.551GIn order to protect the radio astronomy service~~ in the band 42.5-43.5 GHz~~, the aggregate power flux-density in the 42.5-43.5 GHz band produced by all the space stations in any non-geostationary-satellite system in the fixed-satellite service (space-to-Earth) or in the broadcasting-satellite service (space-to-Earth) system operating in the 41.5-42~~.5~~ GHz band shall not exceed - 137 dB(W/m^2) in the 42.5 -43.5 GHz band and ~~–167~~ 153 dB(W/m^2) in any ~~1 MHz~~ 500 kHz subband at the site of a radio astronomy station for more that 2% of the time. The power flux-density in the band 42.5-43.5 GHz produced by any geostationary station in the fixed-satellite service (space-to-Earth) or in the broadcasting-satellite service (space-to-Earth) operating in the band 41.5–42~~–42.5~~ GHz shall not exceed - 137 dB(W/m^2) in the 42.5 -43.5 GHz band and –153~~–167~~ dB(W/m^2) in any ~~1 MHz~~ 500 kHz subband at the site of a radio astronomy station~~. These limits are provisional and will be reviewed in accordance with Resolution 128 (Rev.WRC-2000).~~ (WRC-~~20~~03)

Reasons: This modification reflects the deletion of the FSS and BSS from the 42.0 - 42.5 GHz band. The limits on the power flux-density of unwanted emissions by space services emissions operating in the 41.5 - 42.0 GHz band into the 42.5 - 43.5 GHz radio astronomy band have been relaxed somewhat, by adopting as detrimental threshold levels the continuum detrimental threshold level in the full 1 GHz band and the spectral line power flux density in the 500 kHz reference bandwidth used for spectral line observations in this band (see Table 2 of Recommendation ITU-R RA.769). Footnote RR 5.551G, as provisionally adopted by WRC-2000 combined the more restrictive continuum pfd threshold level with a 1 MHz reference bandwidth. The proposal also subjects geostationary systems operating in that sub-band to the same relaxed PFD limit.

USA/ /4 ADD

5.551x The band 41.5–42 GHz is not available for HDFSS applications. Use of the band by the fixed-satellite service (space-to-Earth) is limited to [gateway] links.

Reasons: Limiting this part of the allocation to gateway links will limit the number of satellite antenna beams that could cause interference to radio astronomy receiver locations.

USA/ /5 MOD

TABLE **21-4** *(END)*

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°**	
~~42-42.5 GHz~~	~~Fixed-satellite (non-geostationary-satellite orbit)~~ ~~Broadcasting-satellite (non-geostationary-satellite orbit)~~	~~-120~~ ~~10, 16, 17, 18~~	~~-120 + 0.75(δ - 5)~~ ~~10, 16, 17, 18~~		~~-105~~ ~~10, 16, 17, 18~~	~~1 MHz~~
~~42-42.5 GHz~~	~~Fixed-satellite (geostationary-satellite orbit)~~ ~~Broadcasting-satellite (geostationary-satellite orbit)~~	~~-127~~ ~~16, 17, 18~~	~~**5°-20°**~~	~~**20°-25°**~~	~~-105~~ ~~16, 17, 18~~	~~1 MHz~~
			~~-127 + (4/3) (δ - 5)~~ ~~16, 17, 18~~	~~-107 + 0.4 (δ - 20)~~ ~~16, 17, 18~~		

Reasons: As a result of the allocation change, power flux density limits for this band are moot and these rows of the table should be removed.

USA/ /6 SUP

~~[17] **21.16.12** In the bands 37.5-40 and 40.5-42.5 GHz, notwithstanding any further studies, the power flux-density limits in this table shall be applied to stations in the fixed-satellite service for which complete coordination (geostationary-satellite orbit) or notification information (non-geostationary-satellite orbit), as appropriate, has been received by the Bureau after 2 June 2000 and before the end of WRC-03. (WRC-2000)~~

Reasons: This suppression is consequential to the allocation change.

USA/ /7 SUP

RESOLUTION 128 (Rev.WRC-2000)

Reasons: Consequential to the conclusion that RAS operations in the 42.5 - 43.5 GHz band can be adequately protected from unwanted emissions from FSS and BSS satellite systems operating in the 41.5 - 42 GHz band by a combination of a 500 MHz guard band (42 - 42.5 GHz) and the application of footnotes 5.551G and 5.551x.

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Doc. WAC/137(05.09.02)

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)**;

Resolution 801 (WRC-2000), Agenda Item 2.12: to consider spectrum requirements for wideband aeronautical telemetry in the band between 3 GHz and 30 GHz;

Background Information: The World Radiocommunication Conference 2000 included item 2.12 in the preliminary agenda for the World Radiocommunication Conference 05/06. The 2000 Radiocommunication Assembly approved Question ITU-R 231/8, titled: *Operation of wideband aeronautical telemetry in bands above 3 GHz*. The 2000 Radiocommunication Assembly directed that Question ITU-R 231/8 studies be completed by 2005. ITU-R Circular letter CA/109 requested administrations and Sector Members to supply data on existing and planned wideband aeronautical telemetry systems operating at frequencies above 3 GHz. In this circular letter Wideband Aeronautical Telemetry is defined as: *Emerging Telemetry Systems With Large Data Transfer Requirements to Support New and Different Telemetry Capabilities (such as high resolution video and associated data for remotely-piloted aeronautical vehicles). It is further defined as telemetry generally requiring a bandwidth of 20 MHz or greater.*

The wideband requirements addressed under this WRC-06 proposal are in addition to those presently operating in the existing aeronautical telemetry allocations below 3 GHz (in the 1 429-1 525 and 2 300-2 390 MHz bands.) The requirement for these allocations will continue. Rather, the allocation addressed in this proposal is for new wideband requirements.

The responses to ITU-R Circular letter CA/109 indicated that there are requirements for additional telemetry spectrum, up to 300 MHz contiguous, for wideband aeronautical telemetry. There has been a trend toward cooperation and multi-platform testing that is leading to a need for identification of additional harmonized band(s) for aeronautical telemetry. As airframe speed, missions, and technology increase there is an expanding need for new and more numerous telemetry points for real-time testing of aircraft to ensure each platform is rigorously tested and evaluated to ensure safety on these high technology platforms. Many Administrations now utilize advanced telemetry testing involving multiple platforms in complex environments that call for cooperation of more than one country. By designating a harmonized wideband aeronautical telemetry band between 3 and 30 GHz, the needs for this type of testing can be met.

Proposal:

USA/ /1 MOD

RESOLUTION 801 (WRC-2003)

Aagenda for the 2005/2006 World Radiocommunication Conference

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

Reasons: Editorial

resolves to give the view

USA/ / 2 NOC

2.12 To consider spectrum requirements for wideband aeronautical telemetry in the band between 3 and 30 GHz.

Reasons: To provide an agenda item to study spectrum requirements for wideband aeronautical telemetry.

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Doc. WAC/138(05.09.02)

Proposal for Resolution 801, Agenda Item 3.1

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: Working Party 8B 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 sharing of the band 2 700-2 900 MHz between IMT-2000 and aeronautical radionavigation and meteorological radars is not feasible. Working Party 8B proposed that the draft CPM text for Chapter 7, Future Work Program, reflect that "WRC-03 may wish to consider deletion of this agenda item from the WRC-05/06 agenda" (8B/TEMP/103-E, 6 May 2002).

The band 2 700-2 900 MHz is used worldwide to support airport surveillance radars in the aeronautical radionavigation service, which is a safety service and "requires special measures to ensure their freedom from harmful interference" in accordance with Article 4.10 of the Radio Regulations.

The primary weather radar system used for flight planning activities operates in the band 2 700-2 900 MHz and is often collocated at airports worldwide, to provide accurate weather conditions for aircraft. Also, these radars observe the presence and calculate the speed and direction of motion of severe weather elements such as tornadoes and violent thunderstorms. These radars provide quantitative area precipitation measurements important to hydrologic forecasting of potential flooding. The severe weather and motion detection capabilities offered by weather radars contribute towards an increase in the accuracy and timeliness of warning services.

Proposal:

USA/ / 1 SUP

~~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: WP8B has already determined that sharing is not feasible in this band, therefore it is not necessary to continue this agenda item.

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