

United States of America

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Agenda Item 1.21: to consider the results of studies, regarding the compatibility between the radio astronomy service and the active space services in accordance with Resolution **740 (WRC-03)**, in order to review and update, if appropriate, the tables of threshold levels used for consultation that appear in the Annex to Resolution **739 (WRC-03)**;

Background information: In preparation for WRC-03, Task Group 1/7 conducted studies that led to the adoption of Recommendation ITU-R SM.1633, which contains nine Annexes that, using the methodology contained in the Recommendation, assess the compatibility of various band pairs between the radio astronomy service and space services. Not all studies in the Annexes were completed prior to WRC-03. On the basis of Recommendation SM.1633 and associated studies, WRC-03 adopted Resolutions **739** and **740**.

Resolution **739** contains guidance to administrations operating space and radio astronomy stations in the band pairs contained in Tables 1-1 and 1-2, in order to come to acceptable solutions regarding space station unwanted emissions at a radio astronomy station. The Resolution includes a consultation process adopted at WRC-03 to assist administrations in reaching mutually acceptable solutions when unwanted emissions from space services exceed specified levels in certain radio astronomy bands. The consultation process is included in Resolution **739** and it will not be considered at WRC-07.

Resolution **740** calls for the completion of studies for the band pairs indicated in its associated band-pair Table. Comprehensive studies were needed to determine whether any of the band pairs from the Table of Resolution **740** should be added to the tables in Resolution **739**, taking into consideration the impact on all the concerned active and passive services, and to determine the appropriate threshold levels for consultation. In accordance with the *resolves 1* of the Resolution **740**, only the band pairs listed in the Table of Resolution **740** will be considered by WRC-07.

Studies have been conducted in TG 1/9 on a number of the band pairs listed in Resolution **740**, and it is proposed at WRC-07 to add these band pairs and values to Tables 1-1 and 1-2 of the Annex to Resolution **739**. In a number of instances, unwanted emissions from existing NGSO systems have been shown to not exceed the threshold levels. Systems with unwanted emissions that exceed the thresholds, but that are already operating, or that have been advanced published prior to the entry in force of the Final Acts of, either WRC-03 or WRC-07, depending on the band (see *resolves 5* of the proposed draft revision of Resolution **739**), are clearly grandfathered under the terms of Resolution **739**, and are not subject to the consultation process.

Studies carried out in TG 1/9 have been documented in the appropriate Annexes of ITU-R Recommendation SM.1633, and, for some satellite systems, indicate levels of unwanted emissions in radio astronomy bands that will not be exceeded.

Proposal:

USA/ /1 (MOD)

RESOLUTION 739 ([REV. WRC-0307](#))

Compatibility between the radio astronomy service and the active space services in certain adjacent and nearby frequency bands

The World Radiocommunication Conference (Geneva, 2003~~7~~),

Reasons: Editorial changes.

USA/ /2 MOD

resolves

5 that the space stations to be considered in the application of the above *resolves* are:

a) those designed to operate in the space service frequency bands listed in [Table 1-1 of the Annex 1](#) or in the band 1613.8-1626.5 MHz listed in [Table 1-2 of Annex 1](#), and for which advance publication information ~~is was~~ received by the Bureau following the entry into force of the Final Acts of ~~this conference~~ [WRC-03](#); and

b) those designed to operate in all other space service frequency bands included in [Table 1-2 of Annex 1](#), and for which advance publication information is received by the Bureau following the entry into force of the Final Acts of this conference;

Reasons: Following the pattern of the existing text, *resolves* 5 is modified to indicate that space systems advance published before the entry into force of the Final Acts of WRC-07 in the bands that are being added to Res. 739 are not to be considered in the application of *resolves* 1 to 3.

USA/ /3 (MOD)

ANNEX 1 TO RESOLUTION 739 ([REV. WRC-0307](#))

Unwanted emission threshold levels

Reasons: Editorial changes.

TABLE 1-1

**pdf thresholds for unwanted emissions from geostationary space stations
at a radio astronomy station**

Space service	Space service band	Radio astronomy band	Single dish, continuum observations		Single dish, spectral line observations		VLBI ⁽¹⁾
			pdf ⁽²⁾	Reference bandwidth	pdf ⁽²⁾	Reference bandwidth	pdf ⁽²⁾
	(MHz)	(MHz)	(dB(W/m ²))	(MHz)	(dB(W/m ²))	(kHz)	(dB(W/m ²))
BSS (space-to-Earth) MSS (space-to-Earth)	1 452-1 492 1 525-1 559	1 400-1 427	-180	27	-196	20	-166
MSS (space-to-Earth) MSS (space-to-Earth)	1 525-1 559 1 613.8-1 626.5	1 610.6-1 613.8	NA	NA	-194	20	-166
BSS (space-to-Earth) FSS (space-to-Earth)	2 655-2 670	2 690-2 700	-177	10	NRNA	25	-161
FSS (space-to-Earth)	2 670-2 690	2 690-2 700 (in Regions 1 and 3)	-177	10	NRNA	20	-161
	(GHz)	(GHz)	-	-	-	-	-
BSS (space-to-Earth)	21.4-22.0	22.21-22.5	NR-146	NR290	NR-162	250	-128

NA: Not applicable, measurements of this type are not made in this band.

[NR](#): No result available.

[NOTE: Some annexes of Recommendation ITU-R SM. 1633 indicate levels of unwanted emissions in radio astronomy bands that certain satellite systems, by design, do not exceed.](#)

⁽¹⁾ The reference bandwidth used for spectral line observations has also been used as reference bandwidth for very long baseline interferometry (VLBI) observations. In VLBI bands, where no spectral line observations are conducted, the reference bandwidth for VLBI observations has been determined using the assumption of Recommendation ITU-R RA.769 for a typical spectrometer channel (3 km/s).

⁽²⁾ Integrated over the reference bandwidth with an integration time of 2 000 s.

TABLE 1-2

**epfd thresholds* for unwanted emissions from non-GSO satellite systems
at a radio astronomy station**

Space service	Space service band	Radio astronomy band	Single dish, continuum observations		Single dish, spectral line observations		VLBI ⁽¹⁾
			epfd ⁽²⁾	Reference bandwidth	epfd ⁽²⁾	Reference bandwidth	epfd ⁽²⁾
			(MHz)	(MHz)	(dB(W/m ²))	(MHz)	(dB(W/m ²))
MSS (space-to-Earth)	137–138	150.05–153.0	–238	2.95	NA	NA	NA
MSS (space-to-Earth)	387–390	322–328.6	–240	6.6	–255	10	–226
MSS (space-to-Earth)	400.15–401	406.1–410	–242	3.9	NA	NA	–226
BSS (space-to-Earth)	620–790	608–614	–241	6.0	NA	NA	–224
MSS (space-to-Earth)	1525–1559	1400–1427	–243	27.0	–259	20	–229
MSS (space-to-Earth)	1525–1559	1610.6–1613.8	NA	NA	–258	20	–230
RNSS (space-to-Earth)	1559–1610	1610.6–1613.8	NA	NA	–258	20	–230
MSS (space-to-Earth)	1 613.8-1 626.5	1 610.6-1 613.8	NA	NA	–258	20	–230

NA: Not applicable, measurements of this type are not made in this band.

[NOTE: Some annexes in Recommendation ITU-R SM.1633 indicate levels of unwanted emissions in radio astronomy bands that certain satellite systems, by design will not exceed.](#)

* These epfd thresholds should not be exceeded for more than 2% of time.

⁽¹⁾ [The reference bandwidth used for spectral line observations has also been used as reference bandwidth for VLBI observations. In VLBI bands, where no spectral line observations are conducted, the reference bandwidth for VLBI observations has been determined using the assumption of Recommendation ITU-R RA.769 for a typical spectrometer channel \(3 km/s\). Reference bandwidths of 10 kHz and 20 kHz, respectively, were assumed when calculating the VLBI threshold levels for the 406.1-410 MHz and 608-614 MHz radio astronomy bands, where no spectral line observations are made.](#)

⁽²⁾ Integrated over the reference bandwidth with an integration time of 2 000 s.

Reasons: Studies in TG 1/9 have been completed on the band pairs and values added to Tables 1-1 and 1-2, and they have been incorporated into Recommendation ITU-R SM.1633. Since the 2690–2700 MHz radio astronomy allocation is not used for spectral line observations, the “NR” (no results available) notations in the appropriate rows of Table 1-1 are changed to “NA” (not applicable) and the explanation for “NR” is removed. The notes added to the Tables reflect compliance with *resolves* 1 for some systems.

USA/ 15 (MOD)

RESOLUTION 740 ([REV. WRC-0307](#))

Future compatibility analyses between the radio astronomy service and active space services in certain adjacent and nearby frequency bands

The World Radiocommunication Conference (Geneva, 2003⁷),

Reasons: Editorial changes.

USA/ 16 MOD

considering

a) that adjacent or nearby primary service allocations have been made to the radio astronomy service (RAS); and ~~to~~ various space services, such as the fixed-satellite service (FSS) ~~and the mobile-satellite service (MSS)~~, broadcasting-satellite service (BSS), ~~and radionavigation satellite service (RNSS)~~, hereafter referred to as “active space services”;

Reasons: Consequential to the removal of entries in the Table for these services.

recognizing

c) _____ that measures beyond the general unwanted emission limits in Appendix 3 may be required to protect the RAS from unwanted emissions of active space services for the band-pairs listed in the Table,

TABLE
Band-pairs to be considered for further studies

Space service band	Space service	Radio astronomy service band
MHz		MHz
137-138	MSS (space-to-Earth)	150.05-153.0 (No. 5.208A)
387-390	MSS (space-to-Earth)	322-328.6 (No. 5.208A)
400.15-401	MSS (space-to-Earth)	406.1-410 (No. 5.208A)
620-790 (No. 5.311) see Resolution 545 (WRC-03)	BSS (space-to-Earth)	608-614
1 452-1 492	BSS (space-to-Earth) (non-GSO systems only)	1 400-1 427
1 525-1 559	MSS (space-to-Earth) (non-GSO systems only)	1 400-1 427
1 525-1 559	MSS (space-to-Earth) (non-GSO systems only)	1 610.6-1 613.8
1 559-1 610	RNSS (space-to-Earth)	1 610.6-1 613.8
2 655-2 670	BSS (space-to-Earth)	2 690-2 700
2 655-2 670	FSS (space-to-Earth) (Region 2)	2 690-2 700
2 670-2 690	FSS (space-to-Earth) (Region 2)	2 690-2 700
GHz		GHz
10.7-10.95	FSS (space-to-Earth)	10.6-10.7
21.4-22.0	BSS (space-to-Earth)	22.21-22.5

Reasons: Band pairs for which values were added to Tables 1-1- and 1-2 of Resolution **739** are eliminated from Resolution **740**.

USA/ /8 MOD

resolves

1 to invite ITU-R to study the compatibility between the RAS and the corresponding active space services as listed in the Table only, with a view to updating or developing ITU-R Recommendations, if appropriate;

~~2 that WRC 07 should consider the results of the studies as identified in *resolves 1*, in order to review and update, if appropriate, the tables of threshold levels for consultation in the Annex to Resolution ~~739 (WRC-03)~~,~~

Reasons: The Conference has completed consideration of these studies.
