INTERNATIONAL TELECOMMUNICATION UNION

WRC-03

WORLD
RADIOCOMMUNICATION
CONFERENCE

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PLENARY MEETING

EUROPEAN PROPOSALS FOR THE WORK OF THE CONFERENCE

PART 24

Agenda Item 1.24 – Sharing conditions in the band 13.75-14 GHz

Introduction

The ITU-R studies have identified a method (described as Method B in Section 1.4.3 of the CPM Report) in order to maintain the delicate balance between the services involved. This method is based on reducing the current limit on the minimum antenna size of FSS earth stations to 1.2 m and adding technical conditions which would adequately manage the interference caused by FSS earth stations into Radiolocation and SRS stations:

– Off-axis eirp density limits to manage the interference into airborne radars, based on a 4 dB tightening of Recommendation ITU-R S.728, and specified in the Radio Regulations on a mandatory basis.

– A single entry pfd limit (specified in the RR on a mandatory basis but not subject to compliance verification by the BR):

  - For maritime radar, X dBW/m²/10MHz not to be exceeded for more than Y% of the time produced at 36 m above sea level at the normal baseline as defined in United Nations Convention on the Law Of the Sea 1982.

  - For land mobile radar, X dBW/m²/10MHz not to be exceeded for more than Y% of the time produced 3 m above ground at the border.

– Table 7 of **Appendix 7** of the RR, would be updated in order to determine the need for coordination of an FSS earth station with radiolocation stations at specified fixed points, as part of the procedure of No. **9.17**.

– To maintain the current protection of SRS operations, the on-axis eirp limit in the 6 MHz bandwidth contained in No. **5.503** would be made a function of the FSS antenna diameter. In addition the protected bandwidth would be extended to 10 MHz centred on 13.775 GHz.

– 6 dB relaxation of the limit on the e.i.r.p. level averaged over 1s on radiolocation emission at elevation angles below 2°.

This method would offer the following advantages :

– FSS development would no longer be constrained to use only earth station antennas larger than 4.5 m. This would grant relaxation of the current limit to 1.2 m with the addition of appropriate limits to ensure the protection of the other services, thus leaving greater flexibility;

– A quantified protection from each individual FSS earth station is afforded to Radiolocation systems;

– Relaxation of the constraints on the radiolocation emission;

– SRS is assured a managed interference environment in the protected bandwidth.

This method would also involve the consequential suppression of No. **5.503A** and its replacement by a secondary allocation to the Earth Exploration Satellite Service.

For these reasons, the adoption of this method (method B) is proposed by the above mentioned Administrations, with appropriate values for the protection of the radiolocation, radionavigation and space research. Also no special procedures concerning compliance with X and Y should be added to the Radio Regulations if WRC-03 adopts Method B, but the ITU-R should be invited to develop Recommendations which administrations could use, at their discretion, to assist them to comply.

Technical considerations used for the derivation of the single entry power flux-density limits applicable to FSS earth stations (values X and Y) are provided in Addendum 1 to this document for information.

Proposals

ARTICLE 5

Frequency allocations

MOD EUR/13A24/1

11.7-14.25 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
…		
13.75-14	FIXED-SATELLITE (Earth-to-space) 5.484A RADIOLOCATION Standard frequency and time signal-satellite (Earth-to-space) Space research ADD Earth exploration-satellite 5.499 5.500 5.501 MOD 5.502 MOD 5.503	
…		

***Reasons** : Since most of the provisions of No **5.503A** have expired, it is possible to reflect the remaining provisions by introducing in the table of allocation a secondary allocation to EESS and by suppressing No **5.503A**.*

MOD EUR/13A24/2

5.502 In the band 13.75-14 GHz, an earth station of a geostationary fixed-satellite service network shall have a minimum antenna diameter of1.2 m and an earth station of a non-geostationary fixed satellite service system shall have a minimum antenna diameter of 4.5 m. In addition the e.i.r.p., averaged over one second, radiated by a station in the radiolocation or radionavigation services shall not exceed 59 dBW above 2° elevation and 65 dBW below. Before an administration brings into use an earth station in a geostationary satellite network in the fixed-satellite service in this band with an antenna size smaller than 4.5 m, it shall ensure that the power flux-density produced by this earth station does not exceed:

- –113 dB(W/(m^2 · 10 MHz)) for more than 0.5% of the time produced at 36 m above sea level at the baseline as defined in UN Convention on the Law Of the Sea 1982 (coastline).
- –113 dB(W/(m^2 · 10 MHz)) for more than 0.5% of the time produced 3 m above ground at the border of the following countries : [France, Greece, Russian Federation, United-Kingdom, …]. This limit may be exceeded at the border of any of these countries whose administration has so agreed.

For earth stations within the fixed-satellite service, having an antenna diameter greater than or equal to 4.5m, the e.i.r.p. of any emission should be at least 68 dBW and should not exceed 85 dBW (WRC-03).

Reasons *:*

- *relaxation to 1.2 m of the current limitation on the minimum antenna diameter for FSS earth stations with the addition of appropriate pfd limits to ensure the protection of maritime and land mobile radiolocation systems.*
- *Relaxation of the constraints on the radiolocation service emission.*
- *The suppression of the last two sentences of the current footnote No 5.502 takes into account the fact that the 59/65 dBW limit on radiolocation stations average e.i.r.p. is intended to protect FSS space stations. Hence no complaint for harmful interference can be made as long as these limits are met by radiolocation stations.*

MOD EUR/13A24/3

5.503 In the band 13.75-14 GHz, geostationary space stations in the space research service for which information for advance publication has been received by the Bureau prior to 31 January 1992 shall operate on an equal basis with stations in the fixed-satellite service; after that date, new geostationary space stations in the space research service will operate on a secondary basis. Until those geostationary space stations in the space research service for which information for advance publication has been received by the Bureau prior to 31 January 1992 cease to operate in this band:

– the e.i.r.p. density of emissions from any earth station in the fixed-satellite service operating with a space station in geostationary-satellite orbit shall not exceed 4.7D + 28 dBW/40 kHz, where D is the fixed-satellite service earth station antenna diameter (m) from 13.770 to 13.780 GHz for antenna diameters equal to or greater than 1.2 m and less than 4.5 m;

  49.2 + 20 log(D/4.5) dBW/40 kHz, where D is the fixed-satellite service earth station antenna diameter (m) from 13.770 to 13.780 GHz for antenna diameters equal to or greater than 4.5 m and less than 31.9 m;

  66.2 dBW/40 kHz for any fixed-satellite service earth station emission in the band 13.770-13.780 GHz for antenna diameters (m) equal to or greater than 31.9 m;

  56.2 dBW/4 kHz for narrow-band (less than 40 kHz of necessary bandwidth) fixed-satellite service earth station emissions in the band 13.770-13.780 GHz for any fixed satellite service earth station antenna diameter;

– the e.i.r.p. density of emissions from any earth station in the fixed-satellite service operating with a space station in non-geostationary-satellite orbit shall not exceed 51 dBW in the 6 MHz band from 13.772 to 13.778 GHz.

Automatic power control may be used to increase the e.i.r.p. density in these frequency ranges to compensate for rain attenuation, to the extent that the power flux-density at the fixed-satellite service space station does not exceed the value resulting from use by an earth station of an e.i.r.p. meeting the above limits, in clear-sky conditions. (WRC-03)

Reasons *: to maintain the current protection of SRS operations and to extend the protected bandwidth to 10 MHz*

SUP EUR/13A24/4

5.503A

Reason *: Since most of the provisions of No* ***5.503A*** *have expired, it is possible to reflect the remaining provisions by introducing in the table of allocation a secondary allocation to EESS and by suppressing No* ***5.503A****.*

ARTICLE 21

Terrestrial and space services sharing frequency bands above 1 GHz

Section III – Power limits for earth stations

ADD EUR/13A24/5

21.13 bis 7) In the band 13.75-14 GHz, the level of e.i.r.p. emitted by an earth station of a geostationary fixed-satellite service network with an antenna diameter smaller than 4.5m shall not exceed the following values:

Angle off-axis	*Maximum e.i.r.p. in any 1 MHz band*
$2° \le \varphi \le 7°$	$43 - 25 \log \varphi$ dBW
$7° < \varphi \le 9.2°$	22 dBW
$9.2° < \varphi \le 48°$	$46 - 25 \log \varphi$ dBW
$\varphi > 48°$	4 dBW

Reasons *: to maintain the current protection of airborne radiolocation stations.*

APPENDIX 7 (WRC-2000)

ANNEX 7

System parameters and predetermined coordination distances for determination of the coordination area around an earth station

MOD EUR/13A24/6

TABLE 7b

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

Transmitting space radiocommunication service designation		**Fixed-satellite, mobile-satellite**	**Fixed-satellite**	**Fixed-satellite**	**Fixed-satellite**		**Space operation, space research**		**Fixed-satellite, mobile-satellite, meteorological-satellite**		**Fixed-satellite**		**Fixed-satellite**		**Fixed-satellite**	**Fixed-satellite** [3]	**Fixed-satellite**	**Fixed-satellite** [3]
Frequency bands (GHz)		2.655-2.690	5.091-5.150	5.725-5.850	5.725-7.075		7.100-7.235 [5]		7.900-8.400		10.7-11.7		12.5-14.8		13.75-14.3	15.43-15.65	17.7-18.4	19.3-19.7
Receiving terrestrial service designations		Fixed, mobile	Aeronautical radio-navigation	Radio-location	Fixed, mobile		Fixed, mobile		Fixed, mobile		Fixed, mobile		Fixed, mobile		Radiolocation radionavigation (land only)	Aeronautical radionavigation	Fixed, mobile	Fixed, mobile
Method to be used		§ 2.1		§ 2.1	§ 2.1		§ 2.1, § 2.2		§ 2.1		§ 2.1		§ 2.1, § 2.2		2.1		§ 2.1, § 2.2	§ 2.2
Modulation at terrestrial station [1]		A			A	N	A	N	A	N	A	N	A	N	-		N	N
Terrestrial station interference parameters and criteria	p_0 (%)	0.01			0.01	0.005	0.01	0.005	0.01	0.005	0.01	0.005	0.01	0.005	0.01		0.005	0.005
	n	2			2	2	2	2	2	2	2	2	2	2	1		2	2
	p (%)	0.005			0.005	0.0025	0.005	0.0025	0.005	0.0025	0.005	0.0025	0.005	0.0025	0.01		0.0025	0.0025
	N_L (dB)	0			0	0	0	0	0	0	0	0	0	0	0		0	0
	M_s (dB)	26 [2]			33	37	33	37	33	37	33	40	33	40	1		25	25
	W (dB)	0			0	0	0	0	0	0	0	0	0	0	0		0	0
Terrestrial station parameters	G_x (dBi) [4]	49 [2]	6		46	46	46	46	46	46	50	50	52	52	36		48	48
	T_e (K)	500 [2]			750	750	750	750	750	750	1 500	1 100	1 500	1 100	2636		1 100	1 100
Reference bandwidth	B (Hz)	4×10^3	150×10^3		4×10^3	10^6	4×10^3	10^6	4×10^3	10^6	4×10^3	10^6	4×10^3	10^6	10^7		10^6	10^6
Permissible interference power	$P_r(p)$ (dBW) in B	–140	–160		–131	–103	–131	–103	–131	–103	–128	–98	–128	–98	- 131		–113	–113

[1] A: analogue modulation; N: digital modulation.

[2] The parameters for the terrestrial station associated with transhorizon systems have been used. Line-of-sight radio-relay parameters associated with the frequency band 5 725-7 075 MHz may also be used to determine a supplementary contour with the exception that $G_x = 37$ dBi.

[3] Feeder links of non-geostationary-satellite systems in the mobile-satellite service.

[4] Feeder losses are not included.

[5] Actual frequency bands are 7 100-7 155 MHz and 7 190-7 235 MHz for space operation service and 7 145-7 235 MHz for the space research service.

APPENDIX 4 (WRC-2000)

MOD EUR/13A24/7

ANNEX 2B

Table of characteristics to be submitted for space and radio astronomy services

C – Characteristics to be provided for each group of frequency assignments for a satellite antenna beam or an earth station antenna *(end)* (WRC-2000)

Items in Appendix	Advance publication of a geostationary-satellite network	Advance publication of a non-geostationary-satellite network subject to coordination under Section II of Article 9	Advance publication of a non-geostationary-satellite network not subject to coordination under Section II of Article 9	Notification or coordination of a geostationary-satellite network (including Appendix 30B)	Notification or coordination of a non-geostationary-satellite network	Notification or coordination of an earth station	Notice for space stations in the broadcasting-satellite service under Appendix 30	Notice for feeder-link stations under Appendix 30A	Notice for stations in the fixed-satellite service under Appendix 30B	Items in Appendix	Radio astronomy
C.9.b.5							X	X		C.9.b.5	
C.9.b.6							X	X		C.9.b.6	
C.9.b.7							X	X		C.9.b.7	
C.9.b.8							X	X		C.9.b.8	
C.9.b.9							X	X		C.9.b.9	
C.9.b.10							X	X		C.9.b.10	
C.9.c			X		X					C.9.c	
C.9.d			X		X		X	X		C.9.d	
C.10.a			X	X	X					C.10.a	
C.10.b			X	X	X			X		C.10.b	
C.10.c.1			X	X	X			X	X	C.10.c.1	
C.10.c.2			X	X	X			X	X	C.10.c.2	
C.10.c.3			O	X	X			X	X	C.10.c.3	
C.10.c.4			X	X	X			X	X	C.10.c.4	
C.10.c.5			X	X	X				X	C.10.c.5	
C.10.c.6			X	X	X	X		X		C.10.c.6	
C.11.a	X[10]	X[10]	X	X	X					C.11.a	
C.11.b								X		C.11.b	
C.11.c							X		X	C.11.c	
C.11.d					X					C.11.d	
C.12									X	C.12	
C.13										C.13	X
C.15							X	X		C.15	

X Mandatory information O Optional information C This information need only be furnished when it has been used as a basis to effect coordination with another administration

[1] Only the value of maximum power density is mandatory.

[2] For transmission from the space station only.

[3] For space-to-space relay only.

[4] For transmission from the earth station only.

[5] Not required for coordination under Nos. **9.15**, **9.17** or **9.17A**.

[6] Required, if applicable, for the type of transmission. If not applicable, a reason why it is not applicable is required.

[7] One or the other of C.8.a or C.8.b is mandatory, but not both.

[8] Only the value of total peak envelope power is required for coordination under Nos. **9.15**, **9.17** or **9.17A**.

[10] Only the list of country or geographic designators or a narrative description of the service area shall be supplied.

[11] Not required for coordination under No. **9.7A** or **9.7B**.

Reasons *: Making the earth station antenna diameter a mandatory item for requests of coordination would allow the Radiocommunications Bureau to make its findings regarding the compliance with No.* ***5.502*** *based on information explicitly given by administrations.*

SUP EUR/13A24/8

RESOLUTION 733 (WRC-2000)

Review of sharing conditions between services in the band 13.75-14 GHz