
PLENARY MEETING

**Addendum 3 to
Document 6287-E
4 September 2019
Original: English**

Member States of the Inter-American Telecommunication Commission (CITEL)

PROPOSALS FOR THE WORK OF THE CONFERENCE

Agenda item 1.3

1.3 to consider possible upgrading of the secondary allocation to the meteorological-satellite service (space-to-Earth) to primary status and a possible primary allocation to the Earth exploration-satellite service (space-to-Earth) in the frequency band 460-470 MHz, in accordance with Resolution **766 (WRC-15)**;

BACKGROUND

The meteorological-satellite service (MetSat) and Earth exploration satellite service (EESS) use Data Collection Systems (DCS), which consist in a network of sensors that are critical to monitor and predict climate change, monitor oceans and water resources, predict the weather, assist in biodiversity protection, and improve marine safety in areas that are hard to reach. In particular, the utility of DCS helps the scientific community to gain a better monitoring and understanding of the environment, and to help the industry to comply with the environmental protection regulations implemented by some governments.

The frequency band 460-470 MHz is allocated on a primary basis to the fixed and mobile services. It is also allocated on a secondary basis to the MetSat (space-to-Earth) service. Moreover, in some countries of Regions 1 and 3, primary allocation is allowed by **No. 5.290** of the Radio Regulations (RR). The operation of EESS applications is also permitted under RR No. **5.289** considering a no-interference and no-protection basis. In addition, channels in the 467.525-467.825 MHz segment can be used for on-board maritime communications under RR No. **5.287** and No. **5.288**.

Primary allocation to MetSat and EESS services in the frequency band 460-470 MHz may give confidence to the public sector and to space and meteorological agencies on the development of data collection systems and programs, as well as provide regulatory certainty. Therefore, parties interested in using the MetSat and EESS services are seeking to upgrade the MetSat allocation to primary status, and to include a primary allocation to EESS in the frequency band 460-470 MHz while providing protection and not imposing additional constraints on existing terrestrial services.

Studies have demonstrated that sharing is possible between meteorological-satellite (space-to-Earth)/Earth-exploration-satellite (space-to-Earth) services and the incumbent services in the 460 – 470 MHz frequency band if the pfd limits proposed below are applied. Based on the results of sharing studies, this proposal supports an allocation upgrade from secondary to a primary for the

meteorological-satellite service (space-to-Earth) and a new primary allocation to the earth-exploration-satellite (space-to-Earth) service in the frequency band 460 – 470 MHz band. This proposal applies a set of elevation angle dependent pfd limits to the meteorological-satellite and Earth exploration-satellite services to protect the incumbent services globally.

ARTICLE 5

Frequency allocations

Section IV – Table of Frequency Allocations
 (See No. 2.1)

MOD IAP/6287A3/1

460-890 MHz

Allocation to services		
Region 1	Region 2	Region 3
460-470	<u>EARTH EXPLORATION-SATELLITE (space-to-Earth) ADD 5.B13</u> FIXED <u>METEOROLOGICAL-SATELLITE (space-to-Earth)</u> MOBILE 5.286AA <u>Meteorological satellite (space to Earth)</u> 5.287 5.288 5.289-5.290 <u>ADD 5.A13</u>	

Reasons: Inclusion in the Table, a primary EESS (space-to-Earth) and MetSat allocation in the frequency band 460-470 MHz.

MOD IAP/6287A3/2

1 660-1 710 MHz

Allocation to services		
Region 1	Region 2	Region 3
1 690-1 700 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) Fixed Mobile except aeronautical mobile <u>MOD 5.289 5.341 5.382</u>	1 690-1 700 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) <u>MOD 5.289 5.341 5.381</u>	
1 700-1 710 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile <u>MOD 5.289 5.341</u>	1 700-1 710 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile <u>MOD 5.289 5.341 5.384</u>	

Reasons: Inclusion in the Table a primary EESS (space-to-Earth) allocation in the frequency band 460-470 MHz.

MOD IAP/6287A3/3

5.289 Earth exploration-satellite service applications, other than the meteorological-satellite service, may also be used in the bands ~~460-470 MHz and~~ 1 690-1 710 MHz for space-to-Earth transmissions subject to not causing harmful interference to stations operating in accordance with the Table of Frequency Allocations. (WRC-19)

Reasons: Inclusion in the Table a primary EESS (space-to-Earth) allocation in the frequency band 460-470 MHz.

SUP IAP/6287A3/4

5.290 *Different category of service:* in Afghanistan, Azerbaijan, Belarus, China, the Russian Federation, Japan, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 460-470 MHz to the meteorological-satellite service (space-to-Earth) is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21**. (WRC-12)

Reasons: Consequential change of the Inclusion in the Table a primary EESS (space-to-Earth) allocation in the frequency band 460-470 MHz.

ADD IAP/6287A3/5

5.A13 In the frequency band 460-470 MHz, earth stations in the meteorological-satellite service (space-to-Earth) and Earth exploration-satellite service (space-to-Earth) shall not claim protection from stations of the fixed and mobile services . Resolution **[IAP/A13] (WRC-19)** shall apply. (WRC-19)

Reasons: To provide protection to the fixed and mobile services from MetSat and EESS satellite downlinks.

ADD IAP/6287A3/6

5.B13 In the frequency band 460-470 MHz stations in the Earth exploration-satellite service (space-to-Earth) shall not cause harmful interference to nor claim protection from stations in the meteorological-satellite service (space-to-Earth). (WRC-19)

Reasons: To provide protection to MetSat downlinks from EESS satellite downlinks.

APPENDIX 7 (REV.WRC-15)

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

ANNEX 7

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

3 Horizon antenna gain for a receiving earth station with respect to a transmitting earth station

MOD IAP/6287A3/7

TABLE 8a (Rev.WRC-192)

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

Receiving space radiocommunication service designation	Space operation, space research	Meteorological-satellite, mobile-satellite	Space research	Space research, space operation	Space operation	Mobile-satellite	Meteorological-satellite	Mobile-satellite	Space research	Space operation	Meteorological-satellite	Broad-casting-satellite	Mobile-satellite	Broadcasting-satellite (DAB)	Mobile-satellite, land-mobile satellite, maritime mobile-satellite
Frequency bands (MHz)	137-138	137-138	143.6-143.65	174-184	163-167 272-273 ⁵	335.4-399.9	400.15-401	400.15-401	400.15-401	401-402	460-470	620-790	856-890	1 452-1 492	1 518-1 530 1 555-1 559 2 160-2 200 ¹
Transmitting terrestrial service designations	Fixed, mobile	Fixed, mobile	Fixed, mobile, radio-location	Fixed, mobile, broadcasting	Fixed, mobile	Fixed, mobile	Meteorological aids	Meteorological aids	Meteorological aids	Meteorological aids, fixed, mobile	Fixed, mobile	Fixed, mobile, broadcasting	Fixed, mobile, broadcasting	Fixed, mobile, broadcasting	Fixed, mobile
Method to be used	§ 2.1	§ 2.1	§ 2.1	§ 2.1	§ 2.1	§ 1.4.6	§ 1.4.6	§ 1.4.6	–	§ 2.1	§ 2.1	§ 1.4.5	§ 1.4.6	§ 1.4.5	§ 1.4.6
Modulation at earth station ²	N		N		N				N	N				N	N
Earth station interference parameters and criteria	p_0 (%)	0.1	0.1	0.1	1.0		0.012		0.1	0.1	0.012				10
	n	2		2	1		1		2	2	+				1
	p (%)	0.05		0.05	1.0		0.012		0.05	0.05	0.012				10
	N_L (dB)	0		0	0	0	0	0	0	0					0
	M_s (dB)	1		1	1	1	4.3		1	1					1
	W (dB)	0		0	0	0	0	0	0	0					0
Terrestrial station parameters	E (dBW) in B ³	A	–	–	15				–	–	5			38	37 ⁴
		N	–	–	15				–	–	5			38	37
	P_f (dBW) in B	A	–	–	–1				–	–	–11			3	0
		N	–	–	–1				–	–	–11			3	0
	G_x (dBi)	–		–	16				–	–	+6			35	37
Reference bandwidth	B (Hz)	1	1		10^3		177.5×10^3		1	1	85			25×10^3	4×10^3
Permissible interference power	$P_f(p)$ (dBW) in B	–199	–199		–173		–148		–208	–208	–178				–176

¹ In the band 2 160-2 200 MHz, the terrestrial station parameters of line-of-sight radio-relay systems have been used. If an administration believes that, in this band transhorizon systems need to be considered, the parameters associated with the frequency band 2 500-2 690 MHz may be used to determine the coordination area.

² A: analogue modulation; N: digital modulation.

³ E is defined as the equivalent isotropically radiated power of the interfering terrestrial station in the reference bandwidth.

⁴ This value is reduced from the nominal value of 50 dBW for the purposes of determination of coordination area, recognizing the low probability of high power emissions falling fully within the relatively narrow bandwidth of the earth station.

⁵ The fixed-service parameters provided in the column for 163-167 MHz and 272-273 MHz are only applicable to the band 163-167 MHz.

Reasons: Consequential change.

ADD IAP/6287A3/8

DRAFT NEW RESOLUTION [IAP/A13] (WRC-19)

Implementation of satellite networks and systems of the meteorological-satellite service (space-to-Earth) and the Earth exploration-satellite service (space-to-Earth) in the frequency band 460-470 MHz

The World Radiocommunication Conference (Sharm el-Sheikh, 2019),

considering

- a) that data collection systems (DCS) operate on geostationary and non-geostationary orbits in the meteorological-satellite service (MetSat) and the Earth exploration-satellite service (EESS) (Earth-to-space) systems in the frequency band 401-403 MHz;
- b) that DCS are essential for monitoring and predicting climate change, monitoring oceans, and water resources, weather forecasting and assisting in protecting biodiversity, and improving maritime security;
- c) that most of these DCS have implemented satellite downlinks (space-to-Earth) in the frequency band 460-470 MHz which bring significant improvements to the operation of satellite DCS, such as the transmission of information to optimize the usage of the terrestrial data collection platforms;
- d) that the frequency band 460-470 MHz is also used for the downlink of mission and telemetry data for meteorological and Earth-exploration purposes;
- e) that the frequency band 460-470 MHz is allocated to the fixed and mobile services on a primary basis and is widely used by these services and is also identified for IMT on a global basis;
- f) that WRC-19 has upgraded the secondary allocation of the MetSat (space-to-Earth) to primary status and added a primary allocation to the EESS (space-to-Earth) in the frequency band 460-470 MHz, and established a power flux-density (pfd) limit to provide protection of existing terrestrial services;
- g) that prior to WRC-19, No. **5.290** provided a primary allocation to the MetSat (space-to-Earth) in some administrations subject to agreement obtained under No. **9.21**,

noting

- a) that frequency assignments for several EESS and MetSat satellite networks and systems in the frequency band 460-470 MHz were notified and brought into use before 22 November 2019;
- b) that some of these EESS and MetSat satellite networks and systems above may not meet the pfd limit referenced in *considering f*), but there is a need to authorise them to continue their operation subject to the conditions of a secondary basis,

resolves

that in the frequency band 460-470 MHz the power flux-density at the Earth's surface produced by stations in the meteorological-satellite (space-to-Earth) and Earth exploration-satellite (space-to-

Earth) services shall comply with the limits listed below under assumed free-space propagation conditions for all methods of modulation:

For non-GSO space stations:

$$pfd (dBW/(m^2 \cdot 4kHz)) = \begin{cases} -157 & 0^\circ \leq \alpha < 5^\circ \\ -157 + 0.5(\alpha - 5) & 5^\circ \leq \alpha < 15^\circ \\ -152 & 15^\circ \leq \alpha \leq 90^\circ, \end{cases}$$

and for GSO space stations:

$$pfd (dBW/(m^2 \cdot 4kHz)) = \begin{cases} -162 & 0^\circ \leq \alpha \leq 15^\circ \\ -162 + 0.5(\alpha - 15) & 15^\circ < \alpha < 35^\circ \\ 152 & 35^\circ \leq \alpha \leq 90^\circ \end{cases}$$

where α is the angle of arrival above the horizontal plane, in degrees,

instructs the Director of the Radiocommunication Bureau

1 to retain the existing status in the MIFR, when applying No. **11.50**, of the frequency assignments of MetSat (space-to-Earth) and EESS (space-to-Earth) satellite networks or systems recorded as of the end of WRC-19 that do not meet the pfd limits given in the *resolves*;

2 to record in the MIFR the frequency assignments for which the complete notification information is received after the end of WRC-19 and the advance publication information or the coordination request, as appropriate, was received prior to the end of WRC-19, that do not meet the pfd limits given in the *resolves*, subject to not causing harmful interference to fixed and mobile services.

Reasons: To apply pfd limits to protect fixed and mobile services and to provide transition measures for EESS (space-to-Earth) and MetSat (space-to-Earth).

SUP IAP/6287A3/9

RESOLUTION 766 (WRC-15)

Consideration of possible upgrading of the secondary allocation to the meteorological-satellite service (space-to-Earth) to primary status and a primary allocation to the Earth exploration-satellite service (space-to-Earth) in the frequency band 460-470 MHz

Reasons: Consequential change.