UNITED STATES OF AMERICA
DRAFT PROPOSAL FOR WRC-19

Agenda Item 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 460-470 MHz frequency band is allocated on a primary basis to the fixed and mobile services. The meteorological-satellite service currently has a secondary allocation in this band. Under No. **5.289**, "Earth exploration-satellite service applications, other than the meteorological-satellite service, may also be used in the bands 460-470 MHz for space-to-Earth transmissions subject to not causing harmful interference to stations operating in accordance with the Table".

Within this frequency band the Argos Data Collection System (ADCS) monitors more than 21,000 active Argos platforms collecting data for over 2,000 distinct projects in 100+ countries. The administration of the Argos program is under a joint agreement between the National Oceanic and Atmospheric Administration (NOAA) within the United States and the French Space Agency, Centre National d'Etudes Spatiales (CNES). Additional partners include the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), and the Indian Space Research Organization (ISRO).

Critical applications of the ADCS include atmospheric and ocean monitoring/research, tropical cyclone forecasting, fishery management, oil spill tracking, fishing vessel tracking, search and rescue modeling (at sea), anti-piracy alerting, import/export and hazardous materials tracking, endangered species studies, migration mapping, and wildlife tracking and management.

The meteorological-satellite (space-to-Earth) service operates on a secondary basis relative to the fixed and mobile services and thus it must not interfere with these services. To protect the fixed and land mobile services within the United States, a power flux density (pfd) of -152 dB(W/(m^2·4kHz)) has been imposed on the meteorological-satellite (space-to-Earth) service.

In accordance with Resolution **766 (WRC-15)**, the ITU-R is conducting sharing studies to ensure the protection of incumbent services and to develop a pfd limit that will protect incumbent services globally from potential interference in the frequency band 460 – 470 MHz.

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 new pfd limits 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 the new pfd limits to the meteorological-satellite and earth exploration-satellite services in order to protect the incumbent services globally.

Proposal:

ARTICLE 5

Frequency allocations

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

MOD USA/AI 1.3/1

460-470 MHz

Allocation to services		
Region 1	Region 2	Region 3
460-470	FIXED MOBILE 5.286AA METEOROLOGICAL-SATELLITE (space-to-Earth) EARTH-EXPLORATION-SATELLITE (space-to-Earth) Meteorological-satellite (space-to-Earth) 5.287 5.288 MOD 5.289 5.290 ADD 5.A103 ADD 5.B103 ADD 5.C103	

Reason: The upgrade from the secondary MetSat and EESS allocations to primary will bring regulatory stability and certainty to decades of investments for the space agencies involved in Satellite Data Collection Programs. Also, this upgraded allocation will ease coordination effort for Administrations.

MOD USA/AI 1.3/2

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.

ADD USA/AI 1.3/4

5.A103 In the frequency band 460-470 MHz, earth stations in the meteorological-satellite (space-to-Earth) and earth-exploration-satellite (space-to-Earth) services shall not claim protection from, stations of the fixed and mobile services.

Reasons: The incumbent fixed and mobile allocations maintain a higher regulatory status over the primary meteorological-satellite (space-to-Earth) and earth exploration-satellite (space-to-Earth) services by not being required to protect the metrological-satellite and earth-exploration satellite services.

ADD   USA/AI 1.3/5

5.B103 In the frequency band 460-470 MHz, in order to protect systems of the fixed and mobile services, stations in the meteorological-satellite (space-to-Earth) and earth exploration-satellite (space-to-Earth) services shall comply with the power flux density limits listed below.

  1) For the non-GSO spacecraft is:

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

  2) For the GSO spacecraft is:

$$pfd\ (dB(W/(m^2\cdot 4kHz))) = -156 + 3/90 \times \alpha \qquad 0° < \alpha < 90°$$

  where α is the angle of arrival above the horizontal plane, in degrees. (WRC-19)

Reasons: The meteorological-satellite (space-to-Earth) and earth exploration-satellite (space-to-Earth) services shall protect the incumbent fixed and mobile services by restricting their operations according to these pfd limits.

ADD   USA/AI 1.3/6

5.C103 In the frequency band 460-470 MHz, stations in the earth exploration-satellite service (space-to-Earth) shall not cause harmful interference to stations in the meteorological-satellite service (space-to-Earth). (WRC-19)

Reasons: Maintain the current priority that the meteorological-satellite service (space-to-Earth) has relative to the earth exploration-satellite (space-to-Earth) service.

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   USA/AI 1.3/7

TABLE 8A   (REV.WRC-19)

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

Receiving space radiocommunication service designation		Space operation, space research	Meteoro-logical-satellite, mobile-satellite	Space research	Space research, space operation	Space operation	Mobile-satellite	Meteoro-logical-satellite	Mobile-satellite	Space research	Space operation	Meteoro-logical-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, broad-casting	Fixed, mobile	Fixed, mobile	Meteoro-logical aids	Meteoro-logical aids	Meteoro-logical aids	Meteoro-logical aids, fixed, mobile	~~Fixed, mobile~~	Fixed, mobile, broad-casting	Fixed, mobile, broad casting	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		1.0		0.012		0.1	0.1	~~0.012~~					10
	n	2		2		1		1		2	2	~~1~~					1
	p (%)	0.05		0.05		1.0		0.012		0.05	0.05	~~0.012~~					10

		A/N												
N_L (dB)			0	0	0	0	0	0				0
M_s (dB)			1	1	1	4.3	1	1				1
W (dB)			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_t (dBW) in B	A	–	–	–1		–	–	~~–11~~			3	0
		N	–	–	–1		–	–	~~–11~~			3	0
	G_x (dBi)		–	–	16		–	–	~~16~~			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	$P_r(p)$ (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.

Reason: Consequential changes to AP 7 to remove the Meteorological Satellite Service given the proposed 5.A103.

SUP   USA/AI 1.3/8

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: Sharing studies have shown that an upgrade to a primary allocation for meteorological-satellite service (space-to-Earth) and earth-exploration satellite service (space-to-Earth) are compatible with the incumbent services and there is no further need for this resolution.

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