

## United States of America

### DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

**Agenda Item 1.9:** to review the technical, operational and regulatory provisions applicable to the use of the band 2 500-2 690 MHz by space services in order to facilitate sharing with current and future terrestrial services without placing undue constraint on the services to which the band is allocated;

#### **Background Information:**

#### **Issue A: Necessary Power Flux Density Limits**

There are three space services allocated in portions of the 2 500-2 690 MHz band. In addition to MSS there are allocations to BSS and FSS. At WRC-03 the issue of sharing between terrestrial services and BSS (Sound) was resolved as reflected in RR Nos. **5.417A** and/or **5.418**. The sharing between BSS and terrestrial services not included in these two provisions was not addressed at WRC-03 and need to be considered. WRC-03 recognized the need review the technical, operational and regulatory provisions applicable to the use of the band 2 500-2 690 MHz by space services in order to facilitate sharing with current and future terrestrial services (see Res. **802 (WRC-03)**, Agenda Item 1.9). To that end, CPM06-1 established the Joint Task Group 6-8-9 (JTG 6-8-9) with the purpose to conduct studies on this issue. The JTG 6-8-9 has developed a methodology for estimating the satellite pfd values required to protect terrestrial services. Based on this methodology, the USA has determined that pfd values at the surface of the Earth produced by the emissions of MSS, BSS and FSS satellites of  $-136 \text{ dBW/m}^2/\text{MHz}$  for angles of arrival below  $5^\circ$  and  $-122 \text{ dBW/m}^2/\text{MHz}$  for angles of arrival greater than  $25^\circ$  would yield tolerable levels of interference to the Fixed and non IMT-2000 mobile services.

There are definite advantages to having a uniform regulatory regime for all space services in the 2 500-2 690 MHz band, based on the specification of a power flux density limits in RR **Article 21**. First it would ensure long term safeguard of terrestrial systems in the band 2 500-2 690 MHz from satellite interference and could also be beneficial to the long-term development of space services as a defined set of pfd limits would be established and finalized. Additionally, a hard limit regulatory regime would alleviate coordination burden and provide regulatory certainty to all services in the band.

In short, the proposed regulatory approach would ensure that existing and planned satellite networks are not overly constrained while existing and future terrestrial services are adequately protected.

## **Issue B: Mobile Satellite Service (MSS)**

The band 2 500-2 520 MHz is allocated to MSS (space-to-Earth) paired with MSS (Earth-to-space) allocation in the band 2 670-2 690 MHz.<sup>1</sup> The terrestrial services in these bands include the Mobile and the Fixed Services (including IMT-2000). Both the terrestrial Mobile and Fixed Services have been rapidly evolving to encompass high-speed mobile Internet services requiring sensitive receiving equipment, which may be highly susceptible to interference.

In general, co-frequency sharing between MSS and terrestrial services has been found to be difficult by the ITU-R studies. The SG-8, for example, studied the feasibility of sharing between MSS and MS for IMT-2000 and concluded that co-frequency/co-coverage sharing is not feasible. A new regulatory provision is proposed that would limit MSS downlinks in the 2 500-2 520 MHz band to national and regional systems only. Under the proposed regulatory provision, administrations seeking to implement MSS will be allowed to do so while other administrations will be able to implement terrestrial services, all without the undue regulatory constraints. In case of a national system, the service area of the MSS system would be limited to the territory under the jurisdiction of the notifying administration. In case of a regional system, the following Radio Regulations Board's decisions would apply<sup>2</sup>:

- (1) No. **5.2.1** applies to the interpretation of the word “regional” without a capital “R”.
- (2) When an administration submits a coordination request for a service area that covers its national territory and extends beyond it, the responsible administration, before it notifies the relevant assignments under Article **11**, will have to obtain agreements from those administrations whose territories are included in the service area. When the responsible administration notifies these assignments under Article **11**, it shall submit the list of administrations that agreed to form the regional system and shall adjust the service area accordingly. If no agreement is obtained, the service area shall be limited to its national territory.

It is also important to note that this rule of procedure clearly stipulates that the service area of a national or regional satellite system does not extend beyond the territory of administration(s) that agreed to be included in that service area.

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<sup>1</sup> In accordance with RR **5.403**, the band 2 520-2 535 MHz may also be used for MSS (space-to-Earth) for operation limited to within national boundaries.

<sup>2</sup> See comments under the Rules of Procedure concerning No. **5.415** and **5.416**

**Proposals associated with Issue A:**

**USA/ /1 MOD**

**ARTICLE 21**

**TABLE 21-4 (WRC-03)**

Frequency band	Service*	Limit in dB(W/m <sup>2</sup> ) for angles of arrival (δ) above the horizontal plane			Reference bandwidth
		0°-5°	5°-25°	25°-90°	
2 500-2 690 MHz	Fixed-satellite	-152	<del>-152 + 0.75(δ - 5)</del>	-137	4 kHz
2 520-2 670 MHz	Broadcasting-satellite	-136	<u>-136 + 0.7(δ - 5)</u>	<u>-122</u>	<u>1 MHz</u>
2 500-2 516.5 MHz (No. <b>5.404</b> )	Radiodetermination-satellite				
<u>2500-2535</u>	<u>Mobile Satellite (Space to Earth)</u>				
3 400-4 200 MHz	Fixed-satellite (space-to-Earth) (geostationary-satellite orbit)	-152	-152 + 0.5(δ - 5)	-142	4 kHz

**Reasons:** Studies have shown that a satellite pfd value of -136 dBW/m<sup>2</sup>/MHz at angles below 5°, and -122 dBW/m<sup>2</sup>/MHz at angles greater than 25° yielded acceptable levels of interference to terrestrial services in the 2500-2690 MHz band. The proposed power flux density limits would facilitate FSS, BSS and MSS sharing with current and future terrestrial services in the band 2500-2690 MHz and provide necessary safeguard for the terrestrial (FS and MS) systems in the band. The proposed modification would also provide regulatory certainty to satellite services as a defined set of pfd limits would be known and extensive coordination with uncertain outcome would not be required.

USA/ 12 MOD

APPENDIX 5 (Rev. WRC-03)  
ANNEX 1

TABLE 5-2 (WRC-03)

Frequency band (MHz)	Terrestrial service to be protected	Coordination threshold values				
		GSO space stations		Non-GSO space stations		
		pfd (per space station) calculation factors (NOTE 2)		pfd (per space station) calculation factors (NOTE 2)		% FDP (in 1 MHz) (NOTE 1)
		<i>P</i>	<i>r</i> dB/degrees	<i>P</i>	<i>r</i> dB/degrees	
2 500-2 520	Analogue FS telephony (NOTE 5)	-146 dB(W/m <sup>2</sup> ) in 4 kHz and -128 dB(W/m <sup>2</sup> ) in 1 MHz	0.5	-146 dB(W/m <sup>2</sup> ) in 4 kHz and -128 dB(W/m <sup>2</sup> ) in 1 MHz	0.5	
	All other cases	-128 dB(W/m <sup>2</sup> ) in 1 MHz	0.5	-128 dB (W/m <sup>2</sup> ) in 1 MHz	0.5	25
2 520-2 535	Analogue FS telephony (NOTE 5)	-154 dB(W/m <sup>2</sup> ) in 4 kHz and -136 dB(W/m <sup>2</sup> ) in 1 MHz	75	-146 dB(W/m <sup>2</sup> ) in 4 kHz and -128 dB(W/m <sup>2</sup> ) in 1 MHz	0.5	
	All other cases	-136 dB(W/m <sup>2</sup> ) in 1 MHz	0.75	-128 dB(W/m <sup>2</sup> ) in 1 MHz	0.5	25

**Reasons:** Consequential to adding pfd limit for MSS to Article 21, Table 21-4 per USA/ 11. Limits in Article 21 eliminate the requirement for coordination with terrestrial systems in the band 2 500-2 535 MHz.

**Proposals associated with Issue B:**

**USA/ /3 MOD**

**ARTICLE 5**

**Frequency allocations**

Section IV – Table of Frequency Allocations

**2 500-2 520 MHz**

<b>Allocation to services</b>		
<b>2 500-2 520</b>	<b>2 500-2 520</b>	<b>2 500-2 520</b>
FIXED 5.409 5.410 5.411	FIXED 5.409 5.411	FIXED 5.409 5.411
MOBILE except aeronautical mobile 5.384A	FIXED-SATELLITE (space-to-Earth) 5.415	FIXED-SATELLITE (space-to-Earth) 5.415
MOBILE-SATELLITE (space-to-Earth) 5.351A 5.403	MOBILE except aeronautical mobile 5.384A	MOBILE except aeronautical mobile 5.384A
	MOBILE-SATELLITE (space-to-Earth) 5.351A 5.403	MOBILE-SATELLITE (space-to-Earth) 5.351A 5.403
	<u>ADD 5.AAA</u>	
5.405 5.407 5.412 5.414	5.404 5.407 5.414 5.415A	5.404 5.407 5.414 5.415A

**USA/ /4 ADD**

**5.AAA** The use of the band 2 500-2 520 MHz by the mobile-satellite service is limited to national and regional systems, subject to agreement obtained under No. **9.21**.

**Reasons:** Restricting MSS to national and regional systems would further facilitate sharing between MSS and terrestrial services. This restriction would not constrain MSS, as there are no global coverage systems planned for this band, but would ensure that MSS systems service areas are limited to territories of the administrations seeking to implement MSS. This restriction, however, would not fully address the issue of MSS interference to terrestrial systems and must be implemented in conjunction with the appropriate PFD limits for MSS (see proposed modifications to Article **21**).

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