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| **World Radiocommunication Conference (WRC-15) Geneva, 2–27 November 2015** |  |
| **INTERNATIONAL TELECOMMUNICATION UNION** |  |
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| **PLENARY MEETING** | **Addendum 11 to Document 9-E** |
|  | **24 June 2015** |
|  | **Original: English** |
|  | |
| European Common Proposals | |
| Proposals for the work of the conference | |
|  | |
| Agenda item 1.11 | |

1.11to consider a primary allocation for the Earth exploration-satellite service (Earth-to-space) in the 7-8 GHz range, in accordance with Resolution **650 (WRC‑12)**;

Introduction

A sizable number of future Earth exploration-satellite service (EESS) missions will require to uplink to the spacecraft a large amount of data for operations plans and dynamic spacecraft software modifications. The bandwidth that globally would be required on the Earth-to-space link for these telecommanding functions cannot be accommodated in the only EESS (Earth-to-space) allocation that is currently available in RR Article 5 for telecommanding, i.e. the 2 025-2 110 MHz band. This 2 025-2 110 MHz band is of fundamental importance, since there are already more than 1 100 satellite networks filed with the ITU and many new satellite networks are expected to enter into this band, also including many microsatellites, nanosatellites and picosatellites. It would be extremely difficult, if not impossible, to coordinate satellites with such large bandwidth requirements within this band.

An EESS (Earth-to-space) allocation in the 7-8 GHz range would allow alleviating the problems posed by this new type of EESS mission. The TT&C (Telemetry, Telecommand and Control) function could be implemented by pairing this new allocation with the already existing EESS (space-to-Earth) allocation in the band 8 025-8 400 MHz. This may also eventually lead to a simplified on-board architecture and operational concept for some future EESS missions.

The results of spectrum requirement studies came to the conclusion that the allocation to the EESS (Earth-to-space) in the 7/8 GHz band would need up to 56 MHz.

Resolution 650 (WRC-12) invites ITU-R to conduct compatibility studies between EESS (Earth-to-space) systems and existing services, with priority to the band 7 145-7 235 MHz. The band 7 145‑7 190 MHz (space research service (SRS) Earth-to-space deep-space) has to be excluded from consideration since EESS uplinks may interfere with SRS deep space spaceborne receivers and additionally, SRS earth station emissions would have the potential to saturate and damage the EESS spaceborne receivers.

Europe supports the allocation of the frequency band 7 190-7 250 MHz on a primary basis to the EESS (Earth-to-space), as the conclusions of compatibility studies using criteria and characteristics as specified in existing ITU-R Recommendations have shown that the required protection conditions are met.

Europe supports to restrict the use of the new EESS allocation to TT&C for spacecraft operations, as stated in Resolution 650 (WRC-12).

The GSO EESS systems in the band in the band 7 190-7 235 MHz shall not claim protection from existing and future stations of the fixed service (FS) and the mobile service (MS), similarly to the regulatory provisions of the GSO SRS systems that are already allocated in this band.

RR No. 9.21 is applied to the space operation service (SOS) in the frequency band 7 190‑7 235 MHz in order to provide protection for the existing radio services. Europe considers that RR No. 9.21 in the frequency band 7 190‑7 235 MHz, the space operation service (Earth-to-space) is not subject to obtain agreement under RR No. 9.21 with respect to the Earth exploration-satellite service (Earth-to-space).

Compatibility of the EESS (Earth-to-space) with the fixed (FS) and mobile services (MS) will be achieved by coordination within the area defined on the basis of Appendix 7 of the Radio Regulations. It is noted that the SOS and SRS services are already allocated in the frequency range 7 190-7 235 MHz and that provisions exist in the Appendix 7 of the Radio Regulations with regard to the coordination between SRS and SOS on one side, and FS on the other side, including the characteristics of the reference FS system to be taken into account in the determination of the coordination.

FS and MS stations will be protected from the EESS earth stations by the mandatory coordination under RR No. 9.17.

The allocation to EESS (Earth-to-space) in the band 7 190-7 250 MHz would satisfy the spectrum requirements identified. The frequency range 7 235-7 250 MHz would be used for those cases of EESS spacecraft links presenting a difficult sharing scenario with SRS spacecraft and SOS links in the frequency range 7 190-7 235 MHz.

These European Proposals correspond to the CPM Report on Method A.

ARTICLE 5

Frequency allocations

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

MOD EUR/9A11/1

5 570-7 250 MHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 7 145-7 190 FIXED  MOBILE  SPACE RESEARCH (deep space) (Earth-to-space)  5.458 MOD 5.459 | | |
| 7 190-7 235 EARTH EXPLORATION-SATELLITE (Earth-to-space) ADD 5.A111  FIXED  MOBILE  SPACE RESEARCH (Earth-to-space) MOD 5.460  5.458 MOD 5.459 | | |
| 7 235-7 250 EARTH EXPLORATION-SATELLITE (Earth-to-space) ADD 5.A111  FIXED  MOBILE  5.458 | | |

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5.459 *Additional allocation:*in the Russian Federation, the frequency bands 7 100‑7 155 MHz and 7 190-7 235 MHz are also allocated to the space operation service (Earth-to-space) on a primary basis, subject to agreement obtained under No. **9.21**. In the frequency band 7 190-7 235 MHz, the space operation service (Earth-to-space) is not subject to obtain agreement under No. **9.21** with respect to the Earth exploration-satellite service (Earth-to-space).     (WRC‑15)

**Reasons:** In the frequency band 7 190-7 235 MHz RR No. 9.21 is applied to the space operation service in order to provide protection for the existing radio services and shall not be applied with respect to a new service (the EESS) not to impose new constraints on the existing radio service.

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5.460 No emissions to spacecraft operating in deep space shall be effected in the frequency band 7 190-7 235 MHz. Geostationary satellites in the space research service operating in the frequency band 7 190-7 235 MHz shall not claim protection from existing and future stations of the fixed and mobile services and No. 5.43Adoes not apply.     (WRC-15)

**Reasons:** Deletion of first sentence as consequential changes. Addition of words “spacecraft operating in” to be more precise.

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5.A111 The use of the band 7 190-7 250 MHz by the Earth exploration-satellite service (Earth-to-space) shall be limited to tracking, telemetry and command for the operation of spacecraft. Space stations on the geostationary orbit operating in the Earth exploration-satellite service in this frequency band shall not claim protection from existing and future stations of the fixed and mobile services and No.**5.43A** does not apply.     (WRC‑15)

**Reasons:** To provide a new allocation to the Earth exploration-satellite service (Earth-to-space) in the band 7 190-7 250 MHz. The TT&C (Telemetry, Telecommand and Control) function could be implemented by pairing this new allocation with the already existing Earth exploration-satellite service (space-to-Earth) allocation in the band 8 025-8 400 MHz.

It restricts the usage of the frequency band 7 190-7 250 MHz to the operation of the EESS spacecraft, because the aim for the Resolution 650 (WRC-12) is to obtain a new allocation in the frequency range 7-8 GHz for the TT&C operations and no studies regarding other purpose except for TT&C function have been performed. If there were no restriction, this new allocation might be used for other purposes (e.g. data dissemination).

The allocation covers both GSO and NGSO EESS systems. Similarly to the regulatory provisions of the GSO SRS systems that are already allocated in this band, the GSO EESS systems shall not claim protection from existing and future stations of the FS and the MS.

ARTICLE 21

Terrestrial and space services sharing frequency bands above 1 GHz

Section III − Power limits for earth stations

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TABLE **21-3**     (Rev.WRC‑15)

|  |  |  |
| --- | --- | --- |
| Frequency band | | Services |
| ...  7 190-7 250 MHz | ... | ... |
| 7 900-8 400 MHz |  |  |
| 10.7-11.7 GHz6 | (for Region 1) |  |
| 12.5-12.75 GHz6 | (for Region 1 with respect to the countries listed in No. 5.494) |  |
| 12.7-12.75 GHz6 | (for Region 2) |  |
| 12.75-13.25 GHz |  |  |
| 14.0-14.25 GHz | (with respect to the countries listed in No. 5.505) |  |
| 14.25-14.3 GHz | (with respect to the countries listed in Nos. 5.505, 5.508 and 5.509) |  |
| 14.3-14.4 GHz6 | (for Regions 1 and 3) |  |
| 14.4-14.8 GHz |  |  |

**Reasons:** Consequential changes as a result of considering the new allocation to the Earth exploration-satellite service (Earth-to-space) 7 190-7 250 MHz.

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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

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TABLE 7b    (Rev.WRC‑15)

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Transmitting space radiocommunication  service designation | Fixed-satellite, mobile-satellite | Aero-nautical mobile-satellite (R) service | Aero-nautical mobile-satellite (R) service | Fixed- satellite | Fixed- satellite | Fixed- satellite | Fixed- satellite | Earth exploration-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 | 5.030-5.091 | 5.030-5.091 | 5.091-5.150 | 5.091-5.150 | 5.725-5.850 | 5.725-7.075 | 7.100-7.250 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 | Aeronautical mobile (R) | Aeronautical radio- navigation | Aeronautical mobile (R) | Radiolocation | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile | Radiolocation radionavigation (land only) | Aeronautical radionavigation | Fixed, mobile | Fixed, mobile |

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 *Gx* = 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 7 190-7 250 MHz for the Earth exploration-satellite service, 7 100-7 155 MHz and 7 190-7 235 MHz for the space operation service and 7 145-7 235 MHz for the space research service.     (WRC‑15)

**Reasons:** Consequential changes as a result of including the new allocation to the Earth exploration-satellite service (Earth-to-space) in Appendix 7, Table 7B (Parameters required for the determination of coordination distance for a transmitting earth station).

SUP EUR/9A11/8

RESOLUTION 650 (WRC‑12)

Allocation for the Earth exploration-satellite service   
(Earth-to-space) in the 7-8 GHz range

**Reasons:** This Resolution is no longer necessary.

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