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| **World Radiocommunication Conference (WRC-15) Geneva, 2–27 November 2015** |  |
| **INTERNATIONAL TELECOMMUNICATION UNION** |  |
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| PLENARY MEETING | **Addendum 1 to Document 9(Add.6)-E** |
|  | **16 October 2015** |
|  | **Original: English** |
|  | |
| European Common Proposals | |
| Proposals for the work of the conference | |
| PART 6 | |
| Agenda item 1.6.1 | |

1.6 to consider possible additional primary allocations:

1.6.1 to the fixed-satellite service (Earth-to-space and space-to-Earth) of 250 MHz in the range between 10 GHz and 17 GHz in Region 1;

and review the regulatory provisions on the current allocations to the fixed-satellite service within each range, taking into account the results of ITU‑R studies, in accordance with Resolutions **151 (WRC‑12)** and **152 (WRC‑12)**, respectively;

Introduction

The spectrum allocated to the unplanned fixed-satellite service (FSS) in the space-to-Earth direction in the 10-15 GHz band is 750 MHz in ITU Region 1, 1 000 MHz in Region 2 and 1 050 MHz in Region 3. This difference of capacity creates an imbalance among the Regions, thus restricting satellite operators in different ITU Regions from fully and effectively utilizing the limited frequency resource to cope with the increasing spectrum demand for the unplanned fixed-satellite service, which extensively used for a large variety of applications.

To resolve the shortage of FSS spectrum in Region 1 studies of possible bands for a new primary allocation to the fixed-satellite service of 250 MHz in space-to-Earth direction in Region 1 within the bands 10-17 GHz on technical (including necessary calculations and criteria), operational and regulatory issues on this topic, in accordance with Resolution 151 (WRC-12) were conducted.

Based on the sharing studies results, Europe proposes an additional primary allocation of 250 MHz to the fixed-satellite service in the space-to-Earth direction limited to geostationary-satellite systems in Region 1 in frequency band 13.40-13.65 GHz, see Section 1 of this document.

This new allocation is subject to adoption of the additional operational constraints and to development of possible specific mitigation technique if required (e.g. PFD mask) to permit compatibility with existing systems as developed in Section 1.

Also, Europe is opposed to the additional allocation to the fixed-satellite service in the frequency bands 10.6-10.68 GHz, 13.25-13.40 GHz and 15.35-15.40 GHz due to the difficulty of sharing with active and passive services operating in these bands, see Section 2 of this document.

Proposals

SECTION 1

Space-to-Earth allocation in the band 13.40-13.65 GHz in Region 1

ARTICLE 5

Frequency allocations

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

MOD EUR/9A6A1/1

11.7-14 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 13.4-13.65  EARTH EXPLORATION-SATELLITE (active)  FIXED-SATELLITE (space-to-Earth) ADD 5.A161 ADD 5.С161 ADD 5.X161  RADIOLOCATION  SPACE RESEARCH ADD 5.B161  Standard frequency and time signal-satellite (Earth-to-space)  5.499 5.500 5.501 5.501B | 13.4-13.65  EARTH EXPLORATION-SATELLITE (active)  RADIOLOCATION  SPACE RESEARCH ADD 5.B161  Standard frequency and time signal-satellite (Earth-to-space)  5.499 5.500 5.501 5.501B | |
| 13.65-13.75 EARTH EXPLORATION-SATELLITE (active)  RADIOLOCATION  SPACE RESEARCH MOD 5.501A  Standard frequency and time signal-satellite (Earth-to-space)  5.499 5.500 5.501 5.501B | | |

**Reasons:** To allocate the band 13.4-13.65 GHz to GSO FSS (space-to-Earth) in Region 1.

ADD EUR/9A6A1/2

5.A161 The use of the band 13.4-13.65 GHz by the fixed-satellite service (space-to-Earth) is limited to geostationary-satellite systems and is subject to agreement obtained under No. **9.21** with respect to satellite systems operating in the space research service (space-to-space) to relay data from space station in the geostationary satellite orbit to associated space station in the non-geostationary satellite orbit for which information for advance publication has been received by the Bureau prior to 27 November 2015.    (WRC‑15)

**Reasons:** To limit the usage of new allocation to FSS (space-to-Earth) in Region 1 by geostationary systems in the fixed satellite service. To apply the provisions of No. 9.21 for coordination of the frequency assignments of new allocation to GSO FSS (space-to-Earth) with the notified frequency assignments of forward inter-orbit links (space-to-space) (GSO satellite DRS systems- satellite NGSO DRS) of DRS systems in the space research service in the frequency band 13.4-13.65 GHz. Coordination of frequency assignments of new allocation to GSO FSS (space-to-Earth) with the frequency assignments of return feeder links (space-to-Earth) (GSO satellite DRS systems- DRS ES) of DRS systems in the space research service is subject to application of the provisions No. 9.7.

ADD EUR/9A6A1/3

5.B161 The allocation of the band 13.4-13.65 GHz to the space research service on a primary basis is limited to active spaceborne sensors, as well as satellite systems, operating in the space research service (space-to-Earth) and/or (space-to-space) to relay data from space station in the geostationary-satellite orbit to associated earth station and space station in non-geostationary-satellite orbit respectively for which information for advance publication has been received by the Bureau prior to 27 November 2015. Satellite systems in the space research service (space-to-Earth) and/or (space-to-space) shall not cause harmful interference to nor claim protection from stations in the fixed, mobile, radiolocation and Earth exploration-satellite (active) services. Other uses of the band by the space research service are on a secondary basis.     (WRC‑15)

**Reasons:** Since only the frequency assignments having allocation of the considered frequency band on an equal basis are taken into account in the coordination under Article 9 it is proposed to modify No. 5.501Аand to add a new footnote under which the status of the ITU BR notified frequency assignments of DRS in SRS (s-E and s-s) in Region 1 will be increased up to the primary with regard to FSS. Other usage of the systems within SRS does not change the status. DRS in the SRS in Regions 2 and 3 remain on a secondary basis since FSS satellite in Region 1 will not affect the receiving ES of SRS in Region 2. With respect to FSS stations in Region 1 in any case it is required to seek the agreement of other administrations (under No. 9.21) operating DRS in SRS in Region 1, with NGSO user which can be potentially located over the territories of Region 2 and 3. The direction of the DRS SRS links (s-E and s-s) is defined by the relevant Recommendations therefore it is not specified in Article 5 footnotes.

ADD EUR/9A6A1/4

5.C161 In the band 13.4-13.65 GHz, geostationary-satellite networks in the fixed-satellite service (space-to-Earth) shall not claim protection from space stations in the Earth exploration-satellite service (active) operating in accordance with these Regulations. No. **5.43A** and No. **22.2** do not apply.     (WRC‑15)

**Reasons:** The studies have shown that FSS receiving earth station may receive interference exceeding the FSS protection criterion during a small percentage of time (0.01%-0.1%). This small percentage of time is assumed to be acceptable for the FSS and in any case, there is no practical means for the EESS to prevent this.

ADD EUR/9A6A1/5

5.X161 Administrations shall not preclude the deployment and operation of transmitting earth stations in the standard frequency and time signal-satellite (Earth-to-space) allocated on a secondary status in the band 13.4-13.65 GHz, due to the primary allocation to FSS (space-to-Earth).     (WRC‑15)

**Reasons:** To ensure the deployment of transmitting earth stations for the European ACES system in the band 13.4-13.75 GHz operating under the standard frequency and time signal-satellite.

MOD EUR/9A6A1/6

5.501A The allocation of the band 13.65-13.75 GHz to the space research service on a primary basis is limited to active spaceborne sensors. Other uses of the band by the space research service are on a secondary basis.     (WRC‑15)

ARTICLE 21

Terrestrial and space services sharing frequency bands above 1 GHz

Section I − Choice of sites and frequencies

MOD EUR/9A6A1/7

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1 21.2.1 For their own protection receiving stations in the fixed or mobile service operating in bands shared with space radiocommunication services (space-to-Earth) should also avoid directing their antennas towards the geostationary-satellite orbit if their sensitivity is sufficiently high that interference from space station transmissions may be significant. In particular, in the bands 13.4-13.65 GHz and 21.4-22 GHz, it is recommended to maintain a minimum separation angle of 1.5° with respect to the direction of the geostationary-satellite orbit.    (WRC‑15)

**Reasons:** For protection of the receiving stations in terrestrial services (FS, MS) from the potential impact of GSO FSS space stations (space-to-Earth) interferences.

Section V − Limits of power flux-density from space stations

MOD EUR/9A6A1/8

TABLE **21-4**  (*continued*)     (Rev.WRC‑12)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Frequency band | Service\* | Limit in dB(W/m2) for angles of arrival (δ) above the horizontal plane | | | | | | | Reference bandwidth |
| 0°-5° | | 5°-25° | | | 25°-90° | |
| 12.2-12.75 GHz 7 (Region 3)  12.5‑12.75 GHz 7 (Region 1 countries listed in Nos. 5.494 and 5.496) | Fixed-satellite (space-to-Earth) (geostationary-satellite orbit) | −148 | | −148 + 0.5(δ − 5) | | | −138 | | 4 kHz |
| 13.4-13.65 GHz (Region 1) | Fixed-satellite (space-to-Earth) (geostationary-satellite orbit) | **0°-0.6°** | **0.6°-1.25°** | | **1.25°-21.25°** | **21.25°-70°** | | **70°-90°** | 1 MHz |
| −137.5 | −136.5 | | −130.5 | −127.5 | | −122.0 |
| 15.43-15.63 GHz | Fixed-satellite (space-to-Earth) | −127 | | 5°-20°: −127  20°-25°: −127 + 0.56(δ − 20)2 | | | 25°-29°: −113  29°-31°: −136.9 + 25 log (δ − 20)  31°-90°: −111 | | 1 MHz |

**Reasons:** To add the permissible pfd limits for GSO FSS (space-to-Earth) in Article 21 in order to protect allocations to terrestrial services (FS, MS) and RLS.

APPENDIX 5 (REV.WRC‑12)

Identification of administrations with which coordination is to be effected or  
agreement sought under the provisions of Article 9

MOD EUR/9A6A1/9

TABLE 5-1     (Rev.WRC‑15)

Technical conditions for coordination

(see Article 9)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Reference of Article 9 | Case | Frequency bands (and Region) of the service for which coordination is sought | Threshold/condition | Calculation  method | Remarks |
| No. **9.7** GSO/GSO | A station in a satellite network using the geostationary-satellite orbit (GSO), in any space radiocommunication service, in a frequency band and in a Region where this service is not subject to a Plan, in respect of any other satellite network using that orbit, in any space radiocommunication service in a frequency band and in a Region where this service is not subject to a Plan, with the exception of the coordination between earth stations operating in the opposite direction of transmission | 1) 3 400-4 200 MHz 5 725-5 850 MHz (Region 1) and 5 850-6 725 MHz 7 025-7 075 MHz | i) Bandwidth overlap, and  ii) any network in the fixed-satellite service (FSS) and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±8° of the nominal orbital position of a proposed network in the FSS |  | With respect to the space services listed in the threshold/condition column in the bands in 1), 2), 2*bis*), 3), 4), 5), 6), 7) and 8), an administration may request, pursuant to No. **9.41**, to be included in requests for coordination, indicating the networks for which the value of Δ*T*/*T* calculated by the method in § 2.2.1.2 and 3.2 of Appendix **8** exceeds 6%. When the Bureau, on request by an affected administration, studies this information pursuant to No. **9.42**, the calculation method given in § 2.2.1.2 and 3.2 of Appendix **8** shall be used |
| 2) 10.95-11.2 GHz 11.45‑11.7 GHz  11.7-12.2 GHz  (Region 2) 12.2-12.5 GHz  (Region 3) 12.5‑12.75 GHz (Regions 1 and 3) 12.7‑12.75 GHz (Region 2) and  13.75‑14.5 GH | i) Bandwidth overlap, and  ii) any network in the FSS or broadcasting-satellite service (BSS), not subject to a Plan, and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±7° of the nominal orbital position of a proposed network in the FSS or BSS, not subject to a Plan |
| 2*bis*) 13.4-16.65 GHz (Region 1) | i) Bandwidth overlap, and  ii) any network in the space research service (SRS) or any network in the FSS and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±7° of the nominal orbital position of a proposed network in the FSS or SRS |

TABLE 5-1 (*end*)     (Rev.WRC‑15)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Reference of Article 9 | Case | Frequency bands  (and Region) of the service for which coordination is sought | Threshold/condition | Calculation  method | Remarks |
| No. **9.21** Terrestrial, GSO, non‑GSO/ terrestrial, GSO, non‑GSO | A station of a service for which the requirement to obtain the agreement of other administrations is included in a footnote to the Table of Frequency Allocations referring to No. **9.21** | Band(s) indicated in the relevant footnote except 13.4-13.65 GHz in Region 1 | Incompatibility established by the use of Appendices **7**, **8**, technical Annexes of Appendices **30** or **30A**, pfd values specified in some of the footnotes, other technical provisions of the Radio Regulations or ITU‑R Recommendations, as appropriate | Methods specified in, or adapted from, Appendices **7**, **8**, **30**, **30A**, other technical provisions of the Radio Regulations or ITU‑R Recommendations |  |
| 13.4-13.65 GHz in Region 1 indicated in No.**5.A161** | i) Bandwidth overlap, and  ii) any network in the space research service (SRS) with a space station within an orbital arc of ±21° of the nominal orbital position of a proposed network in the FSS |

**Reasons:** To define the procedure for coordination under the provisions of No **9.7** and No **9.21** between the newly notified FSS networks and SRS networks.

APPENDIX 7 (REV.WRC‑12)

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 EUR/9A6A1/10

TABLE 8c    (Rev.WRC‑15)

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Receiving space radiocommunication service designation | Fixed-satellite | Fixed-satellite, radio- determination satellite | Fixed-satellite | Fixed- satellite | Meteorological-satellite7, 8 | Meteorological-satellite9 | Earth exploration- satellite7 | Earth exploration- satellite9 | Space research10 | | Fixed-satellite | Broadcasting-satellite | Fixed- satellite9 | Broadcasting-satellite | Fixed-satellite7 |
|  |  |  |  |  |  |  |  |  | Deep space |  |  |  |  |  |  |
| Frequency bands (GHz) | 4.500-4.800 | 5.150-5.216 | 6.700-7.075 | 7.250-7.750 | 7.450-7.550 | 7.750-7.900 | 8.025-8.400 | 8.025-8.400 | 8.400-8.450 | 8.450-8.500 | 10.7-12.75 13.4-13.657 | 12.5-12.7512 | 15.4-15.7 | 17.7-17.8 | 17.7-18.8 19.3-19.7 |
| Transmitting terrestrial  service designations | Fixed, mobile | Aeronautical radionavigation | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile | | Fixed, mobile | Fixed, mobile | Aeronau-tical radio-navigation | Fixed | Fixed, mobile |
| ... |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |

**Reasons:** To define coordination distances for the FSS receiving earth stations to provide protection from the stations in the terrestrial services such as FS and MS.

SECTION 2

No allocation space-to-Earth made in specific band

ARTICLE 5

Frequency allocations

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

NOC EUR/9A6A1/11

10-11.7 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 10.6-10.68 EARTH EXPLORATION-SATELLITE (passive)  FIXED  MOBILE except aeronautical mobile  RADIO ASTRONOMY  SPACE RESEARCH (passive)  Radiolocation  5.149 5.482 5.482A | | |

NOC EUR/9A6A1/12

11.7-14 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 13.25-13.4 EARTH EXPLORATION-SATELLITE (active)  AERONAUTICAL RADIONAVIGATION 5.497  SPACE RESEARCH (active)  5.498A 5.499 | | |

NOC EUR/9A6A1/13

14-15.4 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 15.35-15.4 EARTH EXPLORATION-SATELLITE (passive)  RADIO ASTRONOMY  SPACE RESEARCH (passive)  5.340 5.511 | | |

**Reasons:** Difficulty of sharing with active and passive services operating in these bands.

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