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| --- | --- |
| **World Radiocommunication Conference (WRC-15) Geneva, 2–27 November 2015** |  |
| **INTERNATIONAL TELECOMMUNICATION UNION** |  |
|  |  |
| PLENARY MEETING | **Addendum 1 to Document xx(Add.6)-E** |
|  | **31 July 2015** |
|  | **Original: English** |
|  | |
| Asia-Pacific Telecommunity Common Proposals | |
| Proposals for the work of the conference | |
|  | |
| Agenda item 1.6.1 | |

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;

**Introduction:**

APT Members support no change (NOC) method in the frequency bands 10-10.68GHz, 13.25-13.4 and 14.8-17 GHz due to incompatibility with existing services.

APT Members do not support the additional allocation to the FSS (Earth-to-space) in Region 1 in the frequency band 13.4-13.75GHz due to incompatibility with existing services.

APT Members do not support the additional allocation to the FSS (space-to-Earth) in Region 1 in the frequency band 14.5-14.8 GHz due to incompatibility with existing services.

APT Members support to make an additional allocation of 250 MHz to the FSS (space-to-Earth) in Region 1 in the frequency band 13.4-13.65 GHz.

**Proposals:**

ARTICLE 5

Frequency allocations

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

NOC ASP/xxA6-A1/1

10-11.7 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 10-10.45  FIXED  MOBILE  RADIOLOCATION  Amateur | 10-10.45  RADIOLOCATION  Amateur | 10-10.45  FIXED  MOBILE  RADIOLOCATION  Amateur |
| 5.479 | 5.479 5.480 | 5.479 |
| 10.45-10.5 RADIOLOCATION  Amateur  Amateur-satellite  5.481 | | |
| 10.5-10.55  FIXED  MOBILE  Radiolocation | 10.5-10.55  FIXED  MOBILE  RADIOLOCATION | |
| 10.55-10.6 FIXED  MOBILE except aeronautical mobile  Radiolocation | | |
| 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 | | |

**Reasons:** No change in the band 10-10.68 GHz due to incompatibility with existing services.

NOC ASP/ xxA6-A1/2

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 | | |

**Reasons:** No change in the band 13.25-13.4 GHz due to incompatibility with existing services.

NOC ASP/ xxA6-A1/3

11.7-14 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 13.4-13.75 EARTH EXPLORATION-SATELLITE (active)  RADIOLOCATION  SPACE RESEARCH 5.501A  Standard frequency and time signal-satellite (Earth-to-space)  5.499 5.500 5.501 5.501B | | |

**Reasons:** No additional allocation to the FSS (Earth-to-space) is proposed in the band 13.4-13.75 GHz for Region 1 due to incompatibility with existing services.

MOD ASP/ xxA6-A1/4

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.C161 ADD 5.X161 ADD 5.C161*bis*  RADIOLOCATION  SPACE RESEARCH ADD 5.L161  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.L161  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 the FSS (space-to-Earth) in Region 1.

ADD ASP/ xxA6-A1/5

5.C161 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 stations in the geostationary satellite orbit to associated space stations 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 use of the new FSS allocation (space-to-Earth) in Region 1 to GSO FSS, and to specify the terms and conditions for sharing between newly filed GSO FSS networks and SRS systems already notified to the Bureau, operating on space-to-space link to relay data from GSO space station to non-GSO user space station. There is understanding, that coordination of newly filed GSO FSS networks and already notified to the Bureau SRS (space-to-Earth) systems is subject to RR No. **9.7**.

ADD ASP/ xxA6-A1/6

5.L161 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 space-to-space) to relay data from space stations in the geostationary-satellite orbit to associated earth stations and space stations in the non-geostationary-satellite orbit, 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 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 RR Article **9** it is proposed to modify footnote No. **5.501А** and to add a new footnote under which the status of the notified frequency assignments of DRS in SRS (s-E and s-s) will be increased up to the primary with regard to FSS. With respect to FSS stations in Region 1 in any case it is required to seek the agreement of other administrations (under RR No. **9.21**) operating DRS in SRS (space-to-space) in Region 1, with NGSO user which can be potentially located over the territories of Regions 2 and 3. The direction of the DRS SRS links (space-to-Earth and space-to-space) is defined by the relevant Recommendations. Therefore it is not specified in RR Article **5** footnotes.

ADD ASP/ xxA6-A1/7

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 basis 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.

ADD ASP/ xxA6-A1/8

5.C161*bis* 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. Nos. **5.43A** and **22.2** do not apply. (WRC‑15)

MOD ASP/ xxA6-A1/9

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)

**Reasons:** To ensure operation of notified to the Bureau SRS systems on space-to-Earth and space-to-space links on an equal basis with newly filed stations in the fixed-satellite service (space-to-Earth)

NOC ASP/ xxA6-A1/10

14-15.4 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 14.5-14.8 FIXED  FIXED-SATELLITE (Earth-to-space) 5.510  MOBILE  Space research | | |

**Reasons:** No additional allocation to the FSS (space-to-Earth) is proposed in the band 14.5-14.8 GHz for Region 1 due to incompatibility with existing services.

NOC ASP/ xxA6-A1/11

**14-15.4 GHz**

|  |  |  |
| --- | --- | --- |
| **Allocation to services** | | |
| **Region 1** | **Region 2** | **Region 3** |
| **14.8-15.35** FIXED  MOBILE  Space research  5.339 | | |
| **15.35-15.4** EARTH EXPLORATION-SATELLITE (passive)  RADIO ASTRONOMY  SPACE RESEARCH (passive)  5.340 5.511 | | |

**Reasons:** No change in the band 14.8-15.4GHz due to incompatibility with existing services.

NOC ASP/ xxA6-A1/12

**15.4-18.4 GHz**

|  |  |  |
| --- | --- | --- |
| **Allocation to services** | | |
| **Region 1** | **Region 2** | **Region 3** |
| **15.4-15.43** RADIOLOCATION 5.511E 5.511F  AERONAUTICAL RADIONAVIGATION  5.511D | | |
| **15.43-15.63** FIXED-SATELLITE (Earth-to-space) 5.511A  RADIOLOCATION 5.511E 5.511F  AERONAUTICAL RADIONAVIGATION  5.511C | | |
| **15.63-15.7** RADIOLOCATION 5.511E 5.511F  AERONAUTICAL RADIONAVIGATION  5.511D | | |
| **15.7-16.6** RADIOLOCATION  5.512 5.513 | | |
| **16.6-17.1** RADIOLOCATION  Space research (deep space) (Earth-to-space)  5.512 5.513 | | |

**Reasons:** No change in the band 15.4-17 GHz due to incompatibility with existing services.

ARTICLE 21

**Terrestrial and space services sharing frequency bands above 1 GHz**

**Section I − Choice of sites and frequencies**

**MOD ASP/** **xxA6-A1/13**

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)

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

**MOD ASP/** **xxA6-A1/14**

TABLE **21-4**  (*continued*)     (Rev.WRC‑15)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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\*] |

*Editor’s Note: A suitable maximum pfd limit value of the FSS downlink maybe needed in order to protect the EESS(active). This value could be decided in the WRC-15.*

**Reasons:** To insert pfd limits for GSO FSS (space-to-Earth) into RR Article **21** in order to protect allocations to terrestrial services (FS, MS), RLS and EESS (active).

APPENDIX 5 (REV.WRC‑15)

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

**MOD ASP/ xxA6-A1/15**

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), 2bis), 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 GHz  2*bis*) 13.4-13.65 GHz (Region 1) | 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  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 |

**Reasons:** To specify the order and mechanism of coordination in accordance with provisions of RR No **9.7** between newly notifying networks of the FSS and SRS (space-to-Earth).

**MOD ASP/ xxA6-A1/16**

TABLE 5-1 (*end*)     (Rev.WRC‑12)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **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  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  Any network in the space research service (SRS) within an orbital arc of ±[24]° of the nominal orbital position of a proposed network in the FSS | Methods specified in, or adapted from, Appendices **7**, **8**, **30**, **30A**, other technical provisions of the Radio Regulations or ITU‑R Recommendations |  |

**Reasons:** To define the procedure for coordination under the provisions of RR 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 ASP/ xxA6-A1/17**

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 |
| Method to be used | | | § 2.1 | | § 2.1 | § 2.2 | § 2.1 | | § 2.1, § 2.2 | § 2.2 | § 2.1 | § 2.2 | § 2.2 | | § 2.1, § 2.2 | | § 1.4.5 | |  | § 1.4.5 | § 2.1 |
| Modulation at earth  station1 | | | A | N |  | N | A | N | N | N | N | N | N | N | A | N | A | N | – |  | N |
| Earth station interference parameters and criteria | *p*0 (%) | | 0.03 | 0.005 |  | 0.005 | 0.03 | 0.005 | 0.002 | 0.001 | 0.083 | 0.011 | 0.001 | 0.1 | 0.03 | 0.003 | 0.03 | 0.003 | 0.003 |  | 0.003 |
| *n* | | 3 | 3 |  | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 2 |  | 2 |
| *p* (%) | | 0.01 | 0.0017 |  | 0.0017 | 0.01 | 0.0017 | 0.001 | 0.0005 | 0.0415 | 0.0055 | 0.001 | 0.05 | 0.015 | 0.0015 | 0.03 | 0.003 | 0.0015 |  | 0.0015 |
| *NL* (dB) | | 1 | 1 |  | 1 | 1 | 1 | – | – | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |  | 1 |
| *Ms* (dB) | | 7 | 2 |  | 2 | 7 | 2 | – | – | 2 | 4.7 | 0.5 | 1 | 7 | 4 | 7 | 4 | 4 |  | 6 |
| *W* (dB) | | 4 | 0 |  | 0 | 4 | 0 | – | – | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 0 | 0 |  | 0 |
| Terrestrial station parameters | *E* (dBW) in *B*2 | A | 923 | 923 |  | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 25 5 | 255 | 40 | 40 | 55 | 55 |  |  | 35 |
| N | 424 | 424 |  | 42 | 42 | 42 | 42 | 42 | 42 | 42 | −18 | −18 | 43 | 43 | 42 | 42 |  | 40 | 40 |
| *Pt* (dBW)  in *B* | A | 403 | 403 |  | 13 | 13 | 13 | 13 | 13 | 13 | 13 | −175 | −175 | −5 | −5 | 10 | 10 |  |  | −10 |
| N | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | −60 | −60 | −2 | −2 | −3 | −3 |  | −7 | −5 |
| *Gx* (dBi) | | 523, 4 | 523, 4 |  | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 45 | 45 | 45 | 45 |  | 47 | 45 |
| Reference band- width6 | *B* (Hz) | | 106 | 106 |  | 106 | 106 | 106 | 107 | 107 | 106 | 106 | 1 | 1 | 106 | 106 | 27 × 106 | 27 × 106 |  |  | 106 |
| Permissible interference power | *Pr*( *p*) (dBW) in *B* | |  |  |  | −151.2 |  |  | −125 | −125 | −15411 | −142 | −220 | −216 |  |  | −131 | −131 |  |  |  |

*Notes to Table 8c:*

1 A: analogue modulation; N: digital modulation.

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

3 In this band, the parameters for the terrestrial stations associated with transhorizon systems have been used. If an administration believes that transhorizon systems do not need to be considered, the line-of-sight radio-relay parameters associated with the frequency band 3.4-4.2 GHz may be used to determine the coordination area.

4 Digital systems assumed to be non-transhorizon. Therefore *Gx* = 42.0 dBi. For digital transhorizon systems, parameters for analogue transhorizon systems above have been used.

5 These values are estimated for 1 Hz bandwidth and are 30 dB below the total power assumed for emission.

6 In certain systems in the fixed-satellite service it may be desirable to choose a greater reference bandwidth *B*. However, a greater bandwidth will result in smaller coordination distances and a later decision to reduce the reference bandwidth may require recoordination of the earth station.

7 Geostationary-satellite systems.

8 Non-geostationary satellites in the meteorological-satellite service notified in accordance with No. **5.461A** may use the same coordination parameters.

9 Non-geostationary-satellite systems.

10 Space research earth stations in the band 8.4-8.5 GHz operate with non-geostationary satellites.

11 For large earth stations: *Pr*(*p*) = (*G* − 180) dBW

For small earth stations: *Pr*(20%) = 2 (*G* − 26) − 140 dBW for  26 < *G* ≤ 29 dBi

*Pr*(20%) = *G* − 163 dBW for        *G*  29 dBi

*Pr*(*p*)% = *G* − 163 dBW for        *G* ≤ 26 dBi

12 Applies to the broadcasting-satellite service in unplanned bands in Region 3.

**Reasons:** To specify coordination distances for the FSS receiving earth station in order to protect it from interferences produced by terrestrial FS and MS stations, based on the allowable interference criterion I/N = 6%, see Recommendation ITU-R S.1432.

**SUP ASP/ xxA6-A1/18**

RESOLUTION 151 (WRC‑12)

**Additional primary allocations to the fixed-satellite service   
in frequency bands between 10 and 17 GHz in Region 1**

The World Radiocommunication Conference (Geneva, 2012),