|  |  |
| --- | --- |
| **World Radiocommunication Conference (WRC-15) Geneva, 2–27 November 2015** |  |
| **INTERNATIONAL TELECOMMUNICATION UNION** |  |
|  |  |
| PLENARY MEETING | **Addendum 6 to Document 8-E** |
|  | **9 October 2015** |
|  | **Original: Russian** |
|  | |
| Regional Commonwealth in the field of Communications Common Proposals | |
| Proposals for the work of the conference | |
|  | |
| Agenda item 1.6 | |

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;

1.6.2 to the fixed-satellite service (Earth-to-space) of 250 MHz in Region 2 and 300 MHz in Region 3 within the range 13-17 GHz;

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 RCC Administrations consider that, based on the results of ITU-R studies conducted in accordance with Resolutions 151 (WRC-12) and 152 (WRC-12), the following points should be implemented.

# 1 Agenda item 1.6.1

The RCC Administrations support the additional allocation to the FSS (space-to-Earth) in Region 1, in frequency bands 13.4-13.65 GHz or 14.85-15.1 GHz, for the use of geostationary communication networks (GSO FSS); see the example of regulatory text in Section 1 (Option 1 or Option 2) of this document.

The RCC Administrations consider the new allocation of the frequency band 13.4-13.65 GHz for GSO FSS (space-to-Earth) to be preferable, given its advantages in terms of technical implementation of FSS systems in that band, and considering the intensive use of the 14.85-15.1 GHz by fixed service stations.

The RCC Administrations support the frequency band 14.5-14.75 GHz, to change the existing GSO FSS (Earth-to-space) allocation in Region 1; see example of regulatory text in Section 2 of this document.

The RCC Administrations object to the allocation of frequency bands 13.4-13.75 GHz and 14.8-15.35 GHz for GSO FSS (Earth to space) in Region 1; see example of regulatory text in Section 3.2 of this document.

# 2 Agenda item 1.6.2

The RСС Administrations do not object to changes to the existing GSO FSS (Earth-to-space) allocation of frequency band 14.5-14.75 GHz in Region 2 and 14.5-14.8 GHz in Region 3, and endorse the example of regulatory text set out in Section 2 of this document.

The RCC Administrations consider that with a primary allocation to GSO FSS (Earth-to-space) of 250 MHz in Region 2 and of 300 MHz in Region 3 in frequency bands between 13 and 17 GHz, protection must be provided for the existing services to which these frequency bands are allocated in Region 1.

The RCC Administrations object to the allocation of the frequency bands 13.4-13.75 GHz and 14.8-15.35 GHz for GSO FSS (Earth-to-space) in Regions 2 and 3; see example of regulatory text in Section 3.2 of this document.

# 3 Agenda item 1.6 – General part

The RСС Administrations consider that allocation of additional spectrum for the GSO FSS on a worldwide basis (in all three ITU Regions) has an advantage over regional allocation (in one Region) for planning satellite communication networks and for providing efficient territorial coverage; see example of regulatory text in Section 2 of this document.

The RСС Administrations object to the allocation of frequency bands 10.6-10.68 GHz and 15.35-15.4 GHz to FSS in view of the difficulty of ensuring compatibility with passive service stations operating in those frequency bands; see example of regulatory text in Sections 3.1 and 3.2 of this document.

The RCC Administrations propose concluding WRC-15 agenda item 1.6 and suppression of Resolution 151 (WRC-12) and Resolution 152 (WRC-12); see example of regulatory text in Section 4.

Proposals

**Section 1**

**Option 1: Allocation of the band 13.4-13.65 GHz to the GSO FSS  
(space-to-Earth) in Region 1**

ARTICLE 5

Frequency allocations

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

MOD RCC/8A6/1

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.C161  RADIOLOCATION  SPACE RESEARCH ADD 5.B161  Standard frequency and time signal-satellite (Earth-to-space) | 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 | 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 RCC/8A6/2

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 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 the use of the new FSS allocation (space-to-Earth) in Region 1 to GSO FSS systems, and to specify the terms and conditions for sharing between newly filed GSO FSS systems. To apply the provisions of RR No. 9.21 for coordination of frequency assignments of the new GSO FSS allocation (space-to-Earth) with frequency assignments of direct inter-orbit links (space-to-space) (DRS GSO satellite to DRS NGSO satellite) of the DRS systems in the space research service in the frequency band 13.4-13.65 GHz. The understanding is that coordination of frequency assignments in the new GSO FSS allocation (space-to-Earth) with frequency assignments for return feeder links (space-to-Earth) (DRS GSO satellite to DRS earth station) in the space research service is subject to RR No. 9.7.

ADD RCC/8A6/3

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 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, a new note is added to the effect it is proposed to modify footnote No. 5.501А and to add a new footnote under which the status of the ITU BR notified frequency assignments of DRS in the SRS (s-E and s-s) will be raised to primary with regard to FSS. A different use of SRS systems does not alter their status. SRS DRS systems in Regions 2 and 3 retain a secondary basis, since FSS satellites in Region 1 do not create interference to SRS earth stations in Region 2. With respect to FSS stations in Region 1, it is any case necessary to seek the agreement of other administrations (under RR No. 9.21) operating DRS in SRS in Region 1 with an NGSO user that may potentially be located above the territories of Regions 2 and 3. The direction of the SRS DRS links (space-to-Earth and space-to-space) is defined by the relevant Recommendations, and is therefore not specified in RR Article 5 footnotes.

ADD RCC/8A6/4

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:** Studies have shown that FSS earth station receivers may receive interference from the EESS (active) that raises the FSS protection criterion, which is acceptable for FSS only for a small proportion of the time (0.01 per cent to 0.1 per cent).

MOD RCC/8A6/5

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 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).

ARTICLE 21

Terrestrial and space services sharing frequency bands above 1 GHz

Section I − Choice of sites and frequencies

MOD RCC/8A6/6

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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:** To protect receiving stations in terrestrial services (FS, MS) from GSO FSS (space-to-Earth) interference.

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

MOD RCC/8A6/7

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° | |
| 10.7-11.7 GHz  11.7-12.5 GHz (Region 1)  12.5-12.75 GHz (Region 1 countries listed in Nos. 5.494 and 5.496)  11.7-12.7 GHz (Region 2)  11.7-12.75 GHz (Region 3) | Fixed-satellite (space-to-Earth)  (non-geostationary-satellite orbit) 19 | −129 18 | | −129 + 0.75(δ − 5) 18 | | | −114 18 | | 1 MHz |
| 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 |

**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).

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 RCC/8A6/8

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 GHz | 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*) 13.4-13.65 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. |

**Reasons:** To specify the order and mechanism of coordination in accordance with provisions of RR No 9.7 between newly notified networks of the FSS and SRS networks.

\* NOTE − These are the current values of the coordination arc. Depending on decisions of WRC-15, the size of the coordination arc may change and these values should be adjusted accordingly.

MOD RCC/8A6/9

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 (Region 1) | 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 establish a coordination procedure in accordance with provisions of RR No 9.21 between newly notified networks of the FSS 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 RCC/8A6/10

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 |
| 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.

**Section 1**

Option 2: Allocation of the frequency and 14.85-15.1 GHz to the GSO FSS (space-to-Earth) in Region 1

ARTICLE 5

Frequency allocations

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

MOD RCC/8A6/11

14-15.4 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 14.8-14.85  FIXED  MOBILE  Space research  5.339 | 14.8-15.35  FIXED  MOBILE  Space research ADD 5.K161 | |
| 14.85-15.1  FIXED  FIXED-SATELLITE (space-to-Earth) ADD 5.J161 ADD 5.L161  MOBILE  Space research ADD 5.K161  5.339 |
| 15.1-15.35  FIXED  MOBILE  Space research |
| 5.339 | 5.339 | |

**Reasons:** To allocate the band 14.85-15.1 GHz to FSS (space-to-Earth) in Region 1.

ADD RCC/8A6/12

5.J161 The use of the band 14.85-15.1 GHz by the fixed-satellite service (space-to-Earth) is limited to geostationary-satellite subject to the application of No. **9.7** provisions for coordination with satellite systems operating in the space research service (Earth-to-space and space-to-space) to relay data to space stations in the geostationary-satellite orbit from 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.     (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 frequency sharing between newly filed GSO FSS networks and SRS systems already notified to the Bureau and operating on Earth-to-space and space-to-space links to relay data from a non-GSO user space station to a GSO space station. There is an understanding that coordination of newly filed GSO FSS networks and SRS systems already notified to the Bureau is subject to RR No. 9.7.

ADD RCC/8A6/13

5.K161 The band 14.85-15.1 GHz is also allocated to the space research service on a primary basis. However, such use is limited to geostationary-satellite systems, operating in the space research service (Earth-to-space and space-to-space) to relay data to space stations in the geostationary-satellite orbit from associated earth stations and space stations in the non-geostationary-satellite orbit, as well as non-geostationary-satellite systems, operating in the space research service (space-to-Earth), for which information for advance publication has been received by the Bureau prior to 27 November 2015. Stations in the space research service shall not cause harmful interference to nor claim protection from stations in the fixed and mobile services.     (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, a new note is added to the effect that the status of frequency assignments to SRS systems (Earth-to-space and space-to-Earth) notified to BR before WRC-15 is raised to primary vis-à-vis FSS. Such use of the SRS applies to all Regions, as FSS transmitting space stations covering the territory of Region 1 may produce interference affecting receiving SRS space stations in GSO operating with earth stations in Regions 2 and 3.

ADD RCC/8A6/14

5.L161 In the band 14.85-15.1 GHz geostationary satellite systems in the fixed-satellite service (space-to-Earth) shall not claim protection from non-geostationary satellite systems in the space research service (space-to-Earth) for which information for advance publication has been received by the Bureau prior to 27 November 2015. Nos. **5.43A** and **22.2** do not apply in this case.     (WRC‑15)

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

ARTICLE 21

Terrestrial and space services sharing frequency bands above 1 GHz

Section I − Choice of sites and frequencies

MOD RCC/8A6/15

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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 14.85‑15.1 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:** To protect receiving stations in terrestrial services (FS, MS) from GSO FSS (space-to-Earth) interference.

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

MOD RCC/8A6/16

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° |
| 10.7-11.7 GHz  11.7-12.5 GHz (Region 1)  12.5-12.75 GHz (Region 1 countries listed in Nos. 5.494 and 5.496)  11.7-12.7 GHz (Region 2)  11.7-12.75 GHz (Region 3) | Fixed-satellite (space-to-Earth)  (non-geostationary-satellite orbit) 19 | −129 18 | −129 + 0.75(δ − 5) 18 | −114 18 | 1 MHz |
| 14.85-15.1 GHz (Region 1) | Fixed-satellite (space-to-Earth)  (geostationary-satellite orbit) | −132 | −132 + 0.5(δ − 5) | −122 | 1 MHz |

**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).

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 RCC/8A6/17

TABLE 5-1     (Rev.WRC‑12)

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 GHz | 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*) 14.85‑15.1 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. |

**Reasons:** To specify the order and mechanism of coordination in accordance with provisions of RR No **9.7** between newly notified networks of the FSS and SRS networks.

\* NOTE − These are the current values of the coordination arc. Depending on decisions of WRC-15, the size of the coordination arc may change and these values should be adjusted accordingly.

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 RCC/8A6/18

TABLE 8c    (Rev.WRC‑12)

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 | | 12.5-12.7512 | | 15.4-15.7 | 17.7-17.8 | 14.85-15.17 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.

MOD RCC/8A6/19

TABLE 9b     (Rev.WRC‑15)

Parameters required for the determination of coordination distance for a transmitting earth station  
in bands shared bidirectionally with receiving earth stations

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Space service designation in which the transmitting earth station operates | | | Fixed-satellite | | | Fixed-satellite | | | Space research service | Fixed- satellite 3 | Fixed-satellite | Fixed-satellite | Fixed- satellite3 | Fixed- satellite3 | Earth exploration- satellite, space research | |
| Frequency bands (GHz) | | | 10.7-11.7 | | | 12.5-12.75 | | | 14.85-15.1 | 15.43-15.65 | 17.3-17.8 | 17.7-18.4 | 19.3-19.6 | 19.3-19.6 | 40.0-40.5 | |
| Space service designation in which the *receiving* earth station operates | | | Fixed-satellite | | | Fixed-satellite | | | Fixed-satellite | Fixed-satellite3 | Broadcasting-satellite | Fixed-satellite, meteorological- satellite | Fixed-satellite3 | Fixed-satellite4 | Fixed-satellite, mobile‑satellite | |
| Orbit7 | | | GSO | | Non-GSO | GSO | | Non-GSO | GSO | Non-GSO |  | GSO | Non-GSO | GSO | GSO | Non-GSO |
| Modulation at *receiving* earth station1 | | | A | N | N | A | N |  | N |  |  | N | N |  |  |  |
| Receiving earth station interference parameters and criteria | | *p*0 (%) | 0.03 | 0.003 | | 0.03 | 0.003 | | 0.003 | 0.003 |  | 0.003 | 0.01 | 0.003 | 0.003 | |
| *n* | 2 | 2 | | 2 | 2 | | 2 | 2 |  | 2 | 1 | 2 | 2 | |
| *p* (%) | 0.015 | 0.0015 | | 0.015 | 0.0015 | | 0.0015 | 0.0015 |  | 0.0015 | 0.01 | 0.0015 | 0.0015 | |
| *NL* (dB) | 1 | 1 | | 1 | 1 | | 1 | 1 |  | 1 | 0 | 1 | 1 | |
| *Ms* (dB) | 7 | 4 | | 7 | 4 | | 6 | 4 |  | 6 | 5 | 6 | 6 | |
| *W* (dB) | 4 | 0 | | 4 | 0 | | 0 | 0 |  | 0 | 0 | 0 | 0 | |
| Receiving earth station parameters | | *Gm* (dBi) 2 |  |  | 51.9 |  |  | 31.2 | 37.6 | 48.4 |  | 58.6 | 53.2 | 49.5 | 50.8 | 54.4 |
| *Gr* 5 | 9 | 9 | 10 | 9 | 9 | 1111 | 9 | 10 |  | 9 | 10 | 10 | 9 | 7 12 |
| *min* 6 | 5° | 5° | 6° | 5° | 5° | 10° | 5° | 5° |  | 5° | 5° | 10° | 10° | 10° |
| *Te* (K)8 | 150 | 150 | | 150 | 150 | | 150 | 150 |  | 300 | 300 | 300 | 300 | |
| Reference bandwidth | | *B* (Hz) | 106 | 106 | | 106 | 106 | | 106 | 2 × 106 |  | 106 | 106 |  |  | |
| Permissible interference power | | *Pr*( *p*) (dBW) in *B* | −144 | −144 | −144 | −144 | −144 | −144 | −144 | −141 |  | −138 | −141 |  |  | |
| *Notes to Table 9b:*  1 A: analogue modulation; N: digital modulation.  2 On-axis gain of the receive earth station antenna.  3 Feeder links of non-geostationary-satellite systems in the mobile‑satellite service.  4 Geostationary‑satellite systems.  5 Horizon antenna gain for the receive earth station (refer to § 3 of the main body of the Appendix).  6 Minimum elevation angle of operation in degrees (non-GSO or GSO).  7 Orbit of the space service in which the receiving earth station operates (GSO or non-GSO).  8 The thermal noise temperature of the receiving system at the terminal of the receiving antenna (under clear-sky conditions). Refer to § 2.1 of this Annex for missing values.  9 Horizon antenna gain is calculated using the procedure of Annex 5. Where no value of *Gm* is specified, a value of 42 dBi is to be used.  10 Horizon antenna gain is calculated using the procedure of Annex 5, except that the following antenna pattern may be used in place of that given in § 3 of Annex 3:  *G* = 32 − 25 log φ for 1° ≤ φ < 48°; and *G* = −10 for 48° ≤ φ < 180° (refer to Annex 3 for definition of symbols).  11 Non-geostationary horizon antenna gain. *Ge* = *Gmax* (see § 2.2 of the main body of this Appendix) for *G* = 36 − 25 log (φ) > −6 (refer to Annex 3 for definition of symbols).  12 Non-geostationary horizon antenna gain. *Ge* = *Gmax* (see § 2.2 of the main body of this Appendix) for *G* = 32 − 25 log (φ) > −10 (refer to Annex 3 for definition of symbols). | | | | | | | | | | | | | | | | |

**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.

**Section 2**

Allocation to GSO FSS of 250 MHz in the band 14.50-14.75 GHz in Regions 1 and 2 and of 300 MHz in the band 14.50-14.80 GHz in Region 3

ARTICLE 5

Frequency allocations

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

MOD RCC/8A6/20

14-15.4 GHz

|  |  |  |  |
| --- | --- | --- | --- |
| Allocation to services | | | |
| Region 1 | Region 2 | Region 3 | |
| 14.5-14.75 FIXED  FIXED-SATELLITE (Earth-to-space) MOD 5.510 ADD 5.F16  MOBILE  Space research ADD 5.I16 | | | |
| 14.75-14.8  FIXED  FIXED-SATELLITE (Earth-to-space) MOD 5.510 ADD 5.E16  MOBILE  Space research ADD 5.I16 | | | 14.75-14.8  FIXED  FIXED-SATELLITE (Earth-to-space) MOD 5.510 ADD 5.F16  MOBILE  Space research ADD 5.I16 |

**Reasons:** To change the conditions for the existing FSS allocation (Earth-to-space) in the frequency bands 14.5-14.75 GHz in Regions 1 and 2 and 14.5-14.8 GHz in Region 3 for operation of GSO FSS links (Earth-to-space) not limited to feeder links in the broadcasting-satellite service.

MOD RCC/8A6/21

5.510 The use of the band 14.5-14.8 GHz by the fixed-satellite service (Earth-to-space) for feeder links of the broadcasting-satellite service must comply with the Plan and is restricted to countries outside Europe.      (WRC‑15)

**Reasons:** The frequency band 14.5-14.8 GHz in Regions 1 and 3 is used by stations in the Plan or List of feeder-link assignments to the broadcasting-satellite service. Such use under the terms of RR Appendix 30A is reserved for countries outside Europe.

ADD RCC/8A6/22

5.E16 Use of the band 14.75-14.8 GHz by the fixed-satellite service (Earth-to-space) in Regions 1 and 2 is limited to broadcasting-satellite service feeder links. Such use is reserved for countries outside Europe.     (WRC‑15)

**Reasons:** The allocation of frequency band 14.75-14.8 GHz in Regions 1 and 2 is unchanged.

ADD RCC/8A6/23

5.F16 The allocation of the band 14.5-14.75 GHz in Regions 1 and 2 and 14.5-14.8 GHz in Region 3 for the fixed-satellite service (Earth-to-space) is limited to geostationary satellite systems.     (WRC‑15)

**Reasons:** To limit use of the band 14.5-14.75 GHz in Regions 1 and 2 and of bands 14.5-14.8 GHz in Region 3 to GSO FSS systems (Earth-to-space).

ADD RCC/8A6/24

5.I16 The band 14.5-14.8 GHz is also allocated to the space research service on a primary basis. However, such use is limited to satellite systems, operating in the space research service (Earth-to-space) to relay data to space stations in the geostationary-satellite orbit from associated earth stations, for which information for advance publication has been received by the Bureau prior to 27 November 2015. Stations in the space research service shall not cause harmful interference to nor claim protection from stations in the fixed, mobile services and stations in the fixed-satellite service limited to feeder links for the broadcasting satellite service operating under Appendix **30A** and feeder links for the broadcasting satellite service in Region 2.     (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, a new note is added to the effect that the status of frequency assignments to the SRS DRSS (Earth-to-space) notified to BR is raised to primary vis-à-vis unplanned FSS; status of other uses of other SRS systems does not change.

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 RCC/8A6/25

TABLE 5-1     (Rev.WRC‑12)

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), 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 | 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 |
|  | iii) in the band 14.5-14.8 GHz any network in the space research service (SRS) or any network in the FSS that do not come within the terms of the 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 SRS or FSS network that does not come under the Plan |

**Reasons:** To specify the order and mechanism of coordination in accordance with provisions of RR No **9.7** between newly notified networks of the FSS and SRS networks.

\* NOTE − These are the current values of the coordination arc. Depending on decisions of WRC-15, the size of the coordination arc may change and these values should be adjusted accordingly.

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 RCC/8A6/26

TABLE 10     (Rev.WRC‑15)

Predetermined coordination distances

|  |  |  |
| --- | --- | --- |
| Frequency sharing situation | | Coordination distance (in sharing situations involving services allocated with equal rights) (km) |
| Type of earth station | Type of terrestrial station |
| Ground-based in the bands below 1 GHz to which No. **9.11A** applies. Ground-based mobile in the bands within the range 1‑3 GHz to which No. **9.11A** applies | Mobile (aircraft) | 500 |
| Aircraft (mobile) (all bands) | Ground-based | 500 |
| Aircraft (mobile) (all bands) | Mobile (aircraft) | 1 000 |
| Ground-based in the bands:  400.15-401 MHz 1 668.4-1 675 MHz | Station in the meteorological aids service (radiosonde) | 580 |
| Aircraft (mobile) in the bands:  400.15-401 MHz 1 668.4-1 675 MHz | Station in the meteorological aids service (radiosonde) | 1 080 |
| Ground-based in the radiodetermination-satellite service (RDSS) in the bands:  1 610-1 626.5 MHz 2 483.5-2 500 MHz  2 500-2 516.5 MHz | Ground-based | 100 |
| Airborne earth station in the radiodetermination-satellite service (RDSS) in the bands:  1 610-1 626.5 MHz 2 483.5-2 500 MHz 2 500-2 516.5 MHz | Ground-based | 400 |
| Receiving earth stations in the meteorological-satellite service | Station in the meteorological aids service | The coordination distance is considered to be the visibility distance as a function of the earth station horizon elevation angle for a radiosonde at an altitude of 20 km above mean sea level, assuming 4/3 Earth radius (see Note 1) |
| Non-GSO MSS feeder‑link earth stations (all bands) | Mobile (aircraft) | 500 |
| Ground-based in the bands in which the frequency sharing situation is not covered in the rows above | Mobile (aircraft) | 500  (see Note 2) |
| NOTE 1 – The coordination distance, *d* (km), for fixed earth stations in the meteorological-satellite service vis-à-vis stations in the meteorological aids service assumes a radiosonde altitude of 20 km and is determined as a function of the physical horizon elevation angle ε*h* (degrees) for each azimuth, as follows:  for          ε*h*  ≥  11°  for 0° < ε*h*  <  11°  for          ε*h*  ≤  0°  The minimum and maximum coordination distances are 100 km and 582 km, and correspond to physical horizon angles greater than 11° and less than 0°. (WRC‑2000)  NOTE 2 – The coordination distance in the band 14.5-14.8 GHz for earth transmitting stations in the fixed-satellite service in relation to receiving stations of the aeronautical mobile service is 575 km.     (WRC‑15) | | |

**Reasons:** Based on the results of compatibility studies between FSS (Earth-to-space) and AMS, it is proposed that a coordination distance of 575 km be applied to protect AMS stations in the band 14.5-14.8 GHz, assuming the worst-case interference scenario.

MOD RCC/8A6/27

APPENDIX 30A (REV.WRC‑15)[[1]](#footnote-1)\*

Provisions and associated Plans and List[[2]](#footnote-2)1 for feeder links for the broadcasting-satellite service (11.7-12.5 GHz in Region 1, 12.2-12.7 GHz  
in Region 2 and 11.7-12.2 GHz in Region 3) in the frequency bands  
14.5-14.8 GHz[[3]](#footnote-3)2 and 17.3-18.1 GHz in Regions 1 and 3,  
and 17.3-17.8 GHz in Region 2     (Rev.WRC‑15)

(See Articles 9 and 11)     (WRC‑03)

ARTICLE 4     (Rev.WRC‑03)

Procedures for modifications to the Region 2 feeder-link Plan   
or for additional uses in Regions 1 and 3

MOD RCC/8A6/28

## 4.1 Provisions applicable to Regions 1 and 3

4.1.1 An administration proposing to include a new or modified assignment in the feeder-link List shall seek the agreement of those administrations whose services are considered to be affected, i.e. administrations[[4]](#footnote-4)4, [[5]](#footnote-5)5:

*a)* of Regions 1 and 3 having a feeder-link frequency assignment in the fixed-satellite service (Earth-to-space) to a space station in the broadcasting-satellite service which is included in the Regions 1 and 3 feeder-link Plan with a necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment; *or*

*b)* of Regions 1 and 3 having a feeder-link frequency assignment included in the feeder-link List or for which complete Appendix **4** information has been received by the Radiocommunication Bureau in accordance with the provisions of § 4.1.3, and any portion of which falls within the necessary bandwidth of the proposed assignment; *or*

*c)* of Region 2 having a feeder-link frequency assignment in the fixed-satellite service (Earth-to-space) to a space station in the broadcasting-satellite service which is in conformity with the Region 2 feeder-link Plan, or in respect of which proposed modifications to that Plan have already been received by the Bureau in accordance with the provisions of § 4.2.6 with a necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment; *or*

*d)* having a feeder-link frequency assignment in the band 17.8-18.1 GHz in Region 2 in the fixed-satellite service (Earth-to-space) to a space station in the broadcasting-satellite service or a frequency assignment in the band 14.5-14.8 GHz in the fixed-satellite service (Earth-to-space) not subject to this Appendix which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. 9.7, or under § 7.1 of Article 7, with a necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment.     (Rev. WRC‑15)

**Reasons:** An administration proposing to include in the feeder-link List a new or modified frequency assignment has to obtain the agreement of administrations with unplanned FSS frequency assignments in the band 14.5-14.8 GHz. Thus, after WRC-15, in order to include in the BSS feeder-link List new (modified) frequency assignments in the band 14.5-14.8 GHz, coordination will be required with notified (priority by notification date) unplanned FSS frequency assignments (Earth-to-space).

MOD RCC/8A6/29

ARTICLE 7     (Rev.WRC‑15)

Coordination, notification and recording in the Master International   
Frequency Register of frequency assignments to stations in the fixed-satellite service (space-to-Earth) in Region 1 in the band 17.3-18.1 GHz and in   
Regions 2 and 3 in the band 17.7-18.1 GHz, to stations in the fixed-satellite service (Earth-to-space) in Region 2 in the band 17.8-18.1 GHz, to stations in the fixed-satellite service (Earth-to-space) in Regions 1 and 2 in the band 14.5-14.75 GHz, and in Region 3 in the band 14.5-14.8 GHz, where those stations are not subject to the Plan, and to stations in the broadcasting-satellite service in Region 2 in the band 17.3-17.8 GHz when frequency assignments to feeder links for broadcasting-satellitestations in the 14.5-14.8 GHz and 17.3-18.1 GHz bands in Regions 1 and 3 or in the band 17.3-17.8 GHz in Region 2 are involved[[6]](#footnote-6)28

MOD RCC/8A6/30

Section I – Coordination of transmitting space or earth stations in the fixed-satellite   
service or transmitting space stations in the broadcasting-satellite service  
with assignments to broadcasting-satellite service feeder links

7.1 The provisions of No. 9.7[[7]](#footnote-7)29and the associated provisions under Articles 9 and 11 are applicable to transmitting space stations in the fixed-satellite service in Region 1 in the band 17.3-18.1 GHz, to transmitting space stations in the fixed-satellite service in Regions 2 and 3 in the band 17.7-18.1 GHz, to transmitting earth stations in the fixed-satellite service in Region 2 in the band 17.8‑18.1 GHz, to transmitting earth stations in the fixed-satellite service in Regions 1 and 2 in the band 14.5-14.75 GHz, and in Region 3 in the band 14.5-14.8 GHz, where those stations are not subject to the Plan, and to transmitting space stations in the broadcasting-satellite service in Region 2 in the band 17.3-17.8 GHz.    (WRC‑15)

7.2 In applying the procedures referred to in § 7.1, the provisions of Appendix 5 are replaced by the following:

7.2.1 The frequency assignments to be taken into account are:

*a)* the assignments in conformity with the appropriate Regional feeder-link Plan in Appendix 30A;

*b)* the assignments included in the Regions 1 and 3 feeder-link List;

*c)* the assignments for which the procedure of Article 4 has been initiated as from the date of receipt of the complete Appendix 4 information under § 4.1.3 or 4.2.6.     (WRC‑15)

7.2.2 The criteria to be applied are those given in Annex 4.

**Reasons:** To determine the order and mechanism for coordination of transmitting earth stations in the FSS where frequency assignments to feeder links for BSS satellite stations are involved. No. 9.7 and the related provisions of Article 9 and 11 are applicable to FSS unplanned transmitting earth stations in Regions 1 and 2 in the band 14.5-14.75 GHz and in Region 3 in the band 14.5-14.8 GHz for coordination with frequency assignments to BSS feeder links.

ADD RCC/8A6/31

7.2*bis* In applying the procedures referred to in § 7.1 for FSS frequency assignments in the band 14.5-14.8 GHz not subject to the Regions 1 and 3 feeder link Plan or List, the provision of No. **11.41** is replaced by the following provision. No. **11.41.2** continues to apply.

7.2*bis*.1 If, after a notice is returned under No. **11.38**, should the notifying administration resubmit the notice and insist upon its reconsideration, and the assignment which was the basis of the unfavourable finding is neither an assignment in the Regions 1 and 3 Plan nor an assignment of definitive recording in the Regions 1 and 3 feeder-link List at the time when the notice is returned under No. **11.38**, the Bureau shall enter the assignment in the Master Register with an indication of those administrations whose assignments were the basis of the unfavourable finding (see also No. **11.42**).     (WRC‑15)

**Reasons:** To establish the procedure for notifying and recording FSS unplanned frequency assignments in the event that a notice is returned following an unfavourable finding under RR No. 11.38.

MOD RCC/8A6/32

ANNEX 1

Limits for determining whether a service of an administration is considered  
to be affected by a proposed modification to the Region 2 feeder-link Plan  
or by a proposed new or modified assignment in the Regions 1 and 3  
feeder-link List or when it is necessary under this Appendix to seek  
the agreement of any other administration     (Rev.WRC‑15)

MOD RCC/8A6/33

# 6 Limits applicable to protect a frequency assignment in the band 17.8-18.1 GHz (Region 2) to a receiving feeder-link space station in the fixed-satellite service (Earth-to-space), or a frequency assignment in the bands 14.5-14.75 GHz (in Regions 1 and 2) and 14.5-14.8 GHz (in Region 3) to a receiving space station in the fixed-satellite service (Earth-to-space), where that frequency assignment is not subject to the Plan     (Rev.WRC‑15)

With respect to § 4.1.1 *d)* of Article 4, an administration is considered affected by a proposed new or modified assignment in the Regions 1 and 3 feeder-link List when the power flux-density arriving at the receiving space station of a broadcasting-satellite feeder-link in Region 2, or at the receiving space station of that administration's fixed-satellite service uplinks not subject to the Plan in any regions, would cause an increase in the noise temperature of the receiving space station which exceeds the threshold value of Δ*T*/*T* corresponding to 6%, where Δ*T*/*T* is calculated in accordance with the method given in Appendix 8, except that the maximum power densities per hertz averaged over the worst 1 MHz are replaced by power densities per hertz averaged over the necessary bandwidth of the uplink carriers.     (WRC‑15)

**Reasons:** To establish the limits applied for the protection of the frequency assignment to a receiving space station in the unplanned FSS in the bands 14.5-14.75 GHz (Regions 1 and 2) and 14.5-14.8 GHz (Region 3) where such an assignment is affected by a proposed new or modified assignment in the feeder-link List for Regions 1 and 3.

MOD RCC/8A6/34

ANNEX 4     (Rev.WRC‑15)

Criteria for sharing between services

MOD RCC/8A6/35

# 2 Threshold values for determining when coordination is required between, on one hand, transmitting feeder-link earth stations in the fixed-satellite service in Region 2 in the band 17.8-18.1 GHz or transmitting earth stations in the fixed-satellite service in the bands 14.5-14.75 (in Regions 1 and 2) and 14.5-14.8 GHz (in Region 3) not subject to the Plan, and, on the other hand a receiving space station in the Plan or List or a proposed new or modified receiving space station in the List, in the frequency bands 14.5-14.8 GHz or 17.8‑18.1 GHz     (Rev.WRC‑15)

With respect to § 7.1, Article 7, coordination of a transmitting earth station in the fixed-satellite service with a receiving space station in a broadcasting-satellite feeder link in the Regions 1 and 3 feeder-link Plan or List, or a proposed new or modified receiving space station in the List, is required when the power flux density arriving at the receiving space station of a broadcasting-satellite service feeder link of another administration would cause an increase in the noise temperature of the feeder-link space station which exceeds a threshold value of Δ*T*/*T* corresponding to 6%, where Δ*T*/*T* is calculated in accordance with the method given in Appendix 8, except that the maximum power densities per hertz averaged over the worst 1 MHz are replaced by power densities per hertz averaged over the necessary bandwidth of the uplink carriers.     (WRC‑15)

**Reasons:** To establish threshold values that can be applied to determine when coordination is required between unplanned FSS transmitting earth stations in the bands 14.5-14.75 GHz (Regions 1 and 2) and 14.5-14.8 GHz (Region 3) and a receiving space station in the Plan or feeder link List for Regions 1 and 3 in the band 14.5-14.8 GHz.

**Section 3.1**

No allocation of frequency bands indicated to GSO FSS (space-to-Earth)

ARTICLE 5

Frequency allocations

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

NOC RCC/8A6/36

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 RCC/8A6/37

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 ensuring compatibility with passive services operating in these frequency bands.

Section 3.2

No allocation of frequency bands indicated to GSO FSS (Earth-to-space)

NOC RCC/8A6/38

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 RCC/8A6/39

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 | | |

NOC RCC/8A6/40

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:** Difficulty of ensuring compatibility with passive services operating in these frequency bands.

Section 4

Conclusion of WRC-15 agenda item 1.6 and suppression of Resolutions 151 (WRC-12) and 152 (WRC-12)

SUP RCC/8A6/41

RESOLUTION 151 (WRC‑12)

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

SUP RCC/8A6/42

RESOLUTION 152 (WRC‑12)

Additional primary allocations to the fixed-satellite service in the   
Earth-to-space direction in frequency bands between 13-17 GHz   
in Region 2 and Region 3

**Reasons:** Suppression of these Resolutions is proposed in view of the completion of studies under agenda items 1.6.1 and 1.6.2.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. \* The expression “frequency assignment to a space station”, wherever it appears in this Appendix, shall be understood to refer to a frequency assignment associated with a given orbital position.     (WRC‑03) [↑](#footnote-ref-1)
2. 1 The Regions 1 and 3 feeder-link List of additional uses is annexed to the Master International Frequency Register (see Resolution **542 (WRC‑2000**)\*\*).     (WRC‑03) [↑](#footnote-ref-2)
3. 2 This use of the band 14.5-14.8 GHz is reserved for countries outside Europe.

   \*\* *Note by the Secretariat*: This Resolution was abrogated by WRC‑03.

   *Note by the Secretariat: Reference to an Article with the number in roman is referring to an Article in this Appendix.* [↑](#footnote-ref-3)
4. 4 Agreement with administrations having a frequency assignment in the bands 14.5-14.8 GHz or 17.7-18.1 GHz to a terrestrial station, or having a frequency assignment in the band 17.7-18.1 GHz to an earth station in the fixed-satellite service (space-to-Earth), or having a frequency assignment in the band 17.3-17.8 GHz in the broadcasting-satellite service shall be sought under No. **9.17**, No. **9.17A** or No. **9.19**, respectively. [↑](#footnote-ref-4)
5. 5 Coordination under Nos. **9.17** or **9.17A** is not required for an earth station of an administration on the territory of which this earth station is located and for which the procedures of former § 4.2.1.2 and 4.2.1.3 of Appendix **30A (WRC‑97)** have been successfully applied by that administration before 3 June 2000 in respect of terrestrial stations or earth stations operating in the opposite direction of transmission.     (WRC‑03) [↑](#footnote-ref-5)
6. 28 These provisions do not replace the procedures prescribed in Articles **9** and **11** when stations other than those for feeder links in the broadcasting-satellite service subject to a Plan are involved.     (WRC‑03) [↑](#footnote-ref-6)
7. 29 The provisions of Resolution **33 (Rev.WRC‑97)**\* are applicable to space stations in the broadcasting-satellite service for which the advance publication information or the request for coordination has been received by the Bureau prior to 1 January 1999.

   \* *Note by the Secretariat*: This Resolution was revised by WRC‑03. [↑](#footnote-ref-7)