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| **World Radiocommunication Conference (WRC-15) Geneva, 2–27 November 2015** |  |
| **INTERNATIONAL TELECOMMUNICATION UNION** |  |
|  |  |
| PLENARY MEETING | **Addendum 10 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 1.10 | |

1.10 to consider spectrum requirements and possible additional spectrum allocations for the mobile-satellite service in the Earth-to-space and space-to-Earth directions, including the satellite component for broadband applications, including International Mobile Telecommunications (IMT), within the frequency range from 22 GHz to 26 GHz, in accordance with Resolution **234 (WRC‑12)**;

Resolution **234 (WRC-12)**: Additional primary allocations to the mobile-satellite service within the bands from 22 GHz to 26 GHz

Introduction

The RCC Administrations support an additional allocation to the mobile-satellite service:

– in the frequency bands 23.15-23.4 GHz (space-to-Earth) and 25.25-25.5 GHz (Earth-to-space), or

– in the frequency bands 23.15-23.4 GHz (space-to-Earth) and 24.25-24.5 GHz (Earth-to-space).

The RCC Administrations consider an allocation to the mobile-satellite service in the frequency bands 23.15-23.4 GHz (space-to-Earth) and 24.25-24.5 GHz (Earth-to-space) to be more preferable since the frequency band 24.25-24.5 GHz is less loaded by other services.

Proposals

ARTICLE 5

Frequency allocations

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

MOD RCC/8A10/1

22-24.75 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 23.15-23.4 FIXED  INTER-SATELLITE 5.338A  MOBILE  MOBILE-SATELLITE (space-to-Earth) ADD 5.A110  ADD 5.B110 | | |
| 23.4-23.55 FIXED  INTER-SATELLITE 5.338A  MOBILE | | |
| 23.55-23.6 FIXED  MOBILE | | |
| 23.6-24 EARTH EXPLORATION-SATELLITE (passive)  RADIO ASTRONOMY  SPACE RESEARCH (passive)  5.340 | | |
| 24-24.05 AMATEUR  AMATEUR-SATELLITE  5.150 | | |
| 24.05-24.25 RADIOLOCATION  Amateur  Earth exploration-satellite (active)  5.150 | | |
| 24.25-24.45  FIXED  MOBILE-SATELLITE (Earth-to-space) ADD 5.E110 | 24.25-24.45  MOBILE-SATELLITE (Earth-to-space) ADD 5.E110  RADIONAVIGATION | 24.25-24.45  RADIONAVIGATION  FIXED  MOBILE  MOBILE-SATELLITE (Earth-to-space) ADD 5.E110 |
| 24.45-24.5  FIXED  INTER-SATELLITE  MOBILE-SATELLITE (Earth-to-space) ADD 5.E110 | 24.45-24.5  INTER-SATELLITE  MOBILE-SATELLITE (Earth-to-space) ADD 5.E110  RADIONAVIGATION | 24.45-24.5  FIXED  INTER-SATELLITE  MOBILE  MOBILE-SATELLITE (Earth-to-space) ADD 5.E110  RADIONAVIGATION |
|  | 5.533 | 5.533 |
| 24.5-24.65  FIXED  INTER-SATELLITE | 24.5-24.65  INTER-SATELLITE  RADIONAVIGATION | 24.5-24.65  FIXED  INTER-SATELLITE  MOBILE  RADIONAVIGATION |
|  | 5.533 | 5.533 |

**Reasons:** A change in the Table of Frequency Allocations is necessary to enable use of the corresponding frequency bands for the mobile-satellite service on a primary basis.

ADD RCC/8A10/2

5.A110 In the frequency band 23.15-23.4 GHz, in order to protect inter-satellite links between space stations in the NGSO, the e.i.r.p. of a space station in the mobile-satellite service shall not exceed the following values:

|  |  |
| --- | --- |
| Off-nadir angle | e.i.r.p. |
| 0° ≤ ϕ ≤ 8.7° | 46.5 dB(W/MHz) |
| 8.7° < ϕ < 9.25° | 46.5 + 62log(9.7 − ϕ) dB(W/MHz) |
| ϕ ≥ 9.25° | 25 dB(W/MHz) |

**Reasons:** Studies by Working Party 4C have shown that the e.i.r.p. limits given in this footnote for an MSS space station will protect inter-satellite links between space stations in the NGSO from unacceptable interference.

ADD RCC/8A10/3

5.B110 The use of the band 23.15-23.4 GHz (space-to-Earth) by the mobile-satellite service and by the inter-satellite service between GSO-NGSO space stations is subject to coordination procedures under No. **9.7**. Mobile-satellite service use is limited to geostationary systems.     (WRC‑15)

**Reasons:** The proposed footnote establishes the need for coordination between networks in the mobile-satellite service and inter-satellite service. All of the WP 4C studies with respect to the band 23.15-23.4 GHz were conducted only for GSO systems in the MSS.

ADD RCC/8A10/4

5.E110 The use of the band 24.25-24.5 GHz by the mobile-satellite service is limited to geostationary systems.     (WRC‑15)

**Reasons:** All of the WP 4C studies with respect to the band 24.25-24.5 GHz were conducted only for GSO systems in the MSS.

ARTICLE 21

Terrestrial and space services sharing frequency bands above 1 GHz

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

MOD RCC/8A10/5

TABLE **21-4**     (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° |
| 23.15-23.4 GHz | Mobile-satellite  (space-to-Earth) (geostationary-satellite orbit) | −125 | −125 + 0.5(δ − 5) | −115 | 1 MHz |

**Reasons:** The WP 4C studies showed that the indicated pfd limits for an MSS space station in the band 23.15-23.4 GHz will protect terrestrial stations in the fixed and mobile services from unacceptable interference.

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/8A10/6

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 (*cont.*) |  | 8*bis*) 23.15-23.4 GHz | i) Bandwidths overlap; and  ii) any network in the inter-satellite service (ISS) or MSS and any associated space operation functions (see No. **1.23**) with a GSO space station within an orbital arc of ±8° of the nominal orbital position of a proposed network in the MSS or ISS |  | No. **9.41** does not apply |

**Reasons:** Changes to Table 5-1 in RR Appendix 5 are required to identify the need for coordination between satellite networks in the MSS and ISS.

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/8A10/7

TABLE 7c    (Rev.WRC‑15)

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

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Transmitting space radiocommunication service designation | | Mobile- satellite | Fixed- satellite | Fixed- satellite 2 | Fixed- satellite 3 | Space  research | Earth  exploration-satellite, space research | Fixed-satellite, mobile-satellite, radionavigation-satellite | Fixed- satellite 2 | |
| Frequency bands (GHz) | | 24.25-24.5 | 24.65-25.25 27.0-29.5 | 28.6-29.1 | 29.1-29.5 | 34.2-34.7 | 40.0-40.5 | 42.5-47 47.2-50.2 50.4-51.4 | 47.2-50.2 | |
| Receiving terrestrial  service designations | | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile, radiolocation | Fixed, mobile | Fixed, mobile, radionavigation | Fixed, mobile | |
| Method to be used | | § 2.1 | § 2.1 | § 2.2 | § 2.2 |  | § 2.1, § 2.2 | § 2.1, § 2.2 | § 2.2 | |
| Modulation at terrestrial station 1 | | N | N | N | N |  | N | N | N | |
| Terrestrial station interference parameters and criteria | *p*0 (%) | 0.005 | 0.005 | 0.005 | 0.005 |  | 0.005 | 0.005 | 0.001 | |
| *n* | 1 | 1 | 2 | 1 |  | 1 | 1 | 1 | |
| *p* (%) | 0.005 | 0.005 | 0.0025 | 0.005 |  | 0.005 | 0.005 | 0.001 | |
| *NL* (dB) | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | |
| *Ms* (dB) | 25 | 25 | 25 | 25 |  | 25 | 25 | 25 | |
| *W* (dB) | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | |
| Terrestrial station parameters | *Gx* (dBi) 4 | 50 | 50 | 50 | 50 |  | 42 | 42 | 46 | |
| *Te* (K) | 2 000 | 2 000 | 2 000 | 2 000 |  | 2 600 | 2 600 | 2 000 | |
| Reference bandwidth | *B* (Hz) | 106 | 106 | 106 | 106 |  | 106 | 106 | 106 | |
| Permissible interference power | *Pr*( *p*) (dBW) in *B* | −111 | −111 | −111 | −111 |  | −110 | −110 | −111 | |
| 1 A: analogue modulation; N: digital modulation.  2 Non-geostationary satellites in the fixed-satellite service.  3 Feeder links to non-geostationary-satellite systems in the mobile-satellite service.  4 Feeder losses are not included. | | | | | | | | | |

MOD RCC/8A10/8

TABLE 8d     (Rev.WRC‑12)

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Receiving space radiocommunication service designation | | | Meteorological- satellite | Fixed-satellite | Fixed-satellite3 | Broadcasting-satellite | Mobile- satellite | Earth exploration-satellite4 | Earth exploration-satellite5 | Space research (deep space) | Space research | | Fixed-satellite6 | Fixed- satellite5 | Mobile-satellite | Broadcasting-satellite, fixed‑satellite | Mobile-satellite | Radio-navigation-satellite | |
|  | | |  |  |  |  |  |  |  |  | Unmanned | Manned |  |  |  |  |  |  | |
| Frequency bands (GHz) | | | 18.0-18.4 | 18.8-19.3 | 19.3-19.7 | 21.4-22.0 | 23.15-23.4 | 25.5-27.0 | 25.5-27.0 | 31.8-32.3 | 37.0-38.0 | | 37.5-40.5 | 37.5-40.5 | 39.5-40.5 | 40.5-42.5 | 43.5-47.0 | 43.5-47.0 | |
| Transmitting terrestrial service designations | | | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed,  radio- navigation | Fixed, mobile | | Fixed, mobile | Fixed, mobile | Fixed, mobile | Broadcasting, fixed | Mobile | Mobile | |
| Method to be used | | | § 2.1 | § 2.1, § 2.2 | § 2.2 | § 1.4.5 | § 1.4.6 | § 2.2 | § 2.1 | § 2.1, § 2.2 | § 2.1, § 2.2 | | § 2.2 | § 2.1 | § 1.4.6 | § 1.4.5, § 2.1 | § 1.4.6 | – | |
| Modulation at earth station1 | | | N | N | N |  | N | N | N | N | N | | N | N | N | – | N |  | |
| Earth station interference parameters and criteria | *p*0 (%) |  | 0.05 | 0.003 | 0.01 |  |  | 0.25 | 0.25 | 0.001 | 0.1 | 0.001 | 0.02 | 0.003 |  |  |  |  | |
| *n* |  | 2 | 2 | 1 |  |  | 2 | 2 | 1 | 1 | 1 |  | 2 |  |  |  |  | |
| *p* (%) |  | 0.025 | 0.0015 | 0.01 |  |  | 0.125 | 0.125 | 0.001 | 0.1 | 0.001 |  | 0.0015 |  |  |  |  | |
| *NL* (dB) |  | 0 | 0 | 0 |  |  | 0 | 0 | 0 | 0 | | 1 | 1 |  |  |  |  | |
| *Ms* (dB) |  | 18.8 | 5 | 5 |  |  | 11.4 | 14 | 1 | 1 | | 6.8 | 6 |  |  |  |  | |
| *W* (dB) |  | 0 | 0 | 0 |  |  | 0 | 0 | 0 | 0 | | 0 | 0 |  |  |  |  | |
| Terrestrial station parameters | *E* (dBW) in *B* 2 | A |  | – | – |  | – | – | – | – | – | | – | – | – | – |  |  | |
| N | 40 | 40 | 40 | 40 | 42 | 42 | 42 | −28 | −28 | | 35 | 35 | 35 | 44 | 40 | 40 | |
| *Pt* (dBW) in *B* | A |  | – | – |  | – | – | – | – | – | | – | – | – | – |  |  | |
| N | −7 | −7 | −7 | −7 | −3 | −3 | −3 | −81 | −73 | | −10 | −10 | −10 | −1 | −7 | −7 | |
| *Gx* (dBi) |  | 47 | 47 | 47 | 47 | 45 | 45 | 45 | 53 | 45 | | 45 | 45 | 45 | 45 | 47 | 47 | |
| Reference bandwidth6 | *B* (Hz) |  | 107 | 106 | 106 |  | 107 | 107 | 107 | 1 | 1 | | 106 | 106 | 106 | 106 |  |  | |
| Permissible interference power | *Pr* ( *p*) (dBW) in *B* | | −115 | −140 | −137 |  |  | −120 | −116 | −216 | −217 | | −140 |  |  |  |  |  | |
| 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 Non-geostationary mobile-satellite service feeder links.  4 Non-geostationary-satellite systems.  5 Geostationary-satellite systems.  6 Non-geostationary fixed-satellite service systems. | | | | | | | | | | | | | | | | | | |

**Reasons:** Inclusion of the relevant parameters in Tables 7c and 8d of RR Appendix 7 in order to identify the coordination distances for transmitting and receiving MSS earth stations sharing with terrestrial radiocommunication services (FS, MS).

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