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| **World Radiocommunication Conference (WRC-19) Sharm el-Sheikh, Egypt, 28 October – 22 November 2019** |  |
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| PLENARY MEETING | **Addendum 1 to Document 12(Add.21)-E** |
|  | **2 October 2019** |
|  | **Original: Russian** |
|  | |
| Regional Commonwealth in the field of Communications Common Proposals | |
| Proposals for the work of the conference | |
|  | |
| Agenda item 9.1(9.1.1) | |

9 to consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with Article 7 of the Convention:

9.1 on the activities of the Radiocommunication Sector since WRC-15;

9.1 (9.1.1) Resolution **212 (Rev.WRC-15) -** Implementation of International Mobile Telecommunications in the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz

Introduction

This agenda item relates to the study of possible technical and operational measures to ensure coexistence and compatibility between the terrestrial component of IMT (in the mobile service) and the satellite component of IMT (in the mobile-satellite service) in the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz where those frequency bands are shared by the mobile service and the mobile-satellite service in different countries, in particular for the deployment of independent satellite and terrestrial components of IMT and to facilitate development of both the satellite and terrestrial components of IMT.

The RCC Administrations are of the view that the results of the aforementioned study should serve as the basis for developing suitable and acceptable technical conditions for operation of the satellite and terrestrial components of IMT that will facilitate worldwide use and roaming, and ensure that IMT can also meet the telecommunication needs of the developing countries and rural areas

Proposal

The RCC Administrations consider that sharing between the terrestrial component of IMT (in the mobile service) and the satellite component of IMT (in the mobile-satellite service) in the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz is possible through application of the existing provisions of the Radio Regulations (RR) together with the adoption by WRC-19 of the additional regulatory and technical measures set forth below.

1) For scenario A1, potential interference in the frequency band 1 980-2 010 MHz from terrestrial IMT stations to MSS space stations could be regulated by the existing RR provisions (No. **5.388**), with incorporation into the RR of an additional e.i.r.p. limitation for IMT stations. The proposed changes to Resolution **212 (Rev.WRC-15)** are presented in Annex 1 hereto.

2) For scenario A2, the potential interference in the frequency band 2 170-2 200 MHz from terrestrial IMT stations to MSS earth stations could be regulated by the existing RR provisions on cross-border coordination (Nos. 9.16 and 9.18).

3) For scenario B1, potential interference in the frequency band 1 980-2 010 MHz from MSS earth stations to IMT stations could be regulated by the existing RR provisions on cross-border coordination (RR Nos. **9.15** and **9.17**), with incorporation of the necessary changes into RR Appendix **7**. The proposed changes to Table 7a of Appendix **7** of the RR are presented in Annex 2 hereto.

4) For scenario B2, potential interference in the frequency band 2 170-2 200 MHz from space stations of the satellite component to terrestrial IMT stations could be regulated by the existing RR provisions on coordination (RR No. **9.14**), with incorporation of the necessary changes in RR Appendix **5**. Proposals for the coordination pfd levels for inclusion in Table 5-2 of RR Appendix **5** are presented in Annex 3 hereto).

ANNEX 1

Scenario A1 - Impact of the IMT terrestrial component into the receiving space station of the satellite component

ARTICLE 5

Frequency allocations

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

MOD RCC/12A21A1/1

1 710-2 170 MHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 1 980-2 010 FIXED  MOBILE  MOBILE-SATELLITE (Earth-to-space) MOD 5.351A  MOD 5.388 5.389A 5.389B 5.389F | | |

**Reasons:** Updating of RR Nos. **5.351A** and **5.388** to reflect the updated references to Resolutions **212 (Rev.WRC-19)** and **225 (Rev.WRC-12)**.

MOD RCC/12A21A1/2

2 170-2 520 MHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 2 170-2 200 FIXED  MOBILE  MOBILE-SATELLITE (space-to-Earth) MOD 5.351A  MOD 5.388 5.389A 5.389F | | |

**Reasons:** Updating of RR Nos. **5.351A** and **5.388** to reflect the updated references to Resolutions **212 (Rev.WRC-19)** and **225 (Rev.WRC-12)**.

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5.351A For the use of the bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 610-1 645.5 MHz, 1 646.5-1 660.5 MHz, 1 668-1 675 MHz, 1 980-2 010 MHz, 2 170-2 200 MHz, 2 483.5-2 520 MHz and 2 670-2 690 MHz by the mobile-satellite service, see Resolutions **212 (Rev.WRC‑**19**)**and **225 (Rev.WRC‑12)**     (WRC‑19)

**Reasons:** Updating of the reference to Resolutions **212 (Rev.WRC-19)** and **225 (Rev.WRC-12)**.

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5.388The frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz are intended for use, on a worldwide basis, by administrations wishing to implement International Mobile Telecommunications (IMT). Such use does not preclude the use of these frequency bands by other services to which they are allocated. The frequency bands should be made available for IMT in accordance with Resolution **212 (Rev.WRC‑19)** (see also Resolution **223 (Rev.WRC‑15)**).     (WRC‑19)

**Reasons:** Updating of the reference to Resolution **212 (Rev.WRC-19)**.

MOD RCC/12A21A1/5

RESOLUTION 212 (Rev.WRC‑19)

Implementation of International Mobile Telecommunications in the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz

The World Radiocommunication Conference (Sharm El-Sheikh, 2019),

considering

*a)* that Resolution ITU‑R 56 defines the naming for International Mobile Telecommunications (IMT);

*b)* that the ITU Radiocommunication Sector (ITU‑R), for WRC‑97, recommended approximately 230 MHz for use by the terrestrial and satellite components of IMT;

*c)* that ITU‑R studies forecast that additional spectrum may be required to support the future services of IMT and to accommodate future user requirements and network deployments;

*d)* that ITU‑R has recognized that space techniques are an integral part of IMT;

*e)* that, in No. **5.388**, WARC‑92 identified frequency bands to accommodate certain mobile services, now called IMT,

noting

*a)* that the terrestrial component of IMT has already been deployed or is being considered for deployment in the frequency bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz;

*b)* that both the terrestrial and satellite components of IMT have already been deployed or are being considered for deployment in the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz;

*c)* that the availability of the satellite component of IMT in the frequency bands 1 980‑2 010 MHz and 2 170-2 200 MHz simultaneously with the terrestrial component of IMT in the frequency bands identified in No. **5.388** would improve the overall implementation and the attractiveness of IMT,

noting further

*a)* that co‑coverage, co-frequency deployment of independent satellite and terrestrial IMT components is not feasible unless techniques, such as the use of an appropriate guardband or other mitigation techniques, are applied to ensure coexistence and compatibility between the terrestrial and satellite components of IMT;

*b)* that, when the satellite and terrestrial components of IMT are deployed in the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz in adjacent geographical areas, technical or operational measures may need to be implemented to avoid harmful interference;

*c)* that some difficulties have been raised in addressing potential interference between the satellite and terrestrial components of IMT;

*d)* that Report ITU‑R M.2041 addresses sharing and adjacent band compatibility in the 2.5 GHz band between the terrestrial and satellite components of IMT‑2000,

resolves

that administrations which implement IMT:

*a)* should make the necessary frequencies available for system development;

*b)* should use those frequencies when IMT is implemented;

*c)* should use the relevant international technical characteristics, as identified by ITU‑R and ITU‑T Recommendations;

*d)* shall limit the maximum equivalent isotropically radiated power of the mobile service land stations to 20 dBm/5 MHz in the frequency band 1 980-2 010 MHz, except for terrestrial stations in the frequency band 1 980-1 990 MHz for which the complete information for notification is received by the Radiocommunication Bureau prior to 1 January 2020 for the countries listed in No. **5.389B**,

encourages administrations

to give due consideration to the accommodation of other services currently operating in these frequency bands when implementing IMT.

**Reasons:** Studies have shown that limiting mobile service land stations to a maximum equivalent isotropically radiated power of 20 dBm/5 MHz in the frequency band 1 980-2 010 MHz on the one hand allows use of this band by user terminals (in accordance with Report ITU-R M.2292, 20 dBm/5MHz is the maximum e.i.r.p. for user terminals), and on the other hand allows sharing of the band 1 980-2 010 MHz between the satellite and terrestrial components of IMT.

ANNEX 2

Scenario B1 - Impact of the ES of the satellite component into the terrestrial component of IMT

APPENDIX 7 (REV.WRC‑15)

Methods for the determination of the coordination area around an earth  
station in frequency bands between 100 MHz and 105 GHz

ANNEX 7

System parameters and predetermined coordination distances for determination of the coordination area around an earth station

# 3 Horizon antenna gain for a receiving earth station with respect to a transmitting earth station

MOD RCC/12A21A1/6

TABLE 7a     (Rev.WRC‑19)

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Transmitting space radiocommunication  service designation | | Mobile-satellite, space operation | Earth  exploration-satellite, meteorological  satellite | | Space  operation | Space research, space  operation | Mobile- satellite | Space operation | | Mobile- satellite, radio- determination- satellite | Mobile- satellite | | Space operation, space  research | | Mobile- satellite | | Space research, space  operation, Earth exploration-satellite |
| Frequency bands (MHz) | | 148.0-149.9 | 401-403 | | 433.75-434.25 | 449.75-450.25 | 806-840 | 1 427-1 429 | | 1 610-1 626.5 | 1 668.4-1 675 | | 1 750-1 850 | | 1 980-2 025 | | 2 025-2 110 2 110-2 120 (Deep space) |
| Receiving terrestrial  service designations | | Fixed, mobile | Meteorological aids | | Amateur, radiolocation fixed, mobile | Fixed, mobile, radio- location | Fixed, mobile broadcasting, aeronautical radionavigation | Fixed, mobile | | Aeronautical radionavigation | Fixed, mobile | | Fixed, mobile | | Fixed, mobile | | Fixed, mobile |
| Method to be used | | § 2.1, § 2.2 | § 2.1, § 2.2 | | § 2.1, § 2.2 | § 2.1, § 2.2 | § 1.4.6 | § 2.1, § 2.2 | | § 1.4.6 | § 1.4.6 | | § 2.1, § 2.2 | | § 1.4.6 | | § 2.1, § 2.2 |
| Modulation at terrestrial station 1 | | A | A | N |  | A and N | A and N | A | N |  | A | N | A | N | A | N | A |
| Terrestrial station interference parameters and criteria | *p*0 (%) | 1.0 |  |  |  | 0.01 | 0.01 | 0.01 | 0.01 |  | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 20 | 0.01 |
| *N* | 1 |  |  |  | 2 | 2 | 2 | 2 |  | 2 | 2 | 2 | 2 | 2 | 1 | 2 |
| *p* (%) | 1.0 |  |  |  | 0.005 | 0.005 | 0.005 | 0.005 |  | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 | 20 | 0.005 |
| *NL* (dB) | – |  |  |  | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Ms* (dB) | – |  |  |  | 20 | 20 | 33 | 33 |  | 33 | 33 | 33 | 33 | 26 2 | 1 | 26 2 |
| *W* (dB) | – |  |  |  | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Terrestrial station parameters | *Gx* (dBi) 3 | 8 |  |  |  | 16 | 16 | 33 | 33 |  | 35 | 35 | 35 | 35 | 49 2 | 16.1 | 49 2 |
| *Te* (K) | – |  |  |  | 750 | 750 | 750 | 750 |  | 750 | 750 | 750 | 750 | 500 2 | 925 | 500 2 |
| Reference bandwidth | *B* (Hz) | 4 × 103 |  |  |  | 12.5 × 103 | 12.5 × 103 | 4 × 103 | 106 |  | 4 × 103 | 106 | 4 × 103 | 106 | 4 × 103 | 4 × 103 | 4 × 103 |
| Permissible interference power | *Pr*(*p*) (dBW) in *B* | −153 |  |  |  | −139 | −139 | −131 | −107 |  | −131 | −107 | −131 | −107 | −140 | −169 | −140 |
| 1 A: analogue modulation; N: digital modulation.  2 The parameters for the terrestrial station associated with transhorizon systems have been used. Line-of-sight radio-relay parameters associated with the frequency band 1 668.4-1 675 MHz may also be used to determine a supplementary contour.     (WRC‑03)  3 Feeder losses are not included. | | | | | | | | | | | | | | | | | |

**Reasons:** Appendix 7 currently contains parameters only for analogue modulation in the frequency band 1 980-2 025 MHz. The relevant digital modulation parameters are needed for determining the coordination distance.

ANNEX 3

Scenario B2 - Impact of the space station of the satellite component into the terrestrial component of IMT

MOD RCC/12A21A1/7

APPENDIX 5 (REV.WRC‑19)

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

**Reasons:** Update required further to revision by WRC-19.

...

ANNEX 1

MOD RCC/12A21A1/8

# 1 Coordination thresholds for sharing between MSS (space-to-Earth) and terrestrial services in the same frequency bands and between non‑GSO MSS feeder links (space-to-Earth) and terrestrial services in the same frequency bands and between RDSS (space-to-Earth) and terrestrial services in the same frequency bands     (WRC‑19)

## ...

### 1.2.3 Determination of the need for coordination between MSS and RDSS space stations (space-to-Earth) and terrestrial stations    (WRC‑19)

#### 1.2.3.1 Method for the determination of the need for coordination between MSS and RDSS space stations (space-to-Earth) and other terrestrial services sharing the same frequency band in the 1 to 3 GHz range

Coordination of assignments for transmitting space stations of the MSS and RDSS with respect to terrestrial services is not required if the pfd produced at the Earth’s surface or the FDP of a station in the fixed service does not exceed the threshold values shown in the following table.    (WRC‑19)

**Reasons:** Updating required further to revision by WRC-19.

MOD RCC/12A21A1/9

TABLE 5-2     (Rev.WRC‑19)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Frequency band (MHz) | Terrestrial service  to be protected | Coordination threshold values | | | | |
|  |  | GSO space stations | | Non-GSO space stations | | |
|  |  | pfd (per space station) calculation factors (NOTE 2) | | pfd (per space station) calculation factors (NOTE 2) | | % FDP (in 1 MHz) (NOTE 1) |
|  |  | *P* | *r* dB/ degrees | *P* | *r* dB/ degrees |  |
| 1 518-1 525 | Analogue  FS telephony (NOTE 5) | −146 dB(W/m2)  in 4 kHz and  −128 dB(W/m2)  in 1 MHz | 0.5 | −146 dB(W/m2)  in 4 kHz and  −128 dB(W/m2)  in 1 MHz | 0.5 |  |
|  | All other cases FS telephony (NOTES 4 and 8) | −128 dB(W/m2)  in 1 MHz | 0.5 | −128 dB(W/m2)  in 1 MHz | 0.5 | 25 |

TABLE 5-2 (*end*)     (Rev.WRC‑19)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Frequency band (MHz) | Terrestrial service  to be protected | Coordination threshold values | | | | | |
|  |  | GSO space stations | | Non-GSO space stations | | | |
|  |  | pfd (per space station) calculation factors (NOTE 2) | | pfd (per space station) calculation factors (NOTE 2) | | % FDP (in 1 MHz) (NOTE 1) | |
|  |  | *P* | *r* dB/ degrees | *P* | *r* dB/ degrees |  | |
| 1 525-1 530 | Analogue FS telephony (NOTE 5) | −146 dB(W/m2)  in 4 kHz and  −128 dB(W/m2) in 1 MHz | 0.5 | −146 dB(W/m2)  in 4 kHz and  −128 dB(W/m2) in 1 MHz | 0.5 |  | |
|  | All other cases | −128 dB(W/m2)  in 1 MHz | 0.5 | −128 dB(W/m2)  in 1 MHz | 0.5 | 25 | |
| 2 160-2 200 | Analogue FS telephony (NOTE 5) | −146 dB(W/m2)  in 4 kHz and  −128 dB(W/m2) in 1 MHz | 0.5 | −141 dB(W/m2)  in 4 kHz and  −123 dB (W/m2) in 1 MHz  (NOTE 6) | 0.5 |  | |
| (NOTE 3) | All other cases | −128 dB(W/m2) in 1 MHz | 0.5 | −123 dB(W/m2) in 1 MHz  (NOTE 6) | 0.5 | 25 | |
| 2 170-2 200  (NOTE 11) | MC (IMT) | −108.8 dB(W/m2)  in 1 MHz | – | −108.8 dB(W/m2)  in 1 MHz |  |  | |
| 2 483.5-2 500 (mobile-satellite service) | All cases | –146 dB(W/m2) in 4 kHz and  –128 dB(W/m2) in 1 MHz | 0.5 | −144 dB(W/m2) in 4 kHz and  −126 dB(W/m2) in 1 MHz  (NOTE 9) | 0.65 |  | |
| 2 483.5-2 500 (radiodeterm-ination-satellite service) (NOTE 10) | All cases except the radiolocation service in the countries listed in No. **5.398A** | −152 dB(W/m2)  in 4 kHz  −128 dB(W/m2) in 1 MHz | – | −153 dB(W/m2)  in 4 kHz  −129 dB(W/m2) in 1 MHz (NOTE 9) |  |  | |
| 2 500-2 520    (SUP - WRC‑07) | | | | | | | |
| 2 520-2 535    (SUP - WRC‑07) | | | | | | | |
| NOTE 1 – The calculation of FDP is contained in § 1.2.2.1, using the reference FS parameters contained in § 1.2.2.2.1 and 1.2.2.2.3. The use of FDP threshold is limited to the case of digital FS systems. | | | | | | | | |
| NOTE 2 – The following formula should be used for deriving the coordination threshold in terms of pfd:  *P* for 0° ≤  ≤ 5°  *P* + *r* ( – 5) for 5° <  ≤ 25°  *P* + 20 *r* for 25° <  ≤ 90°  where  is the angle of arrival (degrees).  The threshold values are obtained under assumed free-space propagation conditions. | | | | | | | | |
| |  | | --- | | NOTE 3 – The coordination thresholds in the band 2 160-2 170 MHz (Region 2) and 2 170-2 200 MHz (all Regions) to protect other terrestrial services do not apply to International Mobile Telecommunications (IMT) systems.     (WRC‑19) | | NOTE 4 – Exceptions for the band 1 518-1 525 MHz are as follows:  4.1 For the land mobile service on the territory of Japan (No. **5.348A**): −150 dB(W/m2) in 4 kHz at all angles of arrival is applicable to all satellite space-to-Earth emissions.  4.2 For the aeronautical mobile service for telemetry on the territory of the administrations listed in No. **5.342**: −140 dB(W/m2) in 4 kHz at all angles of arrival.  4.3 For the point-to-multipoint systems operating in the fixed service in the territory of New Zealand: −138 dB(W/m2) in 1 MHz for angles of arrival less than or equal to 5° above the horizon and increasing linearly to −125 dB(W/m2) in 1 MHz for angles of arrival equal to 25° or greater above the horizon.     (WRC‑03) | | NOTE 5 – In all cases involving sharing with analogue systems for telephony in the FS, further coordination is only required when the pfd values are greater than or equal to the coordination threshold values in both reference bandwidths. | | NOTE 6 – The pfd values specified for the band 2 160-2 200 MHz provide full protection for analogue radio-relay systems using the sharing criteria established by the most recent version of Recommendation ITU‑R SF.357, for operation with a non‑GSO MSS system employing narrow-band time division multiple access/frequency division multiple access techniques. | | NOTE 7 – (SUP - WRC‑12)  NOTE 8 – In the band 1 518-1 520 MHz, for the point-to-multipoint systems operating in the fixed service on the territory of Australia: –138 dB(W/m2) in 1 MHz for angles of arrival less than or equal to 5° above the horizon and increasing linearly to –125 dB(W/m2) in 1 MHz for angles of arrival equal to 25° or greater above the horizon.     (WRC‑03) |   NOTE 9 – Instead of the values in the Table, the pfd coordination thresholds of −142.5 dB(W/m2) in 4 kHz and −124.5 dB(W/m2) in 1 MHz for the MSS and −152 dB(W/m2) in 4 kHz and −128 dB(W/m2) in 1 MHz for the RDSS shall apply in Albania, Germany, Andorra, Antigua and Barbuda, Argentina, Australia, Austria, Bahamas, Barbados, Belgium, Belize, Bolivia (Plurinational State of), Bosnia and Herzegovina, Brazil, Bulgaria, Canada, Chile, Cyprus, Vatican, Colombia, Congo (Rep. of the), Costa Rica, Croatia, Denmark, Dominican Rep., Dominica, El Salvador, Ecuador, Spain, Estonia, United States, Finland, France, Greece, Grenada, Guatemala, Guyana, Haiti, Honduras, Hungary, Ireland, Iceland, Israel, Italy, Jamaica, Latvia, The Former Yugoslav Rep. of Macedonia, Liechtenstein, Lithuania, Luxembourg, Malta, Mexico, Monaco, Montenegro, Nicaragua, Nigeria, Norway, Panama, Paraguay, Netherlands, Peru, Poland, Portugal, Slovakia, Czech Rep., Romania, United Kingdom, Saint Lucia, Saint Kitts and Nevis, San Marino, Saint Vincent and the Grenadines, Serbia, Slovenia, Sweden, Switzerland, Suriname, Trinidad and Tobago, Turkey, Uruguay and Venezuela.    (WRC‑12)  NOTE 10 – These pfd values apply only to systems submitted after 17 February 2012 and do not apply to systems for which complete coordination information has been received before 18 February 2012 (see No. **5.401**).    (WRC‑12)  NOTE 11 – The coordination thresholds in the band 2 170-2 200 MHz (all Regions) are applied to protect terrestrial stations of International Mobile Telecommunications (IMT) systems.     (WRC‑19) | | | | | | | | |

**Reasons:** Note 11 is added in order to apply coordination thresholds in the frequency band 2 170-2 200 MHz (in all Regions) to protect terrestrial stations of International Mobile Telecommunications (IMT) systems; the deletion in Note 3 is in order to remove an ambiguity.

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