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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 16(Add.21)-E** |
|  | **9 October 2019** |
|  | **Original: English** |
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| European 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

ITU-R and CEPT have been conducting the technical and operational studies for the implementation of International Mobile Telecommunications (IMT) in the frequency bands 1 980‑2 010 MHz and 2 170‑2 200 MHz. The studies considered the issue of coexistence and compatibility between terrestrial IMT (composed of base stations (IMT BSs) and user equipment (IMT UEs) and satellite IMT (composed of mobile-satellite service (MSS) space stations (IMT space stations) and mobile earth stations (IMT MESs)) in different countries, which are not necessarily adjacent.

The frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz have been identified in the Radio Regulations (RR) for use by IMT. Within these broader frequency ranges, the frequency bands 1 980‑2 010 MHz and 2 170‑2 200 MHz are allocated to the fixed service (FS), mobile service (MS) and mobile-satellite service (MSS) on a co-primary basis. The MSS allocation is in the Earth to-space direction in the 1 980-2 010 MHz frequency band, and in the space-to-Earth direction in the 2 170‑2 200 MHz frequency band, and is prioritized for MSS use in CEPT (see Decisions ECC/DEC/(06)09, ECC/DEC/(06)10, and European Commission Decision 2007/98/EC).

The satellite component of IMT has been deployed and is being considered for further deployment within the 1 980-2 010 MHz and 2 170‑2 200 MHz frequency bands. But some MSS systems operating in these frequency bands have reported receiving harmful interference from terrestrial services.

There are four interference scenarios to be considered. Regarding the issue of potential interference from the terrestrial IMT base station to MSS earth stations (MES) in the frequency band 2 170‑2 200 MHz (interference scenarios A2 as defined in sections 2/9.1.1/3.2 of the CPM Report, in Doc [CPM19-2/226](https://www.itu.int/dms_pub/itu-r/md/15/cpm19.02/r/R15-CPM19.02-R-0001!!PDF-E.pdf)), and considering the results of the technical studies, CEPT is of the view that such interference can be managed by the existing cross-border coordination provisions of the RR in Article **9** and Appendix **7** and there is no requirement for additional regulatory measures.

Potential interference in the frequency band 1 980‑2 010 MHz from MES to IMT stations (interference scenario B1 as defined in section 2/9.1.1/3.3 of the CPM Report) can be addressed by the current provisions on border coordination given in RR Article **9** and with necessary additions to RR Appendix **7** to include relevant parameters for digital modulation required for the determination of coordination distance for a transmitting earth station. RR Appendix **7** currently contains parameters only for analogue modulation in the frequency band 1 980-2 025 MHz. This would assist administrations which need to coordinate with IMT MESs with respect to terrestrial IMT systems.

Regarding the protection of the terrestrial component of the IMT from the emissions of the satellite IMT downlink (interference scenario B2 as defined in section 2/9.1.1/3.4 of the CPM Report), based on the results of technical studies, CEPT is of the view that Table 5-2 of RR Appendix **5** should be modified to add a new coordination threshold for the protection of IMT terrestrial stations, along with a new Note 11 and update of Note 3.

Regarding the protection of the satellite IMT uplink (interference scenario A1 as defined in section 2/9.1.1/3.1 of the CPM Report), CEPT is of the view that in order to ensure the coexistence between the satellite IMT and the terrestrial IMT, WRC-19 should adopt regulatory provisions.

The studies indicate that the use of the frequency band 1 980-2 010 MHz by transmitting IMT BSs, i.e. the use of this frequency band for downlinks of the terrestrial system, creates significant harmful interference to the satellite IMT uplink. Moreover, in this scenario of interference, there is no existing provision in the RR to trigger bilateral coordination. Therefore, the concerned administrations cannot be easily identified, and the satellite receiver may receive aggregated interference from several countries which exceeds the IMT space station protection requirements by a considerable margin. On the other hand, studies indicate that if the frequency band 1 980‑2 010 MHz is limited to terrestrial IMT stations using lower power then there is no harmful interference. CEPT therefore proposes to establish power limits applicable to all three Regions in the RR that would allow the frequency band 1 980-2 010 MHz to be used by administrations for the operation of terrestrial IMT systems in a manner that would ensure that harmful interference is not caused to IMT space stations serving other countries.

Since footnote RR No. **5.389B** gives priority to the MS over the MSS in certain Region 2 countries in the band 1 980-1 990 MHz the above limitations on terrestrial IMT systems should therefore not apply to those countries listed in footnote RR No. **5.389B** or in all countries of Region 2 in that band. The limitations should however apply for the band 1 990-2 010 MHz to all Region 2 countries. CEPT supports “No Change” to footnote RR No. **5.389B** which gives priority to the MS over the MSS in certain Region 2 countries in the band 1 980-1 990 MHz.

Footnote RR No. **5.389F** gives priority to the MS over the MSS in certain countries in Region 1 and Region 3 up to 1 January 2005 and has the potential to cause interference to MSS systems serving Europe from all orbital locations. CEPT propose to suppress this footnote as the 1 January 2005 date has now passed.

In summary, CEPT supports View 1 in the CPM Report and is of the view that the most expedient way to ensure the long term sharing of terrestrial IMT and satellite IMT in these bands is:

– To adopt an e.i.r.p. limit for stations in the mobile service transmitting in the band 1 980‑2 010 MHz in all three Regions (Scenario A1).

– To add digital modulation parameters to RR Appendix **7** (Scenario B1).

– To add a new coordination threshold pfd value for MSS space stations along with a new Note 11 and modify NOTE 3 in Table 5-2 of RR Appendix **5** (Scenario B2).

Modifications to Resolution **212 (Rev. WRC-15)** to reflect the completion of studies are also included.

Proposals

ARTICLE 5

Frequency allocations

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

MOD EUR/16A21A1/1

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 | | |
| … | | |

MOD EUR/16A21A1/2

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 | | |
| … |  |  |

MOD EUR/16A21A1/3

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:** To update RR No. **5.351A** to reference the revision to Resolution **212 (Rev. WRC-19)**.

MOD EUR/16A21A1/4

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:** To update RR No. **5.388** to reference the revision to Resolution **212 (Rev. WRC-19)**.

NOC EUR/16A21A1/5

5.389B The use of the band 1 980-1 990 MHz by the mobile-satellite service shall not cause harmful interference to or constrain the development of the fixed and mobile services in Argentina, Brazil, Canada, Chile, Ecuador, the United States, Honduras, Jamaica, Mexico, Peru, Suriname, Trinidad and Tobago, Uruguay and Venezuela.

**Reasons:** RR No. **5.389B** gives priority to the MS over the MSS in certain Region 2 countries in the frequency band 1 980-1 990 MHz. The above limitations on terrestrial IMT systems should therefore not apply to those countries listed in footnote RR No. **5.389B** in that band. The limitations should however apply for the frequency band 1 980-1 990 MHz to Region 2 countries that are not included in the footnote and should apply for the frequency band 1 990-2 010 MHz to all Region 2 countries, taking into account the risk of interference to satellites, including those above Europe.

SUP EUR/16A21A1/6

5.389F In Algeria, Benin, Cape Verde, Egypt, Iran (Islamic Republic of), Mali, Syrian Arab Republic and Tunisia, the use of the bands 1 980-2 010 MHz and 2 170-2 200 MHz by the mobile-satellite service shall neither cause harmful interference to the fixed and mobile services, nor hamper the development of those services prior to 1 January 2005, nor shall the former service request protection from the latter services.     (WRC‑2000)

**Reasons:** RR No. **5.389F** gave priority to the mobile service over the mobile-satellite service in certain countries up to 1 January 2005 and that date has now passed.

APPENDIX 5 (REV.WRC‑15)

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

ANNEX 1

# 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‑12)

## 1.2 Between 1 and 3 GHz

### 1.2.3 Determination of the need for coordination between MSS and RDSS space stations (space-to-Earth) and terrestrial stations    (WRC‑12)

#### 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

MOD EUR/16A21A1/7

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 |  |
| … |  |  |  |  |  |  |
| 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  (including non-IMT MS) | −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) | MS (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) | | | | | | |
| … | | | | | | |

…

|  |
| --- |
| 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 11 – The coordination thresholds in the frequency band 2 170-2 200 MHz (all Regions) are applied to protect terrestrial stations of International Mobile Telecommunications (IMT) systems.     (WRC‑19) |

**Reasons:** To apply a coordination threshold value in the frequency band 2 170-2 200 MHz (all Regions) to protect terrestrial stations of International Mobile Telecommunications (IMT) systems and remove the ambiguity inherent in NOTE 3.

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 EUR/16A21A1/8

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 | 10 | 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 x 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:** RR Appendix **7** currently contains parameters only for analogue modulation in the frequency band 1 980-2 025 MHz. Relevant parameters for digital modulation required for the determination of coordination distance for a transmitting earth station are needed.

MOD EUR/16A21A1/9

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 satellite services 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 part of the frequency bands 1 885- 2 025 MHz and 2 110-2 200 MHz;

*b)* that the satellite components of IMT has already been deployed and is being considered for further 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, but that co-coverage, co-frequency deployment of IMT mobile-satellite systems integrated with a complementary ground component is feasible;

*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 different 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,

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 land stations in the mobile service to 20 dBm/5 MHz in the frequency band 1 980-2 010 MHz, except in the frequency band 1 980-1 990 MHz [Option 1: in Region 2][Option 2: 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:** ITU-R studies in response to this agenda item showed that limiting the e.i.r.p. of stations in the mobile service to 20 dBm/5MHz, which is the maximum e.i.r.p. for user equipment indicated in Report ITU-R M.2292, would enable the development of the frequency band 1 980‑2 010 MHz by both the satellite and terrestrial components of IMT and satisfy the objective of agenda item 9.1 issue 9.1.1.

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