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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 89(Add.21)-E** |
|  | **7 October 2019** |
|  | **Original: English** |
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| Angola (Republic of)/Botswana (Republic of)/Eswatini (Kingdom of)/Lesotho (Kingdom of)/Madagascar (Republic of)/Malawi/Mauritius (Republic of)/Mozambique (Republic of)/Namibia (Republic of)/Democratic Republic of the Congo/Seychelles (Republic of)/South Africa (Republic of)/Tanzania (United Republic of)/Zambia (Republic of)/Zimbabwe (Republic of)  (Southern African Development Community (SADC) Countries) | |
| 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 has been conducting 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 systems of the Mobile Service (MS) and satellite IMT systems of the Mobile-Satellite Service (MSS) in different countries.

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 in the Radio Regulations (RR).

Southern African Development Community (SADC) countries are planning to implement both MS and MSS in the 1 980-2 010 MHz (for MSS in the Earth-to-space direction) and the 2 170-2 200 MHz (for MSS in the space-to-earth direction) frequency bands.

Furthermore, SADC countries also note that CEPT countries have prioritized MSS over MS in the 1 980-2 010 MHz frequency band and the 2 170-2 200 MHz frequency band (refer to Decisions ECC/DEC/(06)09, ECC/DEC/(06)10, and European Commission Decision 2007/98/EC).

SADC countries remain cognisant that co-existence and compatibility between MSS and MS is not necessarily limited to adjacent countries and are therefore of the view that measures must be taken at either globally or Regionally to ensure compatible operation of both MSS and MS.

The ITU-R studies considered four interference scenarios, namely A1, A2, B1 and B2 for which certain key issues were identified as noted in the CPM Report, document [CPM19-2/226](https://www.itu.int/dms_pub/itu-r/md/15/cpm19.02/r/R15-CPM19.02-R-0001!!PDF-E.pdf).

In the case of scenario B1 (section 2/9.1.1/3.3 of the CPM Report), potential interference from MES to IMT stations can be addressed by current provisions on cross border co-ordination under RR Article **9** but does require necessary additions to RR Appendix **7** (Table 7a) in respect of digital modulation parameters to enable the determination of coordination distances for applicable transmitting earth stations (RR Appendix **7** currently only contains parameters in respect of analogue modulation in the 1 980-2 025 MHz frequency band). SADC countries are of the view that RR Appendix **7** should be updated to include the relevant digital modulation parameters for the 1 980‑2 025 MHz frequency band which will assist administrations that need to coordinate between IMT MES and terrestrial IMT.

In the case of scenario B2 (section 2/9.1.1/3.4 of the CPM Report), in order to protect terrestrial IMT UEs from satellite IMT space station emissions in the 2 170-2 200 MHz frequency band, RR Appendix **5** (Table 5-2) must be updated to include the protection of terrestrial IMT. SADC countries are of the view that RR Appendix **5** must be modified to add an appropriate coordination threshold for the protection of terrestrial IMT through the addition of a new note (NOTE 11) and also an update to the existing NOTE 3.

In the case of scenario A2 (sections 2/9.1.1/3.2 of the CPM Report), while it is noted that potential interference could exist from terrestrial IMT (MS) base stations to satellite IMT (MSS) earth stations (MES) in the 2 170-2 200 MHz frequency band, this can be managed through the existing provisions of the RR under Article **9** and Appendix **7**. Consequently, SADC countries are of the view that there is no need for any further modification to the RR for this scenario.

In the case of scenario A1 (section 2/9.1.1/3.1 of the CPM Report), potential interference from terrestrial IMT (MS) base stations to satellite IMT (MSS) space stations in the 1 980-2 010 MHz frequency band, requires necessary regulatory measures to be developed as there are no existing provisions in the RR to address this case of interference. As highlighted in the CPM Report, the level of interference from terrestrial IMT (MS) base stations transmitting in the 1 980‑2 010 MHz frequency band, to satellite IMT (MSS) space stations is significant.

Given the foregoing, SADC countries are of the view that, in order to ensure the long term co‑existence and compatibility of both MS and MSS in Region 1, terrestrial IMT (MS) implementations in the 1 980-2 010 MHz frequency band, will need to be limited to equipment transmissions (User Equipment and Base Station), in accordance with IMT Channelling Arrangement B6 under Recommendation ITU-R M.1036-5. SADC countries therefore propose that an e.i.r.p. limit of 20 dB(m/5 MHz) (as per the CPM report) be established that will be applicable to the terrestrial component of IMT operating in Region 1.

Footnote RR No. **5.389F** previously gave priority to the MS over the MSS in certain countries in Region 1 (and Region 3) until the 1st January 2005 and has now expired. SADC countries propose the suppression of this footnote.

In summary, SADC countries propose the following modifications to the RR to ensure the co‑existence and compatibility between MS and MSS in the bands considered under 9.1 Issue 9.1.1.

– Regulation of terrestrial IMT (MS) systems transmitting in the 1 980-2 010 MHz frequency band, by establishing an appropriate e.i.r.p. limit applicable in Region 1 (Scenario A1).

– Modification of RR Appendix **7** by adding applicable digital modulation parameters for co‑ordination distances (Scenario B1).

– Modification of RR Appendix **5** by adding a new coordination threshold pfd level applicable to MSS space stations for the protection of terrestrial IMT (Scenario B2).

– Suppression of footnote RR No. **5.389F** which has now expired and previously gave priority to MS over MSS in certain countries.

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

Proposals

ARTICLE 5

Frequency allocations

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

MOD AGL/BOT/SWZ/LSO/MDG/MWI/MAU/MOZ/NMB/COD/SEY/AFS/TZA/ZMB/ZWE/89A21A1/1

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 AGL/BOT/SWZ/LSO/MDG/MWI/MAU/MOZ/NMB/COD/SEY/AFS/TZA/ZMB/ZWE/89A21A1/2

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 AGL/BOT/SWZ/LSO/MDG/MWI/MAU/MOZ/NMB/COD/SEY/AFS/TZA/ZMB/ZWE/89A21A1/3

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‑19)**.     (WRC‑19)

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

MOD AGL/BOT/SWZ/LSO/MDG/MWI/MAU/MOZ/NMB/COD/SEY/AFS/TZA/ZMB/ZWE/89A21A1/4

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)**.

SUP AGL/BOT/SWZ/LSO/MDG/MWI/MAU/MOZ/NMB/COD/SEY/AFS/TZA/ZMB/ZWE/89A21A1/5

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** granted priority to the mobile service over the mobile-satellite service in certain Region 1 countries up to 1 January 2005. This footnote is no longer applicable as the expiry date has now elapsed.

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 AGL/BOT/SWZ/LSO/MDG/MWI/MAU/MOZ/NMB/COD/SEY/AFS/TZA/ZMB/ZWE/89A21A1/6

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 |  |
| ... |  |  |  |  |  |  |
| 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 |
| 2170-2200  (NOTE 11) | MS (IMT) | −108.8 dB(W/m2) in 1MHz |  | −108.8 dB(W/m2) in 1MHz |  |  |
| 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 (radiodetermi-nation-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 establish coordination threshold levels applicable to the frequency band 2 170‑2 200 MHz (Region 1) for the protection of terrestrial stations of International Mobile Telecommunications (IMT) systems and clarify 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 AGL/BOT/SWZ/LSO/MDG/MWI/MAU/MOZ/NMB/COD/SEY/AFS/TZA/ZMB/ZWE/89A21A1/7

TABLE 7a     (Rev.WRC‑15)

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:** Table 7a under Appendix **7** to the RR is currently limited to parameters for analogue modulation only in the frequency band 1 980‑2 025 MHz. Digital modulation parameters need to be included to determine coordination distances for applicable earth stations.

MOD AGL/BOT/SWZ/LSO/MDG/MWI/MAU/MOZ/NMB/COD/SEY/AFS/TZA/ZMB/ZWE/89A21A1/8

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 mobile 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 in the frequency bands 1 920‑1 980 MHz and 2 110-2 170 MHz;

*b)* that the terrestrial component of IMT is being considered for deployment in the frequency bands 1 980-2 010 MHz and 2 170‑2 200 MHz;

*c)* that the satellite components of IMT has already been deployed or is being considered for deployment in the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz;

*d)* 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 terrestrial and satellite components of IMT is feasible if deployed as integrated networks;

*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 isotropic radiated power of transmitting base stations of the terrestrial component of IMT to 20 dB(m/5MHz) in the frequency band 1 980‑2 010 MHz,

encourages administrations

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

**Reasons:** The results of ITU-R studies for this agenda item indicated that limiting the e.i.r.p. of base stations of the terrestrial component of IMT to 20 dB(m/5MHz) in the 1 980-2 010 MHz frequency band would mitigate cases of interference to the satellite component of IMT and enable co-existence and compatibility of both MS and MSS.

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