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| **The 5th Meeting of the APT Conference Preparatory****Group for WRC-23 (APG23-5)** | **APG23-5/OUT-34** |
| 20 – 25 February 2023, Busan, Republic of Korea | 24 February 2023 |

Working Party 5

**PRELIMINARY VIEWs on WRC-23 agenda item 2**

**Agenda item 2**

*to examine the revised ITU-R Recommendations incorporated by reference in the Radio*

*Regulations communicated by the Radiocommunication Assembly, in accordance with the further resolves of Resolution* ***27 (Rev.WRC-19)****, and to decide whether or not to update the corresponding references in the Radio Regulations, in accordance with the principles contained in the resolves of that Resolution;*

# Background

This is a standing agenda item at every WRC to examine the revised ITU-R Recommendationsincorporated by reference in the Radio Regulations (RR) in order to determine their suitability for incorporation by reference in the RR. As such ITU-R Recommendations (IBR Recommendations) may be revised by ITU-R Study Groups, it is necessary for the next WRC to decide whether or not to update the corresponding references in the RR in accordance with Resolution **27 (Rev.WRC-19)**.

Resolution **27 (Rev.WRC-19)** instructs the Director of the Radiocommunication Bureau to provide the second session of CPM with a list of those ITU-R Recommendations containing texts incorporated by reference that have been revised or approved since the previous WRC, or that may be revised in time for the next WRC. CPM23-2 will consider the list along with other contributions for this agenda item to finalize the CPM report. APG23-6 will examine the results of the CPM23-2 and any further study progress at ITU-R to finalize the APT position on this agenda item.

# Documents

## Input Documents:

APG23-5/INP-18(J), 30(IND), 40(IRN), 60(AUS), 92R1(CHN)

## Information Documents:

APG23-5/INF-16 (DG Chair), 37(BR), 38(BR), 39(CEPT), 45(RCC)

# Summary of Discussions

## Summary of APT Members’ views

### Japan (APG23-5/INP-18)

In order to facilitate the consideration of WRC-23 agenda item 2 by the future APG23 meetings, Japan has updated the Table for “The ITU-R Recommendations incorporated by reference in the Radio Regulations (IBR Recommendations)” contained in APG23-4/OUT-35 Attachment 1 with the study progress. The updated list is currently for information purposes only. APT Members are encouraged to participate and monitor the progress of the ITU-R studies in the relevant Working Parties, which may propose to further update the revisions of IBR Recommendations.

There is one IBR Recommendation for which a new version is approved (Recommendation ITU-R M. M.585-9). Based on the review of the updated information in the revised Recommendation, Japan supports to update its references in the relevant provisions in the Radio Regulations. (See attachment 2)

### India (APG23-5/INP-30)

India supports the examination and review of ITU-R Recommendations incorporated by reference in the Radio Regulations and, where appropriate, the updating of these references in accordance with Resolution **27 (Rev.WRC-19).**

### Iran (Islamic Republic of) (APG23-5/INP-40)

The Administration of Iran (Islamic Republic of) proposes that the following views and proposals be adopted as APT Preliminary Views and PACPs at this stage:

1. **MOD RR** **21.2.2** and **21.4.1:** there is no need to make reference to Resolution **27 (Rev.WRC‑03)** in these footnotes.
2. It is proposed to use the term "the most recent version of" for the referenced ITU-R Recommendations which are not incorporated by reference in the Radio Regulations, when appropriate. This principle should apply to both RR provisions that reference to ITU-R Recommendations and those provisions containing reference to WRC Resolutions that reference to ITU-R Recommendations.

### Australia (APG23-5/INP-60)

Australia supports the examination and review of ITU-R Recommendations incorporated by reference into the Radio Regulations and, where appropriate, the updating of these references.

### China (APG23-5/INP-92R1)

China supports the examination and review of ITU-R Recommendations incorporated by reference into the Radio Regulations and, where appropriate, the updating of these references.

China has updated “The ITU-R Recommendations incorporated by reference in the Radio Regulations” contained in APG23-4/OUT-35 Attachment 1 in revision mode based on the study progress as of Dec 2022. The ITU-R Recommendation P.585-9 has been approved in May 2022 (CACE/1025) and China proposes to modify the RR provisions that incorporate this recommendation by reference. (See attachment 2 section1)

##  Summary of issues raised during the meeting

The meeting agreed:

1. To carry forward the updated Table “The ITU-R Recommendations incorporated by reference in the Radio Regulations (IBR Recommendations)” in Attachment 1 in order to continue monitoring the study progress that may lead to revised IBR Recommendations in time for WRC-23;
2. that there is one IBR Recommendation that has been revised since WRC-19 as shown in Table A1. APT Members agreed to update the references to this ITU-R Recommendation to the most recent versions. Preliminary regulatory text is provided in Attachment 2 (section 1).

Table A1: IBR Recommendations revised since WRC-19

|  |  |  |
| --- | --- | --- |
| Current version in the RR Volume 4 | The most recent version | Relevant RR provisions and footnotes  |
| **P.585-8** | **P.585-9** | Nos. 19.99, 19.102, 19.111 |

1. To modify RR **No. 21.2.2** and **21.4.1** as there is no need to make reference to Resolution **27 (Rev.WRC‑03)** in these footnotes. Preliminary regulatory text is provided in Attachment 2 (section 2).
2. To examine Radio Regulation provisions and WRC Resolutions that contain references to ITU-R Recommendations which are not incorporated by reference in the Radio Regulations and decide whether it is appropriate to insert the term “most recent version of” for the referenced ITU-R Recommendations. Preliminary regulatory text is provided in Attachment 2 (section 3). It should be noted that there are other references to ITU-R Recommendations which require further study regarding the addition of the term “the most recent version of” to those references. Worksheet to facilitate further examination is provided in Attachment 3.

# APT Preliminary View

APT Members support the examination and review of ITU-R Recommendations incorporated by reference (IBR) in the Radio Regulations and, where appropriate, the updating of these references in accordance with Resolution **27 (Rev.WRC-19).**

APT Members are encouraged to participate and monitor the progress of the ITU-R studies in the relevant Working Parties, which may propose and develop revisions of IBR Recommendations, with a view to develop the APT positions on this agenda item towards the WRC-23. The current status of studies that may lead to future revision of IBR recommendations is summarized in Attachment 1.

APT Members are also encouraged to review preliminary regulatory text provided in Attachment 2.

Furthermore, APT Members are invited to examine RR provisions and WRC Resolutions that contain references to ITU-R Recommendations which are not incorporated by reference in the Radio Regulations and decide whether it is appropriate to insert the term “the most recent version of” for the referenced ITU-R Recommendations as required.

# Issues for Consideration at the Next APG Meeting

APG23-6 will examine and review the list of IBR Recommendations in Attachment 1, based on the progress of the ITU-R studies in the relevant Working Parties as well as the result of CPM23-3.

For the IBR Recommendations for which a new version is approved, when it is considered appropriate to update the reference in the Radio Regulations, APT Members are encouraged to fill out the proposed action column in Attachment 1 and propose a specific regulatory text reflecting the update of the reference for consideration by the future APG meeting. Preliminary regulatory texts agreed upon thus far are provided in Attachment 2 for further consideration at APG23-6 in order to develop PACP on this agenda item.

APG23-6 will also examine RR provisions and WRC Resolutions that contain references to ITU-R Recommendations which are not incorporated by reference in the Radio Regulations and decide whether it is appropriate to insert the term “the most recent version of” for the referenced ITU-R Recommendations as required.

# Views from Other Organisations

## Regional Groups

### CEPT(APG23-5/INF-39)

* CEPT supports updating the reference(s) in relevant RR provisions of the following ITU-R Recommendation(s):

•from ITU-R M.585-8 to ITU-R M.585-9

• TBD

* CEPT resumes examining the compliance with the principles of Annex 1 to Resolution **27 (Rev. WRC-19)** of the references to ITU-R Recommendations in the Radio Regulations.
* CEPT supports update of the RR Volume 4 cross-reference list.

### RCC (APG23-5/INF-45)

The RCC Administrations support the principles set out in Resolution **27 (Rev.WRC-19)**.

The RCC Administrations have no objection to update reference to the Rec. M.585.

### ATU (APG23-4/INF-02)

APM23-2 agreed to support the work of the radiocommunication study groups and the Radiocommunication Assembly on revision of those Recommendations to which mandatory references are made in the Radio Regulations.

### ASMG (APG23-4/INF-21)

ASMG administrations support the principle of Resolution No. **27 (Rev.WRC-19**) to review and examine Recommendations incorporated by reference in the Radio Regulations with a view to update them as appropriate.

Invite ASMG members to actively participate in ITU-R related working groups on revision of these recommendations.

## International Organizations

### IMO[[1]](#footnote-1)

1. IMO has studied the Recommendations of relevance and commented on the following IBRs.
* Required/needed: M.476-5, M.489-2, M.492-6, M.541-10, M.585-8, M.625-4, M.690-3, M.1171-0, M.1172-0, M.1173-1, M.1174-4
* Used: M.1084-5, M.633-4,
* Not required but may be required: M.1638-1
1. Incorporation by reference is of importance to IMO because of the close relationship between many of the ITU-R Recommendations related to GMDSS equipment and its operation, to IMO performance standards.
2. IMO requests early indication of any changes proposed by ITU to the mechanism of incorporation by reference and to the list of incorporated Recommendations.

**Attachment 3**

**Attachment 1**

**The ITU‑R Recommendations incorporated by reference in the Radio Regulations**

Note: WD (Working document), PDR (Preliminary draft revision) as of December 2022

| **REC.** | **Title** | **RR Provision** | **Progress of future revision\*** | **ITU-R WP** | **APT Proposed action** |
| --- | --- | --- | --- | --- | --- |
| **TF.460-6** | Standard-frequency and time-signal emissions | No. 1.14 (via Resolution 655 (WRC-15)) |   | WP 7A |  |
| **M.476-5** | Direct-printing telegraph equipment in the maritime mobile service | Nos. 19.83, 19.96A, 51.41 |   | WP 5B |  |
| **M.489-2** | Technical characteristics of VHF radiotelephone equipment operating in the maritime mobile service in channels spaced by 25 kHz | Nos. 51.77, 52.231, Appendix 18 (General *notes* *e)*) |   | WP 5B |  |
| **M.492-6** | Operational procedures for the use of direct-printing telegraph equipment in the maritime mobile service | No. 56.2 |   | WP 5B |  |
| **P.525-4** | Calculation of free-space attenuation | No. 5.444B (via Resolution 748 (Rev.WRC-19)) |  Ann. 8 to Doc. 3J/225(June 2022)(WD) | WP 3J |  |
| **P.526-15** | Propagation by diffraction | No. 5.444B (via Resolution 748 (Rev.WRC-19)) |  Ann.28 to Doc. 3J/225(June 2022)(PDR) | WP 3J |  |
| **M.541-10** | Operational procedures for the use of digital selective-calling equipment in the maritime mobile service | Nos. 51.35, 52.112, 52.149, 52.153, 54.2 | Ann. 2to Doc. 5B/731(Nov. 2022)(PDR) | WP 5B |  |
| **M.585-8  (Annex 1)** | Assignment and use of identities in the maritime mobile service  | Nos. 19.99, 19.102, 19.111 | M.585-9 was approved in May 2022 (CACE/1025) | WP 5B | Update the reference to a newer version (See Attachment 2 (section 1)) |
| **M.625-4** | Direct-printing telegraph equipment employing automatic identification in the maritime mobile service | Nos. 19.83, 51.41 |   | WP 5B |  |
| **M.633-4** | Transmission characteristics of a satellite emergency position-indicating radio beacon (satellite EPIRB) system operating through a satellite system in the 406 MHz band | No. 34.1 | Ann.1 to Doc.4C/388(Sept. 2022)(PDR) | WP 4C |  |
| **S.672-4** | Satellite antenna radiation pattern for use as a design objective in the fixed-satellite service employing geostationary satellites | TABLE 22-2 (and No. 22.5D.3), TABLE 22-3 (and No. 22.5F.3) |   | WP 4A |  |
| **M.690-3** | Technical characteristics of emergency position-indicating radio beacons operating on the carrier frequencies of 121.5 MHz and 243 MHz | Appendix 15 (Table 15-2) |   | WP 5B |  |
| **RA.769-2** | Protection criteria used for radio astronomical measurements | No. 5.372 |   | WP 7D |  |
| **P.838-3**  | Specific attenuation model for rain for use in prediction methods | Appendix 30A (Annex 3 § 2.2 Step 6) | Ann.16 to Doc. 3J/225(June 2022)(WD) | WP 3J |  |
| **M.1084-5** | Interim solutions for improved efficiency in the use of the band 156-174 MHz by stations in the maritime mobile service | Appendix 18 (NOTE B) (prior to the table) |   | WP 5B |  |
| **SM.1138-3** | Determination of necessary bandwidths including examples for their calculation and associated examples for the designation of emissions | Appendix 1 (§ 1 and § 2) |   | WP 1A |  |
| **SA.1154-0** | Provisions to protect the space research (SR), space operations (SO) and Earth-exploration satellite services (EES) and to facilitate sharing with the mobile service in the 2 025-2 110 MHz and 2 200-2 290 MHz bands | No. 5.391 | Ann. 11 to Doc. 7B/246 (Oct.2022) (PDR) | WP 7B |  |
| **M.1171-0** | Radiotelephony procedures in the maritime mobile service | Nos. 52.192, 52.195, 52.213, 52.224, 52.234, 52.240, 57.1 | Ann. 3to Doc.5B/731 (Nov. 2022)(PDR) | WP 5B |  |
| **M.1172-0** | Miscellaneous abbreviations and signals to be used for radiocommunications in the maritime mobile service | No. 19.48 |   | WP 5B |  |
| **M.1173-1** | Technical characteristics of single-sideband transmitters used in the maritime mobile service for radiotelephony in the bands between 1 606.5 kHz (1 605 kHz Region 2) and 4 000 kHz and between 4 000 kHz and 27 500 kHz | Nos. 52.181, 52.229, Appendix 17 (Part B, Section I § 2 and § 6) |   | WP 5B |  |
| **M.1174-4** | Technical characteristics of equipment used for on-board vessel communications in the bands between 450 and 470 MHz | Nos. 5.287, 5.288 |   | WP 5B |  |
| **M.1187-1**  | A method for the calculation of the potentially affected region for a mobile-satellite service network in the 1‑3 GHz range using circular orbits | Appendix 4 (Annex 2 item C.11.b) |   | WP 4C |  |
| **S.1256-0** | Methodology for determining the maximum aggregate power flux-density at the geostationary-satellite orbit in the band 6 700-7 075 MHz from feeder links of non-geostationary satellite systems in the mobile-satellite service in the space‑to‑Earth direction | No. 22.5A |   | WP 4A |  |
| **RS.1260-2** | Feasibility of sharing between active spaceborne sensors and other services in the range 420-470 MHz | No. 5.279A |   | WP 7C |  |
| **BO.1293-2** | Protection masks and associated calculation methods for interference into broadcast-satellite systems involving digital emissions | Appendix 30A (Annex 3 § 3.3), Appendix 30 (Annex 5 § 3.4) |   | WP 4A |  |
| **S.1340-0** | Sharing between feeder links for the mobile-satellite service and the aeronautical radionavigation service in the Earth-to-space direction in the band 15.4-15.7 GHz | No. 5.511C |   | WP 4A |  |
| **S.1428-1** | Reference FSS earth-station radiation patterns for use in interference assessment involving non-GSO satellites in frequency bands between 10.7 GHz and 30 GHz | TABLE 22-1A,TABLE 22-1B,TABLE 22-1C (and No. 22.5C.6) | Ann.5 to Doc.4A/392(July 2021)(WD) | WP 4A |  |
| **BO.1443-3** | Reference BSS earth station antenna patterns for use in interference assessment involving non-GSO satellites in frequency bands covered by RR Appendix 30 | TABLE 22-1D (and No. 22.5C.11) | Ann.6 to Doc.4A/392(July 2021)(WD) | WP 4A |  |
| **RA.1513-2** | Levels of data loss to radio astronomy observations and percentage-of-time criteria resulting from degradation by interference for frequency bands allocated to the radio astronomy service on a primary basis | No. 5.372 |   | WP 7D |  |
| **M.1583-1** | Interference calculations between non-geostationary mobile-satellite service or radionavigation-satellite service systems and radio astronomy telescope sites  | No. 5.372, No. 5.443B (via Resolution 741 (Rev.WRC-15)), Appendix 4 Annex 2 (item A.17.b.3) (via Resolution 741 (Rev.WRC-15)) |   | WP 4C |  |
| **S.1586-1** | Calculation of unwanted emission levels produced by a non‑geostationary fixed-satellite service system at radio astronomy sites | No. 5.551H |   | WP 4A |  |
| **F.1613-0** | Operational and deployment requirements for fixed wireless access systems in the fixed service in Region 3 to ensure the protection of systems in the Earth exploration-satellite service (active) and the space research service (active) in the band 5 250-5 350 MHz | No. 5.447E |   | WP 5A |  |
| **RA.1631-0** | Reference radio astronomy antenna pattern to be used for compatibility analyses between non-GSO systems and radio astronomy service stations based on the epfd concept | No. 5.208B (via Resolution 739 (Rev.WRC‑19), No. 5.372, No. 5.443B (via Resolution 741 (Rev.WRC-15)), No. 5.551H, Appendix 4 Annex 2 (item A.17.b.3) (via Resolution 741 (Rev.WRC-15)) |   | WP 7D |  |
| **M.1642-2** | Methodology for assessing the maximum aggregate equivalent power flux-density at an aeronautical radionavigation service station from all radionavigation-satellite service systems operating in the 1 164-1 215 MHz band | Nos. 5.328A (via Resolution 609 (Rev. WRC‑07)) |   | WP 4C |  |
| **M.1643-0** | Technical and operational requirements for aircraft earth stations of aeronautical mobile-satellite service including those using fixed-satellite service network transponders in the band 14-14.5 GHz (Earth-to-space) | No. 5.504B (refers to Annex 1, Part C of Rec. ITU-R M.1643-0), Nos. 5.504C, 5.508A and 5.509A (refer to Annex 1, Part B of Rec. ITU-R M.1643-0) |   | WP 4C |  |
| **M.1652-1 (Annex 1 and Annex 5 )** | Dynamic frequency selection in wireless access systems including radio local area networks for the purpose of protecting the radiodetermination service in the 5 GHz band | No. 5.446A, 5.447F, 5.450A (via Resolution 229 (Rev.WRC-19)) |   | WP 5A |  |
| **M.1827-1** | Guideline on technical and operational requirements for stations of the aeronautical mobile (R) service limited to surface application at airports in the frequency band 5 091-5 150 MHz | No. **5**.444B (via Resolution 748 (Rev.WRC-19)) |   | WP 5B |  |
| **M.2013-0** | Technical characteristics of, and protection criteria for non-ICAO aeronautical radionavigation systems, operating around 1 GHz | No. 5.327A (via Resolution 417 (Rev.WRC-15)) |   | WP 5B |  |
| **RS.2065-0** | Protection of space research service (SRS) space-to-Earth links in the 8 400-8 450 MHz and 8 450-8 500 MHz bands from unwanted emissions of synthetic aperture radars operating in the Earth exploration-satellite service (active) around 9 600 MHz | No. 5.474C |   | WP 7C |  |
| **RS.2066-0** | Protection of the radio astronomy service in the frequency band 10.6-10.7 GHz from unwanted emission of synthetic aperture radars operating in the Earth exploration-satellite service (active) around 9 600 MHz  | No. 5.474B | Ann.34 to Doc 7C/459(Oct. 2022)(WD) | WP 7C |  |

**Attachment 2**

**Preliminary regulatory texts for further consideration at APG23-6**

*Note: The following preliminary regulatory texts are provided for further consideration at APG23-6 in order to develop PACP. There are 3 sections in this attachment:*

1. *Regulatory text to update the reference to IBR recommendations that have been revised and approved since WRC-19*
2. *Other revisions to provisions of the Radio Regulations that may be considered under Agenda Item 2*
3. *Preliminary regulatory text to modify RR provisions and footnotes containing references to ITU-R Recommendations or to WRC Resolutions containing references to ITU-R Recommendations in order to clarify its non-mandatory nature.*

*In addition to the above contained in the three sections, there are other references to ITU-R Recommendations in a specific version, which are not contained in RR Volume IV (i.e. not IBR) and require further consideration on whether the term “the most recent version of“ should be inserted or the version number be exceptionally retained.*

# ITU-R Recommendations incorporated by reference in the Radio Regulations which have been revised and approved since WRC-19

ARTICLE 19

**Identification of stations**

**Section VI − Identities in the maritime mobile service**(WRC‑12)

**19.98***A − General*

**MOD**

**19.99** § 39 When a station6 operating in the maritime mobile service or the maritime mobile-satellite service is required to use maritime mobile service identities, the responsible administration shall assign the identity to the station in accordance with the provisions described in Annex 1 of Recommendation ITU‑R M.585‑9. In accordance with No. **20.16**, administrations shall notify the Radiocommunication Bureau immediately when assigning maritime mobile service identities.    (WRC‑23)

***Reasons:*** *Recommendation ITU‑R M.585‑9 is in force since May 2022. It is appropriate to update the reference to a newer version. The same change is proposed for Nos.* ***19.102*** *and* ***19.111*** *below.*

**MOD**

**19.102** 3) The types of maritime mobile service identities shall be as described in Annex 1 of Recommendation ITU‑R M.585‑9.    (WRC‑23)

**19.110***C − Maritime mobile service identities*    (WRC‑07)

**MOD**

**19.111** § 43 1) Administrations shall follow Annex 1 of Recommendation ITU‑R M.585‑9 concerning the assignment and use of maritime mobile service identities.    (WRC‑23)

# Other revisions to provisions of the Radio Regulations that may be considered under Agenda Item 2

ARTICLE 21

Terrestrial and space services sharing frequency bands above 1 GHz

Section I − Choice of sites and frequencies

MOD

2 21.2.2 Information on this subject is given in the most recent version of Recommendation ITU‑R SF.765

Section II − Power limits for terrestrial stations

MOD

4 21.4.1 Information on this subject is given in the most recent version of Recommendation ITU‑R SF.765

**Reasons:** In footnotes 21.2.2 and 21.4.1, there is no need to include the reference to Resolution **27 (Rev.WRC 03).**

# Preliminary regulatory text to modify RR provisions and footnotes containing references to ITU-R Recommendations or to WRC Resolutions containing references to ITU-R Recommendations

The following reason applies to all proposals in section 3.1 and 3.2.

**Reasons:** It may be appropriate to insert “the most recent version of” to indicate clearly that this recommendation is not incorporated by reference.

## RR Provisions and footnotes containing references to ITU-R Recommendations that may be considered for revision

APPENDIX 30A (REV.WRC‑19)[[2]](#footnote-2)\*

Provisions and associated Plans and List[[3]](#footnote-3)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[[4]](#footnote-4)2 and 17.3-18.1 GHz in Regions 1 and 3,
and 17.3-17.8 GHz in Region 2     (WRC‑03)

ARTICLE 9A     (Rev.WRC‑19)

Plan for feeder links for the broadcasting-satellite service in
the fixed-satellite service in the frequency bands
14.5-14.8 GHz and 17.3-18.1 GHz in Regions 1 and 3

MOD

9A.1 COLUMN HEADINGS OF THE PLAN

…

Col. 6 S*pace station receiving antenna pattern code*.

 The codes used for the antenna pattern of the receiving space station (feeder link) antenna are defined as follows:

|  |  |
| --- | --- |
| R13RSS | Figure B (Curves A, B and C) and § 3.7.3 in Annex 3 |
| R123FR | Figure C and § 3.7.3 in Annex 3 |
| MODRSS | Figure B (Curves A′, B′ and C) and § 3.7.3 in Annex 3 (the most recent version of Recommendation ITU‑R BO.1296) |

…

Col. 9 *Earth station transmitting antenna pattern code and maximum gain* (dBi).

 The codes used for transmitting earth station (feeder-link) antenna patterns are defined as follows:

|  |  |
| --- | --- |
| R13TES | Figure A (Curves A and B) and § 3.5.3 in Annex 3 |
| MODTES | Figure A (Curves A′ and B′) and § 3.5.3 in Annex 3 (the most recent version of Recommendation ITU‑R BO.1295) |

**…**

ANNEX 3

Technical data used in establishing the provisions and associated
Plans and Regions 1 and 3 feeder-link List, which should
be used for their application[[5]](#footnote-5)36     (Rev.WRC‑03)

# 3 Basic technical characteristics for Regions 1 and 3

MOD

## 3.3 Protection ratios

For planning in Regions 1 and 3 at the 1988 Conference (WARC Orb‑88), the following protection ratios were applied for the purpose of calculating the feeder-link equivalent protection margins[[6]](#footnote-6)41:

– co-channel protection ratio = 40 dB;

– adjacent channel protection ratio = 21 dB.

The method for the calculation of the feeder-link equivalent protection margin is given in § 1.7.

For revising the Regions 1 and 3 feeder-link Plan at WRC‑97, the corresponding values of aggregate protection ratio that were used to calculate the feeder-link equivalent protection margins which appear in the alternative formula for overall equivalent protection margin given in § 1.12 are specified in the most recent version of Recommendation ITU‑R BO.1297, as follows[[7]](#footnote-7)42, [[8]](#footnote-8)43:

– co-channel protection ratio = 30 dB;

– adjacent channel protection ratio = 22 dB.     (WRC‑2000)

…

## 3.5 Transmitting antenna

MOD

### 3.5.3 Off-axis e.i.r.p. of transmitting antennas

The co-polar and cross-polar off-axis e.i.r.p. values used for the original 1988 feeder-link Plan in Regions 1 and 3 are shown by Curves A and B respectively in Fig. A[[9]](#footnote-9)46.

The corresponding off-axis e.i.r.p. values used for planning at WRC‑97 are shown by Curves A′ and B′ in Fig. A as specified in the most recent version of Recommendation ITU‑R BO.1295.

## 3.7 Satellite receiving antenna

MOD

### 3.7.3 Reference patterns

The reference patterns for the co-polar and cross-polar components of the satellite receiving antenna used for planning at the 1988 Conference (WARC Orb-88) are given by Curves A and B respectively in Fig. B[[10]](#footnote-10)47.

The corresponding curves used for replanning at WRC‑97 are given by Curves A′ and B′ in Fig. B, as specified in the most recent version of Recommendation ITU‑R BO.1296.

**…**

MOD

## 3.9 Polarization

In Regions 1 and 3, circular polarization was normally used for the purpose of planning the feeder-links.

For the definitions of the terms “direct and indirect polarization”, see § 3.2.3 of Annex 5 to Appendix 30.

For the planning of the broadcasting-satellite service, circular polarization is generally used. However, for implementation of assignments in the Regions 1 and 3 Plan, linear polarization may also be used subject to successful application of the modification procedure of Article 4. Linear polarization is defined in the most recent version of Recommendation ITU‑R BO.1212. This Recommendation should be used when analysing linearly polarized signals.

## WRC Resolutions containing references to ITU-R Recommendations that may be considered for revision

**MOD**

RESOLUTION 165 (rev.WRC‑23)

**Use of the frequency band 21.4-22 GHz by high-altitude platform
stations in the fixed service in Region 2**

The World Radiocommunication Conference (Dubai, 2023,

*…*

*resolves*

1 that, for the purpose of protecting fixed-service systems in the territory of other administrations in the frequency band 21.4-22 GHz, the power flux-density (pfd) level per HAPS produced at the surface of the Earth in the territory of other administrations shall not exceed the following limits, developed for clear-sky conditions, unless the explicit agreement of the affected administration is provided at the time of notification of HAPS:

 0.7 θ − 135 dB(W/(m² · MHz)) for 0° ≤ θ < 10°

 2.4 θ − 152 dB(W/(m² · MHz)) for 10° ≤ θ < 20°

 0.45 θ − 113 dB(W/(m² · MHz)) for 20° ≤ θ < 60°

 −86 dB(W/(m² · MHz)) for 60° ≤ θ ≤ 90°

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees.

During periods of rain, the equivalent isotropically radiated power (e.i.r.p.) of the beam suffering rain fade may be increased by a level commensurate with the level of rain fade, by up to 20 dB above the e.i.r.p. associated with the above pfd mask at the surface of the Earth;

2 that, for the purpose of protecting the Earth exploration-satellite service (EESS) (passive) in the frequency bands 21.2-21.4 GHz and 22.21-22.5 GHz, the e.i.r.p. density in the frequency bands 21.2-21.4 GHz and 22.21-22.5 GHz per HAPS operating in the frequency band 21.4-22 GHz shall not exceed:

 −0.76 θ − 9.5 dB(W/100 MHz) for −4.53° ≤ θ < 35.5°

 −36.5 dB(W/100 MHz) for 35.5° ≤ θ ≤ 90°

where θ is the elevation angle in degrees at the platform height;

3 that, in order to ensure the protection of the radio astronomy service (RAS), the pfd level produced by unwanted emissions from HAPS downlink transmissions in the frequency band 21.4‑22 GHz shall not exceed −176 dB(W/(m2 · 290 MHz)) for continuum observations and −192 dB(W/(m2 · 250 kHz)) for spectral line observations in the frequency band 22.21-22.5 GHz at an RAS station location at a height of 50 m; this limit relates to the pfd which would be obtained using a time percentage of 2% in the relevant propagation model.

To verify compliance, the following formula shall be used:

 

where:

 *e.i.r.p.nominal clear sky*: nominal unwanted emission e.i.r.p. density towards the RAS station at which the HAPS operates under clear-sky conditions in dB(W/290 MHz) for continuum observations and in dB(W/250 kHz) for spectral line observations in the frequency band 22.21-22.5 GHz

 *Az*: azimuth in degrees from the HAPS towards the RAS station

 θ: elevation angle in degrees at the HAPS towards the RAS station

 *Att*618*p=*2%: attenuation in dB from the most recent version of Recommendation ITU-R P.618 corresponding to *p* = 2% of the time at the radio astronomy location

 *d*: separation distance in metres between the HAPS and the RAS station

 *GasAtt*(θ): gaseous attenuation for an elevation angle of θ (see the most recent version of Recommendation ITU‑R SF.1395);

…

**MOD**

RESOLUTION 166 (rev.WRC‑23)

**Use of the frequency band 24.25-27.5 GHz by high-altitude platform stations
in the fixed service in Region 2**

The World Radiocommunication Conference (Dubai, 2023),

*...*

*resolves*

…

10 that, in order to ensure the protection of in-band space research service (SRS)/EESS in the territory of other administrations from the HAPS gateway in the frequency band 25.5-27.0 GHz, the pfd shall not exceed the threshold values given below at the SRS/EESS earth stations at a height of 20 m above the ground level. If the pfd threshold values below are exceeded, then HAPS shall coordinate in accordance with No. **9.18**, taking into account the parameters of the relevant systems. These limits relate to the pfd which would be obtained under assumed propagation conditions predicted by the most recent version of Recommendation ITU‑R P.452 using the following time percentages: 0.001% for SRS, 0.005% for EESS non-GSO and 20% for EESS GSO:

SRS: pfd = −121 dB(W/(m2 · MHz))

EESS non-GSO: pfd = −97 dB(W/(m2 · MHz))

EESS GSO: pfd = −129 dB(W/(m2 · MHz));

11 that, in order to ensure the protection of the radio astronomy service (RAS), the pfd level produced by unwanted emissions from HAPS downlink transmissions in the frequency band 24.25‑25.25 GHz shall not exceed −177 dB(W/(m² · 400 MHz)) for continuum observations and −191 dB(W/(m² · 250 kHz)) for spectral line observations in the frequency band 23.6-24 GHz at an RAS station location at a height of 50 m; this limit relates to the pfd which would be obtained using a time percentage of 2% in the relevant propagation model.

To verify compliance, the following formula shall be used:

 

where:

 *e.i.r.p.nominal clear sky*: nominal unwanted emission e.i.r.p. density towards the RAS station at which the HAPS operates under clear-sky conditions in dB(W/400 MHz) for continuum observations and in dB(W/250 kHz) for spectral line observations in the frequency band 23.6-24 GHz

 *Az*: azimuth in degrees from the HAPS towards the RAS station

θ: elevation angle in degrees at the HAPS towards the RAS station

 *Att*618*p=*2%: attenuation in dB from the most recent version of Recommendation ITU‑R P.618 corresponding to *p* = 2% of the time at the radio astronomy location

 *d*: separation distance in metres between the HAPS and the RAS station

 *pfd*:pfd at the Earth’s surface per HAPS in dB(W/(m2 · 400 MHz)) for continuum observations and in dB(W/(m2 · 250 kHz)) for spectral line observations in the frequency band 23.6-24 GHz

 *GasAtt*(θ)*:* gaseous attenuation for an elevation angle of θ (see the most recent version of Recommendation ITU‑R SF.1395);

**MOD**

RESOLUTION 167 (rev.WRC‑23)

**Use of the frequency band 31-31.3 GHz by high-altitude platform
stations in the fixed service**

The World Radiocommunication Conference (Dubai, 2023),

…

*resolves*

…

6 that, in order to ensure the protection of the RAS, the pfd level produced by unwanted emissions from HAPS downlink transmissions in the frequency band 31-31.3 GHz shall not exceed −171 dB(W/(m² · 500 MHz)) for continuum observations in the frequency band 31.3‑31.8 GHz at an RAS station location at a height of 50 m; this limit relates to the pfd which would be obtained using a time percentage of 2% in the relevant propagation model;

To verify compliance, the following formula shall be used:

 

where:

*e.i.r.p.nominal**clear sky*: nominal unwanted emission e.i.r.p. density towards the RAS station at which the HAPS operates under clear-sky conditions in dB(W/500 MHz) in the RAS frequency band

 *Az*:azimuth in degrees from the HAPS towards the RAS station

 θ: elevation angle in degrees at the HAPS towards the RAS station

 *Att*618*p*=2%: attenuation in dB from the most recent version of Recommendation ITU‑R P.618 corresponding to *p* = 2% of the time at the radio astronomy location

 *d*: separation distance in metres between the HAPS and the RAS station

 *pfd*(θ): pfd at the Earth’s surface per HAPS station in dB(W/(m² · 500 MHz))

 *GasAtt*(θ): gaseous attenuation for an elevation angle of θ (see the most recent version of Recommendation ITU‑R SF.1395);

…

**MOD**

RESOLUTION 168 (Rev. WRC‑23)

**Use of the frequency band 38-39.5 GHz by high-altitude platform
stations in the fixed service**

The World Radiocommunication Conference (Dubai, 2023),

*…*

*resolves*

…

5 that, for the purpose of protecting earth stations in the geostationary-satellite (GSO) fixed-satellite service (FSS) (space‑to-Earth) in the territory of other administrations, the pfd in the territory of other neighbouring administrations shall not exceed the following values, unless the explicit agreement of the affected administration is provided at the time of notification of HAPS:

 −169.9 + 1954 α² dB(W/(m² · MHz)) for 0° ≤ α < 0.136°

 −133.9 dB(W/(m² · MHz)) for 0.136° ≤ α< 1°

 −133.9 + 25 log α dB(W/(m² · MHz)) for 1° ≤α< 47.9°

 −91.9 dB(W/(m² · MHz)) for 47.9° ≤ α ≤ 180°

where α is the minimum angle between the line to the HAPS (taking into account the HAPS location tolerance) and the lines to the GSO arc, in degrees, at any point on the territory of other administrations.

To calculate the pfd produced by a HAPS platform, the following equation shall be used:

 

where:

 *d*: distance in metres between the HAPS and the GSO FSS earth station

 *Attgaz*: attenuation in dB due to atmospheric gases on the HAPS-to-GSO FSS earth station path (the most recent version of Recommendation ITU‑R P.676)

 *e.i.r.p.*: maximum HAPS e.i.r.p. spectral density in the direction of the GSO FSS earth station in dB(W/MHz);

…

**MOD**

RESOLUTION 169 (rev.WRC-23)

**Use of the frequency bands 17.7-19.7 GHz and 27.5-29.5 GHz by earth stations in motion communicating with geostationary space stations
in the fixed-satellite service**

The World Radiocommunication Conference (Dubai, 2023),

ANNEX 3 TO RESOLUTION 169 (REV.WRC-23)

**Provisions for maritime and aeronautical earth stations in motion to protect terrestrial services in the frequency band 27.5-29.5 GHz**

…

4 The maximum power in the out-of-band domain should be attenuated below the maximum output power of the aeronautical ESIM transmitter as described in the most recent version of Recommendation ITU‑R SM.1541.

5 Higher pfd levels than those provided in 3.1 and 3.2 above produced by aeronautical ESIMs on the surface of the Earth within an administration shall be subject to the prior agreement of that administration (see also *resolves further* of this Resolution).

**MOD**

RESOLUTION 212 (REV.WRC‑23)

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

The World Radiocommunication Conference (Dubai, 2023),

*…*

*resolves*

1 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 Recommendations of ITU‑R and of the ITU Telecommunication Standardization Sector;

2 that administrations should take the technical and operational measures, such as those found in the Annex to this Resolution, to facilitate coexistence and compatibility between the terrestrial and satellite components of IMT in the frequency bands 1 980-2 010 MHz and 2 170‑2 200 MHz;

3 that, in the event of harmful interference, the concerned administrations should investigate and take technical and operational measures, as appropriate, to reduce interference to an acceptable level,

*invites the ITU Radiocommunication Sector*

to study possible technical and operational measures to improve co-existence and compatibility between the terrestrial and satellite components of IMT 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,

*invites administrations*

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

2 to facilitate coexistence of the satellite component of IMT with the terrestrial component of IMT in the frequency band 1 980-2 010 MHz, by the concerned administrations, as appropriate, considering the following:

*a)* to apply an uplink direction from user equipment to IMT base stations as provided in the most recent version of Recommendation ITU‑R M.1036, for the user equipment belonging to the terrestrial component of IMT in the frequency band 1 980-2 010 MHz (see the Annex to this Resolution);

*b)* that, in the event of harmful interference to the satellite component of the IMT space station, the concerned administrations may take additional steps to facilitate the reduction of harmful interference to an acceptable level;

3 to facilitate coexistence of the terrestrial component of IMT stations with the satellite component of IMT in the frequency band 2 170-2 200 MHz, by the concerned administrations, as appropriate, considering the following:

*a)* to apply an appropriate power flux-density value to the IMT space stations in the frequency band 2 170-2 200 MHz (see the Annex to this Resolution);

*b)* that, in the event of harmful interference to the terrestrial component of IMT, the concerned administrations may take additional steps to facilitate the reduction of harmful interference to an acceptable level.

ANNEX TO RESOLUTION 212 (REV.WRC-23)

**Guidance on the implementation of technical and operational measures to facilitate coexistence between terrestrial and satellite components of International Mobile Telecommunications in the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz**

…

**Interference scenarios**

| **Scenario** | **From** | **To** |
| --- | --- | --- |
| A1 | Terrestrial IMT base station or mobile station | Satellite IMT space station |
| A2 | Terrestrial IMT base station | Satellite IMT mobile earth station |
| B1 | Satellite IMT mobile earth station | Terrestrial IMT base station or user equipment |
| B2 | Satellite IMT space station | Terrestrial IMT user equipment |

1) Measures for the terrestrial component of IMT:

a) Use base station antennas with improved sidelobe performance as shown in relevant ITU‑R Recommendations and Reports (e.g. improved antenna patterns compared with those contained in the most recent version of Recommendation ITU‑R F.1336).

…

**MOD**

RESOLUTION 217 (Rev. WRC-23)

**Implementation of wind profiler radars**

The World Radiocommunication Conference (Dubai, 2023),

…

*resolves*

1 to urge administrations to implement wind profiler radars as radiolocation service systems in the following bands, having due regard to the potential for incompatibility with other services and assignments to stations in these services, thereby taking due account of the principle of geographical separation, in particular with regard to neighbouring countries, and keeping in mind the category of service of each of these services:

 46-68 MHz in accordance with No. **5.162A**

 440-450 MHz

 470-494 MHz in accordance with No. **5.291A**

 904-928 MHz in Region 2 only

 1 270-1 295 MHz

 1 300-1 375 MHz;

2 that, in case compatibility between wind profiler radars and other radio applications operating in the band 440-450 MHz or 470-494 MHz cannot be achieved, the bands 420-435 MHz or 438-440 MHz could be considered for use;

3 to urge administrations to implement wind profiler radars in accordance with the most recent versions of Recommendations ITU-R M.1226, ITU-R M.1085 and ITU‑R M.1227 for the frequency bands around 50 MHz, 400 MHz and 1 000 MHz, respectively;

4 to urge administrations not to implement wind profiler radars in the band 400.15‑406 MHz;

5 to urge administrations currently operating wind profiler radars in the band 400.15‑406 MHz to discontinue them as soon as possible,

*instructs the Secretary-General*

to bring this Resolution to the attention of the International Civil Aviation Organization (ICAO), International Maritime Organization (IMO) and WMO.

**MOD**

RESOLUTION 229 (REV.WRC‑23)

**Use of the frequency bands 5 150-5 250 MHz, 5 250-5 350 MHz and 5 470‑5 725 MHz by the mobile service for the implementation of
wireless access systems including radio local area networks**

The World Radiocommunication Conference (Dubai, 2023),

…

*resolves*

1 that the use of these frequency bands by the mobile service is for the implementation of WAS, including RLANs, as described in the most recent version of Recommendation ITU‑R M.1450;

2 that, in the frequency band 5 150-5 250 MHz, stations in the mobile service shall be restricted to indoor use, including inside trains, with a maximum mean e.i.r.p.[[11]](#footnote-11)1 of 200 mW and a maximum mean e.i.r.p. density of 10 mW/MHz in any 1 MHz band or equivalently 0.25 mW/25 kHz in any 25 kHz band; mobile stations inside automobiles shall operate with a maximum e.i.r.p. of 40 mW;

3 that in the frequency band 5 150-5 250 MHz, administrations may exercise some flexibility by taking appropriate measures that would allow controlled and/or limited outdoor usage with a maximum mean e.i.r.p.1 of 200 mW; administrations have a further option to permit stations in the mobile service, for indoor or controlled outdoor use, to operate up to a maximum mean e.i.r.p of 30 dBm; in the case of indoor or controlled outdoor use, administrations are requested to either ensure that the maximum e.i.r.p. at any elevation angle above 5 degrees as measured from the horizon shall not exceed 200 mW (23 dBm), or to ensure that the maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon shall not exceed 125 mW (21 dBm) or to apply the emission mask described in *resolves*5 below to maintain protection to the incumbent services; in that case, administrations shall take all appropriate measures, such as those described in *recognizing k)*, to control the number of these higher power outdoor WAS/RLAN stations up to 2 per cent of the estimated total amount of WAS/RLAN stations; if the maximum e.i.r.p. is raised above 200 mW, unwanted emissions shall not increase above the existing levels already authorized within administrations for the existing systems that operate with an in-band e.i.r.p. of not greater than 200 mW; in all cases, administrations are requested to maintain protection to the other primary services;

4 that administrations may monitor whether the aggregate pfd levels given in the most recent version of Recommendation ITU‑R S.1426[[12]](#footnote-12)2 are exceeded as a consequence of a prolific growth in the number of WAS/RLANs;

5 that, in the frequency band 5 250-5 350 MHz, stations in the mobile service shall be limited to a maximum mean e.i.r.p. of 200 mW and a maximum mean e.i.r.p. density of 10 mW/MHz in any 1 MHz band; administrations are requested to take appropriate measures that will result in the predominant number of stations in the mobile service being operated in an indoor environment; furthermore, stations in the mobile service that are permitted to be used either indoors or outdoors may operate up to a maximum mean e.i.r.p. of 1 W and a maximum mean e.i.r.p. density of 50 mW/MHz in any 1 MHz band, and, when operating above a mean e.i.r.p. of 200 mW, these stations shall comply with the following e.i.r.p. elevation angle mask, where θ is the angle above the local horizontal plane (of the Earth):

 −13 dB(W/MHz) for 0° ≤ θ < 8°

 −13 − 0.716(θ − 8) dB(W/MHz) for 8° ≤ θ < 40°

 −35.9 − 1.22(θ − 40) dB(W/MHz) for 40° ≤ θ ≤ 45°

 −42 dB(W/MHz) for 45° < θ;

6 that administrations may exercise some flexibility in adopting other mitigation techniques, provided that they develop national regulations to meet their obligations to achieve an equivalent level of protection to the EESS (active) and the SRS (active) based on their system characteristics and interference criteria as stated in the most recent version of Recommendation ITU‑R RS.1632;

…

**MOD**

RESOLUTION 242 (rev.WRC‑23)

**Terrestrial component of International Mobile Telecommunications in the frequency band 24.25-27.5 GHz**

The World Radiocommunication Conference (Dubai, 2023),

…

*encourages administrations*

1 to ensure that provisions for the implementation of IMT allow for the continued use of EESS, SRS and FSS earth stations and their future development;

2 to keep the antenna pattern of IMT base stations within the limits of the approximation envelope according to the most recent version of Recommendation ITU‑R M.2101;

3 to apply the spurious emission limits of Recommendation ITU‑R SM.329 Category B for the frequency bands 50.2-50.4 GHz and 52.6-54.25 GHz when making the frequency band 24.25‑27.5 GHz available for IMT;

4 that for the future development of EESS (passive) in the frequency band 23.6-24 GHz, administrations should consider additional mitigation techniques (e.g. guardbands) beyond the limits specified in Resolution **750 (Rev.WRC-19)**, as appropriate,

*…*

**MOD**

RESOLUTION 243 (rev.WRC‑23)

**Terrestrial component of International Mobile Telecommunications in the frequency bands 37-43.5 GHz and 47.2-48.2 GHz**

The World Radiocommunication Conference (Dubai, 2023),

…

*encourages administrations*

1 to ensure that provisions for the implementation of IMT allow for the continued development of EESS, SRS, FSS and broadcasting-satellite service (BSS) earth stations and RAS stations and their future development;

2 to keep the antenna pattern of IMT base stations within the limits of the approximation envelope according to the most recent version of Recommendation ITU‑R M.2101,

*encourages administrations of Region 1*

to consider implementing IMT in the frequency band 40.5-43.5 GHz in order to better accommodate the needs of other services below 40.5 GHz, taking into account protection of the FSS within the frequency band 37.5-40.5 GHz in Region 1,

*…*

**MOD**

RESOLUTION 413 (Rev.WRC‑23)

**Use of the band 108-117.975 MHz by the aeronautical mobile (R) service**

The World Radiocommunication Conference (Dubai, 2023),

…

*invites ITU‑R*

to study any compatibility issues between the broadcasting service and AM(R)S in the band 108‑117.975 MHz that may arise from the introduction of appropriate digital sound broadcasting systems, described in the most recent version of Recommendation ITU‑R BS.1114,and to develop new or revised ITU‑R Recommendations as appropriate,

*instructs the Secretary-General*

to bring this Resolution to the attention of ICAO.

**MOD**

RESOLUTION 424 (REV.WRC-23)

**Use of Wireless Avionics Intra-Communications in the
frequency band 4 200-4 400 MHz**

The World Radiocommunication Conference (Dubai, 2023),

…

*instructs the Secretary-General*

to bring this Resolution to the attention of ICAO,

*invites the International Civil Aviation Organization*

to take into account the most recent version of Recommendation ITU‑R M.2085 in the course of development of SARPs for WAIC systems.

**MOD**

RESOLUTION 716 (Rev.WRC‑23)

**Use of the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz in
all three Regions and 2 010-2 025 MHz and 2 160-2 170 MHz in
Region 2 by the fixed and mobile-satellite services
and associated transition arrangements**

The World Radiocommunication Conference (Dubai, 2023),

…

*resolves*

1 to request administrations to notify to the Radiocommunication Bureau the basic characteristics of frequency assignments to existing or planned fixed stations requiring protection, or those typical[[13]](#footnote-13)2 of existing and planned fixed stations brought into use before 1 January 2000 in the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz in all three Regions and 2 010-2 025 MHz and 2 160-2 170 MHz in Region 2;

2 that administrations proposing to bring an MSS system into service must take account of the fact that, when coordinating their system with administrations having terrestrial services, such administrations may have existing or planned installations covered by Article 48 of the Constitution;

3 that in respect of stations of the fixed service taken into account in the application of No. **9.11A**, administrations responsible for MSS networks operating in the bands 1 980-2 010 MHz and 2 170-2 200 MHz in all three Regions and 2 010-2 025 MHz and 2 160-2 170 MHz in Region 2 shall ensure that unacceptable interference is not caused to fixed service stations notified and brought into use before 1 January 2000;

4 that to facilitate the introduction and future use of the 2 GHz bands by the MSS:

4.1 administrations are urged to ensure that frequency assignments to new fixed service systems, to be brought into operation after 1 January 2000, do not overlap with the 1 980-2 010 MHz and 2 170-2 200 MHz in all three Regions and 2 010-2 025 MHz and 2 160-2 170 MHz in Region 2 MSS allocations, for example by using the channel plans of the most recent version of Recommendation ITU‑R F.1098;

…

**MOD**

RESOLUTION 744 (Rev.WRC-23)

**Sharing between the mobile-satellite service (Earth-to-space) and the fixed and mobile services in the band 1 668.4-1 675 MHz**

The World Radiocommunication Conference (Dubai, 2023),

…

*resolves*

1 that the use of the band 1 668.4-1 675 MHz by systems in the mobile service is limited to transportable radio-relay systems;

2 that administrations operating transportable radio-relay systems should take into account the most recent version of Recommendation ITU‑R M.1799, which states that, to adequately protect MSS networks, the e.i.r.p. of transportable radio-relay stations should not exceed −27 dB(W/4 kHz) in the band 1 668.4‑1 675 MHz in the direction of the geostationary orbit;

3 that from 1 January 2015 administrations operating such systems in the mobile service shall limit the e.i.r.p. spectral density radiated in the direction of the geostationary orbit by these systems to −27 dB(W/4 kHz) in the band 1 668.4-1 675 MHz;

4 that, in the band 1 670-1 675 MHz, stations in the MSS shall not claim protection from stations in the fixed and mobile services operating in Canada and the United States of America;

5 that *resolves*1, 2 and 3 do not apply to stations in the fixed and mobile services operating in Canada and the United States of America.

**MOD**

RESOLUTION 749 (REV.WRC‑23)

**Use of the frequency band 790-862 MHz in countries of Region 1 and the Islamic Republic of Iran by mobile applications and by other services**

The World Radiocommunication Conference (Dubai, 2023),

…

*resolves*

1 that, in Region 1:

in accordance with No. **5.316B**, and based on the criteria contained in the Annex to this Resolution, administrations implementing the mobile service in Region 1 shall seek agreement under No. **9.21** with respect to the ARNS in the countries mentioned in No. **5.312**;

2 that for Region 1 and the Islamic Republic of Iran:

2.1 when coordination between administrations is being effected, the protection ratios applicable to the generic case NB contained in the GE06 Agreement for the protection of the broadcasting service shall be used only for mobile systems with a bandwidth of 25 kHz; if another bandwidth is used, the relevant protection ratios are to be found in the most recent versions of Recommendations ITU‑R BT.1368 and ITU‑R BT.2033;

2.2 administrations are invited to take into account, *inter alia*, the results of the sharing studies conducted by ITU‑R in response to Resolution **749** (**WRC‑07**)\*;

3 that, with respect to adjacent channel interference within the frequency band 790‑862 MHz:

3.1 adjacent channel interference within a given country is a national matter and needs to be dealt with by each administration as a national matter;

3.2 adjacent channel interference should be treated among administrations concerned, using mutually agreed criteria or those contained in relevant ITU‑R Recommendations (see also the most recent versions of Recommendations ITU‑R BT.1368, ITU‑R BT.1895 and ITU‑R BT.2033 when sharing with the broadcasting service is concerned), as appropriate,

…

**MOD**

RESOLUTION 760 (REV.WRC‑23)

**Provisions relating to the use of the frequency band 694-790 MHz in Region 1 by the mobile, except aeronautical mobile, service and by other services**

The World Radiocommunication Conference (Dubai, 2023),

…

*resolves*

1 that use of the frequency band 694-790 MHz in Region 1 by the mobile, except aeronautical mobile, serviceissubject to agreement obtained under No. **9.21** with respect to ARNS in countries listed in No. **5.312**, in which regard the criteria for identifying affected administrations under No. **9.21** for the mobile service with respect to the ARNS in the frequency band 694-790 MHz are set out in the Annex to this Resolution;

2 that, for Region 1 and the Islamic Republic of Iran:

2.1 when coordination between administrations is being effected, the protection ratios applicable to the generic case NB contained in the GE06 Regional Agreement for the protection of the broadcasting service shall be used only for mobile systems with a bandwidth of 25 kHz; if another bandwidth is used, the relevant protection ratios are to be found in the most recent versions of Recommendations ITU‑R BT.1368 and ITU R BT.2033;

2.2 administrations are invited to take into account, *inter alia*, the results of the sharing studies conducted by ITU‑R in response to Resolution **232 (WRC‑12)**[[14]](#footnote-14)\*;

3 that, with respect to adjacent-channel interference between the mobile service in the frequency band 694-790 MHz and the broadcasting service in the frequency band 470-694 MHz:

3.1 adjacent-channel interference within a given country is a national matter and needs to be dealt with by each administration as a national matter;

3.2 adjacent-channel interference should be treated among administrations concerned, using mutually agreed criteria or those contained in relevant ITU‑R Recommendations (see also the most recent versions of Recommendations ITU‑R BT.1368, ITU‑R BT.1895 and ITU-R BT.2033, as well as ITU‑R M.2090 when sharing with the broadcasting service is concerned), as appropriate,

….

**MOD**

RESOLUTION 902 (rev.WRC-23)

**Provisions relating to earth stations located on board vessels which operate
in fixed-satellite service networks in the uplink bands
5 925-6 425 MHz and 14-14.5 GHz**

The World Radiocommunication Conference (Dubai, 2023),

…

ANNEX 2 TO RESOLUTION 902 (rev.WRC‑23)

**Technical limitations applicable to ESVs transmitting in the bands 5 925‑6 425 MHz and 14-14.5 GHz**

|  |  |  |
| --- | --- | --- |
|  | **5 925-6 425 MHz** | **14-14.5 GHz** |
| Minimum diameter of ESV antenna | 2.4 m | 1.2 m1 |
| Tracking accuracy of ESV antenna | ±0.2° (peak) | ±0.2° (peak) |
| Maximum ESV e.i.r.p. spectral density toward the horizon | 17 dB(W/MHz) | 12.5 dB(W/MHz) |
| Maximum ESV e.i.r.p. towards the horizon | 20.8 dBW | 16.3 dBW |
| Maximum off-axis e.i.r.p. density2 | See below | See below |
| 1 While operations within the minimum distances are subject to specific agreement with concerned administrations, licensing administrations may authorize the deployment of smaller antenna sizes down to 0.6 m at 14 GHz provided that the interference to the terrestrial services is no greater than that which would be caused with an antenna size of 1.2 m, taking into account the most recent version of Recommendation ITU‑R SF.1650. In any case, the use of smaller antenna size shall be in compliance with the tracking accuracy of ESV antenna, maximum ESV e.i.r.p. spectral density toward the horizon, maximum ESV e.i.r.p. towards the horizon and maximum off-axis e.i.r.p. density limits in the Table above and the protection requirements of the FSS intersystem coordination agreements.2 In any case, the e.i.r.p. off-axis limits shall be compliant with the FSS intersystem coordination agreements that may agree to more stringent off-axis e.i.r.p. levels. |

**Attachment 3**

**WORKSHEET: RR Provisions, Footnotes and WRC Resolutions that contain references to ITU‑R Recommendations**

NOTE: This worksheet summarizes the result of initial review of RR Provisions, footnotes and WRC Resolutions that contain references to ITU-R Recommendations. It may be appropriate to add “the most recent version of” to the referenced ITU-R Recommendations indicated with GREEN highlight to clarify that the recommendation is NOT incorporated by reference. Preliminary regulatory text is included in Attachment 2 (Section 3). Further examination is required for those shaded in GREY

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Provision | WRC RES | RES section | Rec. ITU-R | Incl. in Vol 4 | initial comments |
| Appendix **30A**: |   |
| Article 9A, Col. 6 |   |   | BO.1296 | NO |   |
| Article 9A, Col. 9 |   |   | BO.1295 | NO |   |
| Annex 3, § 2.1 |   |   | P.837-1 \*\* | NO | it is not appropriate to update |
| Annex 3, § 2.2 |   |   | P.618-5 \*\* | NO | requires consultation with an expert |
| Annex 3, § 2.2 |   |   | P.841 \*\* | NO | requires consultation with an expert |
| Annex 3, § 2.4 |   |   | P.618-5 \*\* | NO | requires consultation with an expert |
| Annex 3, § 3.3 |   |   | BO.1297 | NO |   |
| Annex 3, § 3.5.3 |   |   | BO.1295 | NO |   |
| Annex 3, § 3.7.3 |   |   | BO.1296 | NO |   |
| Annex 3, § 3.9 |   |   | BO.1212 | NO |   |
| Appendix **30B**: |   |
| Annex 1, Section A. § 1.2 |   |   | P.676-7 \*\*, P.618-9 \*\* | NO (both) | requires consultation with an expert |
| Annex 1, Section A, § 1.3 |   |   | P.837-5 \*\* | NO | requires consultation with an expert |
|  |  |  |  |  |  |
| RR Provisions or Footnotes | WRC RES | RES section | Rec. ITU-R | Incl. in Vol 4 | initial comments |
| **No. 5.547** | **75 (WRC‑2000) \*\*** |  | SA.1157 \*\*, SA.1396 | NO (both) | The text to be modified subject to the suppression of RES. 75 under AI4 |
| **-** | **75 (Rev.WRC‑12)** |  | SA.1157 \*\*, SA.1396, F.1760, F.1765 | NO (all) |   |
| **No. 22.5K** | **76 (Rev.WRC-15)** | in Annex 1 | S.1428 \*\* | - | resolution in grey |
| in Annex 1 | BO.1443 Annex 1\*\* | - |   |
| No. **59.8** | **85 (WRC-03)** |   | S.1503 \*\* | NO | Article 59 is to be entirely reviewed at every WRC |
| No. **59.6** | **122 (Rev.WRC-2000)** \*\* |   | RA.769 \*\* | - | See No.59.8 |
|   | SA.1029 \*\*\*\* | NO |
| No. **59.8** | **122 (Rev.WRC-03)** \*\* |   | SF.1481 \*\*\*\*\*, F.1500 | NO (both) | See No.59.8 |
| No. **59.8** | **145 (Rev.WRC‑03) \*\*** |   | RA.769 \*\* | - | See No.59.8 |
|   | SF.1601 \*\*, F.1609 \*\*  | NO (both) |
| No. **5.530E**; **Appendix 4, Annex 1, Table 2, items**1.14.f, 1.14.g, 1.14.h | **165 (WRC-19)** | in resolves | P.618 \*\* | NO |   |
| in resolves: insertion of “the most recent version of” may be required. | SF.1395 | NO |   |
| Nos. **5.532AA**, **5.534A**; **Appendix 4, Annex 1, Table 2, items**1.14.i, 1.14.j | **166 (WRC-19)** | in resolves |  P.452 \*\* | NO |   |
| in resolves | P.618  | NO |   |
| in resolves: insertion of “the most recent version of” may be required. | SF.1395 | NO |   |
| No. **5.543B**; **Appendix 4, Annex 1, Table 2, items**1.14.k, 1**.**14.l, 1.14.m, 1.14.n | **167 (WRC-19)** | in resolves | P.618 \*\* | NO  |   |
| in resolves: insertion of “the most recent version of” may be required. | SF.1395 | NO  |   |
| No. **5.550D**; **Appendix 4, Annex 1, Table 2, items**1.14.o, 1.14.p, 1.14.q | **168 (WRC-19)** | in resolves: insertion of “the most recent version of” may be required. |  P.676 \*\*  | NO  |   |
| No. **5.517A**; **Appendix 4, Annex 2, Table A, items A.20, A.20.a, A.21, A.21.a, A.22, A.22.a** | **169 (WRC-19)** | in Annex 3 requirement: insertion of “the most recent version of” may be required. | SM.1541 \*\* | NO |   |
| No. **5.351A** | **212 (Rev.WRC-07)** \*\* |   | - | - | Can the reference to RES be updated? |
| No. **5.388** | **212 (Rev.WRC-15)** \*\* |   | - | - | Can the reference to RES be updated? |
| - | **212 (Rev.WRC-19)** | in invites administrations | M.1036 (latest version of) | NO | better to use standard term per RES 27 |
| in Annex requirement: insertion of “the most recent version of” may be required. |  F.1336 \*\* | NO |   |
| **Nos. 5.162A, 5.291A** | **217 (WRC‑97)** | in resolves | M.1085-1 | NO | remove version number |
| in resolves | M.1226 | NO |   |
| in resolves | M.1227 \*\* | NO |   |
| No. **59.8** | **221 (Rev.WRC-03)** \*\* |   | M.1456 | NO | Resolution in grey |
|   | M.1457 \*\* | NO |   |
| **No. 5.388A; Appendix 4, Annex 1, Table 2, items 1.14.b, 1.14.c** | **221 (Rev.WRC‑07)** |   | M.1456 | NO | Resolution in grey |
|   | M.1457 \*\* | NO |   |
| **Nos. 5.286AA, 5.295, 5.296A, 5.308A, 5.312A, 5.316B, 5.317A** | **224 (Rev.WRC‑19)** |   | M.819 \*\* | NO | Resolution in grey |
|   | M.1036 \*\* | NO |   |
|   | M.1645 | NO |   |
| **Nos. 5.446A**, **5.447**, **5.447F**, **5.450A**, **5.453** | **229 (Rev.WRC‑19)** | in resolves: insertion of “the most recent version of” may be required. | S.1426 | NO |   |
| in resolves: insertion of “the most recent version of” may be required. | RS.1632 | NO |   |
| Nos. **5.532AB**, **5.536A**, **5.536B** | **242 (WRC-19)** | in encourages administrations | M.2101  | NO |   |
| Nos. **5.550B**, **5.553B** | **243 (WRC-19)** | in encourages administrations | M.2101 | NO |   |
| **No. 32.10A** | **349 (Rev.WRC‑19)** |   | M.493 (most recent version of) | NO | Resolution in grey |
| **Nos. 52.101, 52.189** | **354 (WRC‑07)** | in Annex requirement: insertion of “the most recent version of” may be required. | M.1171  | - | Resolution in grey |
| in Annex requirement: insertion of “the most recent version of” may be required. | M.1172  | - |   |
| No. **59.8** | **413 (WRC-03)** \*\* | in invites ITU-R | BS.1114 \*\* | NO | Can the reference to RES be updated? |
| **No. 5.197A** | **413 (Rev.WRC‑07) \*\*** |   | SM.1009 (most recent version of) | NO |   |
| in invites ITU-R | BS.1114 \*\* | NO |   |
| **-** | **413 (Rev.WRC‑12)** | in recognizing | SM.1009 (most recent version of) | NO |   |
| in considering | BS.1114 \*\*  | NO |   |
| **No. 5.436** | **424 (WRC‑15)** | in invites the International Civil Aviation Organization | M.2085 | NO |   |
| **Appendix 11, Part C,** § **1.1,** § **2.5** | **543 (Rev.WRC‑19)** | in ANNEX | BS.1514 \*\* | NO | factual statement, no need to add "most recent version of" |
| in ANNEX  | BS.1615 \*\* | NO | factual statement, no need to add "most recent version of" |
| **No. A.9.8; Appendix 5, Table 5-1, No. 9.7, 6bis)** | **553 (WRC‑12) \*\*** | in ANNEX 1 to Attachment | BO.1900 | NO | Resolution in grey |
| **-** | **553 (Rev.WRC‑15)** | in ANNEX 1 | BO.1900 | NO |   |
| **No. 21.18** | **609 (Rev.WRC‑03) \*\*** | in resolves | M.1642 \*\* | - | Can the reference to RES be updated? |
| **No. 5.328A** | **609 (Rev.WRC‑07)** |   | **M.1642-2** | **YES** |   |
| **Nos. 5.389A, 5.389C** | **716 (Rev.WRC‑2000) \*\*** | in resolves | F.1098 \*\* | NO | Can the reference to RES be updated? |
| **-** | **716 (Rev.WRC‑12)** | in resolves | F.1098 \*\* | NO |   |
| in noting |  F.1335 | NO |   |
| **No. 5.208B** | **739 (Rev.WRC‑19)** | in ANNEX | S.1586\*\* | NO | Resolution in grey |
| in ANNEX | M.1583\*\*  | - |   |
| **No. 5.379D** | **744 (Rev.WRC‑07)** | in resolves | M.1799 | NO |   |
| **Nos. 5.316B, 5.317A** | **749 (Rev.WRC‑19)** | in resolves 2.1 | BT.1368\*\*, | NO |   |
| in resolves 2.1 | BT.2033\*\* | NO |   |
| **Nos. 5.312A, 5.317A** | **760 (Rev.WRC‑19)** | in resolves 2.1 | BT.1368 \*\* | NO |   |
| in resolves 2.1 | BT.2033 | NO |   |
| in resolves 3.2 | M.2090 | NO | most recent version of M.2090 is implied due to the phrasing? |
| **No. 11.32A.2** | **762 (WRC‑15)** | in resolves’ footnote | BO.1213 \*\* | NO | factual statement, no need to add "most recent version of" |
| Nos. **5.550C**, **22.5L.1**, **22.5M** | **770 (WRC-19)** | in APPENDIX 1 and APPENDIX 2 | P.618\*\* | NO | Resolution in grey |
| in APPENDIX 1 and APPENDIX 2 | P.618-13 | NO |   |
| in ANNEX 1, table 2 | S.672*\*\** | - |   |
| in Annex 2, APPENDIX 1 and APPENDIX 2 | S.1503*\*\** | NO |   |
| in Annex 2, APPENDIX 1 and APPENDIX 2 | S.1503 (latest version of) | NO |   |
| (in APPENDIX 1) | S.2131‑0\*\* | NO |   |
| **Appendix 5, Table 5-1, No. 9.7,** 7) and 8) | **901 (Rev.WRC‑07) \*\*** |   | - | - | Can the reference to RES be updated? |
| **-** | **901 (Rev.WRC‑15)** | in noting | S.1780 | NO |   |
| **Nos. 5.457A, 5.457B, 5.506A, 5.506B**, **59.8** | **902 (WRC‑03)** | in ANNEX 2 | SF.1650\*\* | NO |   |

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

1. WRC-23-IRW-21/15 <https://www.itu.int/md/R19-WSHWRC23-C-0015/en> (December 2021) [↑](#footnote-ref-1)
2. \* 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-2)
3. 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)

 \*\* *Note by the Secretariat*: This Resolution was abrogated by WRC‑03. [↑](#footnote-ref-3)
4. 2 This use of the band 14.5-14.8 GHz is reserved for countries outside Europe.

*Note by the Secretariat*: Reference to an Article with the number in roman is referring to an Article in this Appendix. [↑](#footnote-ref-4)
5. 36 In revising this Annex at WRC‑97 and at WRC‑2000, no changes were made to the technical data applicable to the Region 2 feeder-link Plan. However, for all three Regions it should be noted that some of the parameters of networks proposed as modifications to the Region 2 feeder-link Plan and the Regions 1 and 3 feeder-link Lists may differ from the technical data presented herein.     (WRC‑2000) [↑](#footnote-ref-5)
6. 41 These protection ratio values were used for assignments notified, which are in conformity with this Appendix, brought into use, and for which the date of bringing into use has been confirmed to the Bureau before 27 October 1997. [↑](#footnote-ref-6)
7. 42 These protection ratio values were used for assignments notified, which are in conformity with this Appendix, brought into use, and for which the date of bringing into use has been confirmed to the Bureau between 27 October 1997 and 12 May 2000.     (WRC‑2000) [↑](#footnote-ref-7)
8. 43 These protection ratio values were used for protection of digital and analogue assignments from analogue emissions.     (WRC‑2000) [↑](#footnote-ref-8)
9. 46 This antenna pattern is used in the revision of the Regions 1 and 3 Plan for assignments notified, which are in conformity with this Appendix, brought into use, and for which the date of bringing into use has been confirmed to the Bureau before 27 October 1997. [↑](#footnote-ref-9)
10. 47 See footnote 46. [↑](#footnote-ref-10)
11. 1 In the context of this Resolution, “mean e.i.r.p.” refers to the e.i.r.p. during the transmission burst which corresponds to the highest power, if power control is implemented. [↑](#footnote-ref-11)
12. 2 −124 − 20 log (*hSAT*/1 414) dB(W/(m2 · 1 MHz)), or equivalently, −140 − 20 log (*hSAT*/1 414) dB(W/(m2 · 25 kHz)), at the FSS satellite orbit, where *hSAT* is the altitude of the satellite (km). [↑](#footnote-ref-12)
13. 2 With respect to the notification of frequency assignments to stations in the fixed and mobile services, it was possible to notify the characteristics of typical stations in the fixed service in accordance with No. **11.17** without restriction up until 1 January 2000. [↑](#footnote-ref-13)
14. \* *Note by the Secretariat:* This Resolution was abrogated by WRC-15. [↑](#footnote-ref-14)