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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 4(Add.2)-E** |
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| Director, Radiocommunication Bureau | |
| REPORT OF THE DIRECTOR ON THE ACTIVITIES OF THE RADIOCOMMUNICATION SECTOR | |
| part 2 | |
| EXPERIENCE IN THE APPLICATION OF THE RADIO REGULATORY PROCEDURES AND OTHER RELATED MATTERS  Issues related to Appendix 7 | |

# 1 Introduction

During a review of the Appendix **7** (**Rev**.**WRC-15**) system parameter tables to identify changes required in the corresponding tables of Recommendation [ITU-R SM.1448](http://www.itu.int/rec/R-REC-SM.1448/en), ITU-R Study Group 1 and Working Party 1A found a number of inconsistencies in Appendix **7** (**Rev**.**WRC-15**) of the Radio Regulations.

Noting that the inconsistencies can only be resolved by a World Radiocommunication Conference, they were brought to the attention of the Director of the Radiocommunication Bureau for review and possible inclusion in the Director’s Report to WRC-19, together with possible suggestions as to how to address the inconsistencies.

This document is based on Annex 14 to [Document 1A/340](https://www.itu.int/md/R15-WP1A-C-0340/en) and on Annex 1 to [Document 1/226](https://www.itu.int/md/R15-SG01-C-0226/en).

# 2 Generic changes in the Appendix 7 (Rev.WRC-15) system parameter tables

## 2.1 References to notes within the system parameter tables

### 2.1.1 Issue

The Appendix **7** tables of system parameters refer to a series of table notes. Since WRC-2000 a number of formatting changes have been made to the system parameter tables that have not been limited to the frequency bands under consideration. In the 2016 Edition of the Radio Regulations there is no consistency in the formatting of references to table notes. Some references to table notes are difficult to read. Some references to table notes are either difficult or impossible to distinguish from parameter values depending on the format of the Radio Regulations (i.e., Word or PDF): for example, it is difficult to determine whether the numbers 9 and 10 listed in Table 9b as *horizon antenna gain* are references to table notes or the values of the parameter in dBi. Further the formatting changes to references to table notes have made the system parameter tables susceptible to unintended modification (see Part III § 11, § 12, § 15 and § 16).

### 2.1.2 Proposed solution

The method used for referencing the table note to *Receiving earth stations in the meteorological-satellite service* in Table 10[[1]](#footnote-1), of Appendix **7** (**Rev.WRC-15**) should be extended to Tables 1 to 9 as it would be less prone to unintended modification. Hence table notes would be identified using text guidance as “(see Note 1)”, “(see Note 2)”, etc., as shown in the example below.

|  |  |  |  |
| --- | --- | --- | --- |
| Fixed satellite (see Note 1) | Earth exploration-satellite (see Note 2) | Earth exploration-satellite | Fixed satellite (see Note 1, 2) |
|  |  | (see Note 3) |  |

Note 1 Geostationary-satellite systems.

Note 2 Non-geostationary-satellite systems.

Note 3 Horizon antenna gain is calculated using the procedure of Annex 5. Where no value of *Gm* is specified, a value of 42 dBi is to be used.

The reference to a table note within a cell should be included in parenthesis to clearly limit the extent of the note and avoid any potential for the *Note number* merging with a value in the cell and creating new inconsistencies.

At WRC-15 a new note was added to Table 10 referring to the *Non-GSO MSS feeder-link earth stations in the band 5 091-5 150 MHz* but this note is without parenthesis. Hence in line with the above proposal, this reference to a table note should also be included in parenthesis.

### 2.1.3 Reason

When the text for Appendix **7** was proposed to WRC-2000 the table note numbers and the references to the notes within the system parameter tables 1-9 were contained in parenthesis[[2]](#footnote-2) but the parenthesis were not retained in the Radio Regulations. Instead the note number and the references to notes within the tables were depicted by use of a smaller font with its vertical character spacing position raised. For references to table notes there was also an increased horizontal spacing from other entries in a table cell. If a table cell only contained a reference to a table note, the referenced note number was centralised within the cell. However, now font sizes are frequently identical and vertical character spacing is often reduced.

The formatting of table note references has created a number of difficulties.

• Where a table note reference is the sole entry in a table cell, in some language versions the identification of the table note reference can be invisible in the PDF version of the Radio Regulations – identification of a table note reference is dependent on use of a Word facility located under the “Home” tab (see Font, Advanced and determine if the vertical character spacing position is normal or raised, where raised indicates a reference to a table note);

• all entries in a table row have been reset with the vertical character spacing position:

– at *normal,* thus a table note reference may be considered a parameter value (i.e., if the vertical character spacing position is examined the entry would be identified as a parameter value);

– at *raised,* thus a parameter value may be considered a table note reference (i.e., if the vertical character spacing position is examined, the entry would be identified as a table note reference).

• In some language versions the table note references have been converted to superscript and are so small they are virtually unreadable.

Resetting table note references to the original text size and character spacing would not prevent the current problems returning in the future and the problem of identification in PDF would remain.

## 2.2 Symbol used for the number of equivalent, equal level, equal probability entries of interference, assumed to be uncorrelated for small percentages of the time

### 2.2.1 Issue

The symbol “n” does not reflect the statistical nature of the term *the number of equivalent, equal level, equal probability entries of interference, assumed to be uncorrelated for small percentages of the time* and it is not unique as “n” is also used for other terms within Appendix **7** (**Rev.WRC‑15**) including as a step counter.

### 2.2.2 Proposal

The symbol “*np”* should be used for the term *the number of equivalent, equal level, equal probability entries of interference, assumed to be uncorrelated for small percentages of the time*

### 2.2.3 Reason

The term *number of equivalent equal level, equal probability entries of interference, assumed to be uncorrelated for small percentages of the time* is an important element in the calculations, and it would be preferable if it had a symbol that both accurately reflected the statistical nature of the term and was unique. Currently the symbol “n” can also be interpreted as a simple step counter, especially as this is one of the other terms the symbol “n” is used for within Appendix **7 (Rev.WRC-15).**

In Recommendation ITU-R SM.1448 (and thus Appendix **7**)[[3]](#footnote-3) there are concerns on the unique identification of symbols, as there are more than 100 different symbols associated with parameters used for the calculation of coordination distances with further terms and symbols used in some examples. In addition, the propagation elements of Recommendation ITU-R SM.1448-0 and Appendix **7** **(Rev.WRC-15)** are based on Recommendation ITU-R P.620-4, which itself contains a very large number of parameters. To avoid potential confusion in a future revision, Study Group 1 developed an index of parameters and symbols for inclusion in Recommendation ITU-R SM.1448-0. This index does not form part of Appendix **7** **(Rev.WRC‑15)**.

## 2.3 Table 9 - Bi-directional contour horizon gain parameter *Gr* and table note references

### 2.3.1 Issue

Since June 2018 exchanges of Liaison Statements with other concerned Working Parties have identified that the table note associated with the Horizon Antenna Gain parameter *Gr* does not include a reference to § 3 of Annex 7. Paragraph 3 of Annex 7 provides information relevant to understanding the individual Horizon Antenna Gain entries in Table 9 for the frequency bands and orbit associated with the unknown receiving earth station.

### 2.3.2 Proposal

Table note 4 of Table 9a and table note 5 of Table 9b are identical, it is proposed to modify the existing text to include a reference to § 3 of Annex 7, as shown below:

Table 9a

4 Horizon antenna gain for the receive earth station (refer to § 3 of the main body of this Appendix and to § 3 of this Annex).

Table 9b

5 Horizon antenna gain for the receive earth station (refer to § 3 of the main body of this Appendix and to § 3 of this Annex).

### 2.3.3 Reason

Section 3 in Annex 7 of Appendix **7**, explains the significance of the different Horizon Antenna Gain entries for the unknown receiving earth stations operating to space stations in the GSO/NGSO, how the tabulated values were determined and which antenna patterns have been used to derive them. There is no reference to this text in Appendix **7**.

The individual entries for the Horizon Antenna Gain parameter *Gr* in each frequency band are either:

• a reference to a table note, in the case the unknown receiving earth stations are operating to space stations in the GSO; or,

• a specific value of antenna gain in dBi, with or without a reference to a table note, in the case the unknown receiving earth stations are operating to space stations in a NGSO.

For the case where the unknown receiving earth stations are operating to space stations in GSO, the referenced table note refers to procedures of Annex 5 and may additionally contain an antenna pattern.

For the case where the unknown receiving earth stations are operating to space stations in a NGSO, the referenced table note refers to the § 2.2 in the main body of the Appendix, lists an antenna pattern equation and a second reference to the definition of antenna pattern symbols in Annex 3.

## 2.4 Table 9b - Provision of additional explanatory text in table notes 11 and 12

### 2.4.1 Issue

Table notes 11 and 12 of Table 9b are intended to provide the derivation of a tabulated value of Horizon Antenna Gain (*Gr*) in dBi. However concerns have been raised on the clarity of the text and thus the application of the table note.

### 2.4.2 Proposal

It is proposed to clarify the text of table notes 11 and 12 in Table 9b by replacing the word “for” with the phrase “with the antenna pattern modelled by the equation” in both table notes so that they read:

11 Non-geostationary horizon antenna gain. *Ge* = *Gmax* (see § 2.2 of the main body of this Appendix) with the antenna pattern modelled by the equation *G* = 36 − 25 log (φ) > −6 (dBi) (refer to Annex 3 for definition of symbols).

12 Non-geostationary horizon antenna gain. *Ge* = *Gmax* (see § 2.2 of the main body of this Appendix) with the antenna pattern modelled by the equation *G* = 32 − 25 log (φ) > −10 (dBi) (refer to Annex 3 for definition of symbols).

### 2.4.3 Reason

To clarify application of the equation and the derivation of the tabulated value of the horizon antenna gain in all languages. See also § 2.3 of Attachment 2.

## 2.5 Table 10 - Alignment of column headings with content of the column

### 2.5.1 Issue

The information listed under column 1 “Type of earth station” and column 2 “Type of terrestrial station” is not fully described by the column headings.

### 2.5.2 Proposal

It is proposed to clarify the headings of columns 1 and 2 by adding the word “location” so that they read:

|  |  |  |
| --- | --- | --- |
| Frequency sharing situation | | Coordination distance (in sharing situations involving services allocated with equal rights) (km) |
| Location/Type of earth station | Location/Type of terrestrial station |

### 2.5.3 Reason

The two columns contain some information that identifies the type of earth station and the type of terrestrial station but in other cases the information simply provides the location e.g., “ground-based”.

## 2.6 Table 10 - Type of earth station

### 2.6.1 Issue

Table 10 contains certain terminology that causes confusion between a particular application and the radiocommunication service in which it is operating.

### 2.6.2 Proposal

In Table 10 it is proposed to clarify all three occurrences of the type of earth station as shown below:

|  |  |  |
| --- | --- | --- |
| Frequency sharing situation | | Coordination distance (in sharing situations involving services allocated with equal rights) (km) |
| Type of earth station | Type of terrestrial station |
|  |  |  |
| Aircraft (all bands) | Ground-based | 500 |
| Aircraft (all bands) | Mobile (aircraft) | 1 000 |
|  |  |  |
| Aircraft in the bands:  400.15-401 MHz 1 668.4-1 675 MHz | Station in the meteorological aids service (radiosonde) | 1 080 |

### 2.6.3 Reason

Discussions between Working Parties have noted that the terminology used in Table 10 for the type of earth stations is potentially confusing and may lead the reader to identify the wrong allocation. See also § 2.4 of Attachment 2.

Noting that an “aircraft” is inherently mobile, the term “(mobile)” that is the source of the confusion between application and radiocommunication service is unnecessary to the application of coordination for earth stations; therefore, the term is not required.

## 2.7 Tables 7c and 8d - Use of the frequency bands 27.5-28.6 GHz and 17.7-18.6 GHz by non-GSO FSS satellite systems

### 2.7.1 Issue

While the frequency band 27.5-28.6 GHz can be used by non-GSO FSS satellite systems, this band is listed in Table 7c only for GSO FSS satellite networks. Based on the Rules of Procedure on Appendix **7**, the same terrestrial parameters should be used for the coordination of an earth station associated to a non-GSO FSS earth station as to a GSO FSS earth station.

Similarly, the band 17.8-18.6 GHz used by non-GSO FSS systems is currently not covered by Appendix **7**, but the last column of Table 8c contains the parameters for the bands 17.7-18.8 and 19.3-19.7 GHz when used by GSO FSS networks. The case of non-GSO FSS systems in the band 17.8-18.6 GHz can therefore be addressed by following the Rules of Procedure on Appendix **7**.

### 2.7.2 Proposal

For the frequency band 27.5-28.6 GHz:

TABLE 7c    (Rev.WRC‑12)

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Transmitting space radiocommunication service designation | | Fixed- satellite | Fixed- satellite 2 | Fixed- satellite |
| Frequency bands (GHz) | | 24.65-25.25 27.0-29.5 | 28.6-29.1 | 27.5-28.6  29.1-29.5 3 |
| Receiving terrestrial  service designations | | Fixed, mobile | Fixed, mobile | Fixed, mobile |
| Method to be used | | § 2.1 | § 2.2 | § 2.2 |
| Modulation at terrestrial station 1 | | N | N | N |
| Terrestrial station interference parameters and criteria | *p*0 (%) | 0.005 | 0.005 | 0.005 |
| *N* | 1 | 2 | 1 |
| *p* (%) | 0.005 | 0.0025 | 0.005 |
| *NL* (dB) | 0 | 0 | 0 |
| *Ms* (dB) | 25 | 25 | 25 |
| *W* (dB) | 0 | 0 | 0 |
| Terrestrial station parameters | *Gx* (dBi) 4 | 50 | 50 | 50 |
| *Te* (K) | 2 000 | 2 000 | 2 000 |
| Reference bandwidth | *B* (Hz) | 106 | 106 | 106 |
| Permissible interference power | *Pr*( *p*) (dBW) in *B* | −111 | −111 | −111 |

For the frequency band 17.8-18.6 GHz:

TABLE 8d     (Rev.WRC‑12)

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Receiving space radiocommunication service designation | | | Meteoro-logical- satellite | Fixed-satellite | Fixed-satellite 3 |
|  | | |  |  |  |
| Frequency bands (GHz) | | | 18.0-18.4 | 17.8-18.6 4  18.8-19.3 | 19.3-19.7 |
| Transmitting terrestrial service designations | | | Fixed, mobile | Fixed, mobile | Fixed, mobile |
| Method to be used | | | § 2.1 | § 2.1, § 2.2 | § 2.2 |
| Modulation at earth station 1 | | | N | N | N |
| Earth station interference parameters and criteria | *p*0 (%) |  | 0.05 | 0.003 | 0.01 |
| *n* |  | 2 | 2 | 1 |
| *p* (%) |  | 0.025 | 0.0015 | 0.01 |
| *NL* (dB) |  | 0 | 0 | 0 |
| *Ms* (dB) |  | 18.8 | 5 | 5 |
| *W* (dB) |  | 0 | 0 | 0 |
| Terrestrial station parameters | *E* (dBW) in *B* 2 | A |  | – | – |
| N | 40 | 40 | 40 |
| *Pt* (dBW) in *B* | A |  | – | – |
| N | −7 | −7 | −7 |
| *Gx* (dBi) |  | 47 | 47 | 47 |
| Reference bandwidth 6 | *B* (Hz) |  | 107 | 106 | 106 |
| Permissible interference power | *Pr* ( *p*) (dBW) in *B* | | −115 | −140 | −137 |

### 2.7.3 Reason

The Rules of Procedure on Appendix **7** indicates that: “(…) *In addition, as the system parameter tables have incomplete information in some of the columns, the Board instructed the Bureau to apply the following approach in this regard:*

– *to use the parameters in Table 7 for determining the coordination area for a transmitting earth station in a service not mentioned in that Table, but allocated with equal rights, based on the fact that all parameters related to the earth station needed for the calculation can be found in the notice form;*

– *to use the parameters in Table 8 for determining the coordination area for a receiving earth station in respect to a terrestrial service not mentioned in that Table, but allocated with equal rights, under the assumption that the concerned terrestrial service has the same potential of interference as the other terrestrial services listed in the Table (see also § 4 of Rules of Procedure under No.****11.17****).”*

# 3 Inconsistencies affecting all language versions

The inconsistencies listed below can be found in the 2016 Edition of the Radio Regulations.

## 3.1 Table 2 - References to the section containing the method to determine *Gt* and *Gr*

### 3.1.1 Issue

Table 2 identifies the coordination contours required for each bidirectional scenario. For the coordinating and unknown earth stations operating to GSO space stations, there are two entries as shown below with the associated references to the section containing the method to determine *Gt* and *Gr* in parenthesis:

1) the space to Earth allocation is only for the GSO (§ 3.1); and

2) the space to Earth allocation is for GSO and NGSO (§ 3.1.1 and § 3.2.1).

In each case for the coordinating and unknown earth stations operating to the GSO the coordination scenario is identical but the section referenced is different, § 3.1 in the first and § 3.1.1 in the second.

### 3.1.2 Proposal

For the case where the coordinating earth station is operating with a space station in the GSO and the unknown earth stations are operating with space stations in the GSO and NGSO, the reference to the section containing the method to determine *Gt* and *Gr* is modified as shown below:

| Coordinating earth station operating to a space station in the | Unknown receiving earth station operating with a space station in the | Section containing the method to determine  *Gt* and *Gr* | Contours required | |
| --- | --- | --- | --- | --- |
|  | No. | Details |
|  | Geostationary orbit | § 3.1 | 1 | A coordination contour comprising both propagation mode (1) and propagation mode (2) contours |
| Geostationary orbit | Non-geostationary orbit | § 3.2.1 | 1 | A propagation mode (1) coordination contour |
|  | Geostationary or non-geostationary orbits1 | § 3.1 and 3.2.1 | 2 | Two separate coordination contours, one for the geostationary orbit (propagation mode (1) and mode (2) contours) and one for the non-geostationary orbit (propagation mode (1) contour) |
|  |  |  |  |  |

### 3.1.3 Reason

Paragraph 3.1.1 contains no link to § 3.1.2 for the determination of the propagation mode (2) contour which is required for the overall coordination contour when both coordinating and unknown earth stations are operating with space stations in the GSO. The reference should be to § 3.1, which contains links to both § 3.1.1 and § 3.1.2. Changing the reference to § 3.1 will align it with the identical case at the beginning of the table.

## 3.2 Table 2 Note 1 - Alignment of allocation terminology with text

### 3.2.1 Issue

In Table 2 for the case where the unknown receiving earth stations are operating with space stations in the GSO and NGSO there is a reference to table note 1. Table note 1 contains a reference to the direction of transmission that does not align with its location in the table or the accompanying text.

### 3.2.2 Proposal

The text of table note 1 is modified as shown below:

1 In this case, the bidirectional frequency band may contain allocations in the space-to-Earth direction for space stations in both the geostationary orbit and non-geostationary orbits. Hence, the coordinating administration will not know whether the unknown receiving earth stations are operating with space stations in the geostationary orbit or non-geostationary orbit.

### 3.2.3 Reason

In all the bidirectional coordination scenarios, the unknown earth stations are always receiving earth stations operating with associated transmitting space stations.

## 3.3 Table 8d - Association of the parameter reference bandwidth with table note 6

### 3.3.1 Issue

In Table 8d, table note 6 “*Non-geostationary fixed-satellite service systems*” is associated with:

i) the Fixed satellite service entry in the band 37.5‑40.5GHz; and,

ii) the parameter *reference bandwidth*.

The parameter *reference bandwidth* applies to all services in the table. Further Table 8d lists data relating to multiple space services, with some operating in geostationary orbit and some operating in non‑geostationary orbits. A reference to a table note implying the parameter only applies to *Non*‑*geostationary fixed-satellite service systems* is not appropriate for those cases where the satellite service is neither fixed-satellite service nor operating from the geostationary orbit.

### 3.3.2 Proposal

The parameter *reference bandwidth* should have an association with a new table note (i.e., table note 7 of Table 8d) with text similar to or the same as that of table note 6 of Table 8c:

“NOTE 7: *In certain systems in the fixed-satellite service it may be desirable to choose a greater reference bandwidth B. However, a greater bandwidth will result in smaller coordination distances and a later decision to reduce the reference bandwidth may require recoordination of the earth station.*”

### 3.3.3 Reason

Table note 6 of Table 8c originates from Table II of Appendix **28** that covered the frequency range 1.525-40.0 GHz. During the revision of Appendix **28** (S7) the tables of system parameters were expanded to address the larger frequency range of the revised Appendix[[4]](#footnote-4) and Table II was divided into four new tables (8a:137-2 200 MHz; 8b:1.525-4.2 GHz; 8c:4.5-19.7 GHz; 8d:18.8-47.0 GHz). The table note “*In certain systems in the fixed-satellite service it may be desirable to choose a greater reference bandwidth B. However, a greater bandwidth will result in smaller coordination distances and a later decision to reduce the reference bandwidth may require recoordination of the earth station*” was only associated with the parameter *reference bandwidth* in Table 8c. It should have been applied to the parameter *reference bandwidth* in Table 8c and Table 8d.

## 3.4 Table 9a - Aeronautical mobile-satellite (R) service 5.030-5.091 GHz

### 3.4.1 Issues

#### 3.4.1.1 Issue 1

For the Aeronautical mobile-satellite (R) service in the frequency band 5.030‑5.091 GHz where the receive Earth station is operating in the Aeronautical mobile-satellite (R) service (GSO) the *horizon antenna gain* has a value of 8 dBi. However, a fixed value of *horizon antenna gain* for the receiving Earth station is not possible with the assumptions made in § 3.1.1 of Appendix **7** (**Rev.WRC-15**) for the procedure in § 2.1 of Annex 5 to Appendix **7** (**Rev.WRC-15**).

NOTE – In all other cases of a receive Earth station operating with a Space station in the GSO the entry in Tables 9a and 9b reference a table note identifying the method to be used to calculate the *horizon antenna gain.*

#### 3.4.1.2 Issue 2

For the Aeronautical mobile-satellite (R) service in the frequency band 5.030‑5.091 GHz where the receive Earth station is operating in the Aeronautical mobile-satellite (R) service (NGSO) the *horizon antenna gain* has a value of 8 dBi. Noting the issue raised in § 2.1.1, the value of the *horizon antenna gain* should be confirmed.

### 3.4.2 Proposals

#### 3.4.2.1 Proposal 1

For a receive Earth station operating in the Aeronautical mobile-satellite (R) service (GSO) the entry in the table cell should be a reference to a table note identifying the method to calculate the *horizon antenna gain.* The text of that table note also needs to be confirmed in the case an alternative antenna pattern is required.

#### 3.4.2.2 Proposal 2

For a receive Earth station operating in the Aeronautical mobile-satellite (R) service (NGSO) the value of the *horizon antenna gain* should be confirmed.

### 3.4.3 Reason

The Aeronautical mobile-satellite (R) service in the frequency band 5.030‑5.091 GHz was included in Table 9a at WRC-12 based on proposals in *Addendum 1 to Document 5(Add.3).* That document shows the *horizon antenna gain* cell entries for a receive Earth station operating with a Space station in either the GSO or NGSO has a value of “8”.

The *horizon antenna gain* for a receiving Earth stationoperating with a Space station in the GSO is calculated by the method in § 2.1 of Annex 5 to Appendix **7** (**Rev.WRC‑15**) irrespective of the orbit (GSO or NGSO) associated with the coordinating Earth station, see § 3.1.1 and § 3.2.2. of Appendix **7** (**Rev.WRC‑15**).

For a receive Earth stationoperating in a bidirectionally allocated frequency band, one of the simplifying assumptions is that the receive Earth station is at the same latitude as the coordinating Earth station. For the case when the receive Earth stationis operating with a Space station in the GSO this means that, for the calculations, its *horizon antenna gain* is dependent on the latitude of the coordinating Earth station. Hence the entry in the system parameter table for the horizon antenna gain cannot be a fixed value.

For all other entriesin Tables 9a and 9b, where a receive Earth stationisoperating with a Space station in the GSO, there is a reference to one of the following two table notes:

*• “Horizon antenna gain is calculated using the procedure of Annex 5. Where no value of Gm is specified, a value of 42 dBi is to be used”.*

*• “Horizon antenna gain is calculated using the procedure of Annex 5, except that the following antenna pattern may be used in place of that given in § 3 of Annex 3: G = 32 − 25 log φ for 1° ≤ φ < 48°; and G = −10 for 48° ≤ φ < 180° (refer to Annex 3 for definition of symbols)”.*

Given the issue with the table cell entry for the *horizon antenna gain* for a receive Earth stationoperating with a Space station in the GSO it would be appropriate to confirm the value of the corresponding cell entry for a receiving Earth stationoperating with a Space station in the NGSO.

## 3.5 Table 9a - Use of table note 10

### 3.5.1 Issue

Table 9a lists 10 table notes but only 9 table notes are referenced within the table.

**3.5.2 Proposal**

Table note 10 of Table 9a is either suppressed or its description changed to “(SUP – WRC-03)”.

### 3.5.3 Reason

Table note 10 was formerly referenced by the Mobile-satellite service in the band 1.700-1.710 GHz for unmanned operation. The band 1.700-1.710 GHz was removed from Table 9a by WRC‑03 following the suppression of the allocation in Region 2 to the Mobile-satellite service.

## 3.6 Table 9b - Omission of units

### 3.6.1 Issue

The values associated with the parameter *horizon antenna gain* (Gr) are in dBi, but this is not indicated in Table 9b.

### 3.6.2 Proposal

Include the units and reference antenna “(dBi)” for the parameter *horizon antenna gain* in Table 9b.

### 3.6.3 Reason

The parameter *horizon antenna gain* includes “(dBi)” with the symbol Gr in Table 9a. Further the parameter *on-axis antenna gain* includes “(dBi)” with the symbol Gm (for the receiving Earth station) in Table 9 or with the symbol Gx (for the receiving or transmitting terrestrial station) in Tables 7 and 8. Inclusion of the units and reference antenna with the symbol Gr for the parameter *horizon antenna gain* in Table 9b would correct an omission and improve consistency.

## 3.7 Table 9b - Deletion of limiting conditions in table notes 11 and 12

### 3.7.1 Issue

In Table 9b the table notes 11 and 12 have limiting conditions applied to the antenna pattern equations. These limiting conditions are superfluous in Appendix **7** and misleading.

### 3.7.2 Proposal

It is proposed to clarify the text of table notes 11 and 12 in Table 9b by suppressing “> −6” in table note 11 and “> −10” in table note 12 so that they read:

11 Non-geostationary horizon antenna gain. *Ge* = *Gmax* (see § 2.2 of the main body of this Appendix) for *G* = 36 − 25 log (φ) (refer to Annex 3 for definition of symbols).

12 Non-geostationary horizon antenna gain. *Ge* = *Gmax* (see § 2.2 of the main body of this Appendix) for *G* = 32 − 25 log (φ) (refer to Annex 3 for definition of symbols).

### 3.7.3 Reason

The limiting conditions applied to the equations are intended to explain the domain of validity of the equation in a broader context, but in Appendix **7** where the equation is used in conjunction with the minimum elevation angle, this condition is superfluous and thus misleading. See also § 1.2 in Attachment 2.

## 3.8 Appendix 7 - Internal references

### 3.8.1 Issue

In § 3.1.1 for the case both the coordinating and the unknown Earth stations are operating with Space stations in the geostationary orbit there is a reference to § 2.2 that contains the procedure for Earth stations operating with NGSO satellites. A similar reference exists in Recommendation ITU-R SM.1448-0, except in this case the reference is to § 2.2.1 (TIG method). It is considered that the reference should be to § 2.1.1 and the procedure for calculating the propagation mode (1) contour for the case of Earth stations operating with Space stations in the geostationary orbit.

### 3.8.2 Proposal

The text from § 3.1.1 of Appendix **7** (**Rev.WRC-15**) is modified as shown below.

The procedure for the determination of the propagation mode (1) contour in this case differs from that described in § 2.1.1 in two ways. First, the parameters to be used for the unknown receiving earth station are those in Table 9. Second, and more significantly, the knowledge that the unknown earth stations operate with geostationary satellites can be used to calculate the worst-case value of the horizon antenna gain of the receiving earth station towards the transmitting earth station for each azimuth at the transmitting earth station.

### 3.8.3 Reason

The reference to § 2.2 in Appendix **7** (**Rev.WRC-15**) (§ 2.2.1 in Recommendation ITU-R SM.1448-0) appears to be a typographical error and that the reference should be simply changed to § 2.1.1. for both Appendix **7** (**Rev.WRC-15**) and Recommendation ITU-R SM.1448-0. Noting that in § 3.1.1 the unknown receive Earth station horizon antenna gain is constant with time.

Further the key difference from the procedures in § 2.1.1 and § 2.2 is that the unknown station is a receive Earth station operating with a Space station in the GSO. The pointing direction of the coordinating Earth station is irrelevant. The same procedure, located in § 2.1 of Annex 5, is used for determining the horizon antenna gain of a receive Earth station operating with a Space station in the GSO when the coordinating Earth station is operating with a Space station in a NGSO (see § 3.2.2).

In addition the simplifying assumptions primarily apply to the unknown receiving Earth station operating with a Space station in the GSO. The other assumption relates to the use of plane geometry.

## 3.9 Use of the term coordination

### 3.9.1 Issue

In parts of Appendix **7 (Rev.WRC-15)** the text refers to a propagation mode (1) or propagation mode (2) in terms of the coordination area or coordination contour for cases that specifically relates to or include Earth Stations operating with GSO Space stations. This is not compatible with the text in § 1.6 and hence with the definitions in **No. 1.171, No. 1.172** and **No. 1.173**.

## 3.9.2 Proposals

#### 3.9.2.1 § 2.1.2 (Determination of the coordinating earth station’s propagation mode (2) contour - 2nd paragraph)

The text from § 2.1.2 of Appendix **7** (**Rev.WRC-15**) is modified as shown below.

For an earth station operating with a geostationary space station having a slightly inclined orbit, the rain-scatter contours for each of the satellite’s two most extreme orbit positions are determined individually, using the relevant elevation angles and their associated azimuths to the satellite. The rain scatter area is the total area contained within the two resulting overlapping contours.

#### 3.9.2.2 Annex 5 (§ 1 Introduction – 1st paragraph)

The text from paragraph 1 in § 1 of Annex 5 to Appendix **7** (**Rev.WRC-15**) is modified as shown below.

The propagation mode (1) contour of a transmitting earth station with respect to unknown receiving earth stations operating with geostationary space stations requires the determination of the horizon gain of the antenna of the receiving earth station at each azimuth of the transmitting earth station. Different methods then need to be applied to determine the coordination area of the coordinating earth station, depending on whether it operates with geostationary or non‑geostationary space stations. When both the coordinating earth station and the unknown receiving earth stations operate with geostationary space stations, it is also necessary to determine a propagation mode (2) contour.

#### 3.9.2.3 Annex 5 (§ 2 Determination of the bidirectional coordination contour for propagation mode (1))

The title from of § 2 of Annex 5 to Appendix **7** (**Rev.WRC-15**) is modified as shown below.

Determination of the bidirectional contour for propagation mode (1)

The text from § 2 of Annex 5 to Appendix **7** (**Rev.WRC-15**) is modified as shown below.

For a transmitting earth station operating in a frequency band that is also allocated for bidirectional use by receiving earth stations operating with geostationary space stations, further development of the procedures in Annex 3 is needed. It is necessary to determine the horizon gain of the unknown receiving earth station, the horizon gain to be used at each azimuth at the coordinating (transmitting) earth station, for the determination of the bidirectional contour.

### 3.9.3 Reasons

Paragraph 1.6 of Appendix **7** (**Rev.WRC-15**) describes the coordination contour: concepts and construction. It states “the coordination distance, determined for each azimuth around the coordinating earth station, defines the coordination contour that encloses the coordination area. The coordination distance lies within the range defined by the minimum coordination distance and the maximum calculation distance”.

Where the coordination distance (**No. 1.173**), the coordination contour (**No. 1.172**) and coordination area (**No. 1.171**) are defined in Article **1.** Both the coordination distance and coordination area are defined in terms of the distance or area “beyond which the level of *permissible interference* will not be exceeded and coordination is therefore not required”.

Paragraph 1.6 of Appendix **7** (**Rev.WRC-15**) also states “some procedures[[5]](#footnote-5)6 require that, for any azimuth, the greater of the distances determined for propagation mode (1) and propagation mode (2) is the distance to be used in determining the coordination contour”.

#### 3.9.3.1 For the proposal in § 3.9.2.1

Paragraph 2.1 of Appendix **7** (**Rev.WRC-15**) details the procedure for Earth stations operating with geostationary space stations. It states “when determining the coordination area between a coordinating earth station operating with a geostationary space station and terrestrial systems, the coordination distance on any azimuth is the greater of the propagation mode (1) and propagation mode (2) required distances.” Note: the term required distance is used due to the limiting effects of the minimum coordination distance, maximum calculation distance and the correction factor.

Hence the proposal in § 3.9.2.1 aligns the text for the propagation mode (2) procedure with §1.6 and § 2.1 of Appendix **7** and removes an inconsistency with **Nos. 1.171 – 1.173**.

#### 3.9.3.2 For the proposals in § 3.9.2.2 and § 3.9.2.3

Paragraph 3.1 of Appendix **7** (**Rev.WRC-15**) describes the procedure for the “coordinating and unknown earth stations operating with geostationary space stations”. It states “when both the coordinating and the unknown earth stations operate with space stations in the geostationary orbit, it is necessary to develop a coordination contour comprising both propagation mode (1) and propagation mode (2) contours”.

Paragraph 1 and § 2 of Annex 5 to Appendix **7** (**Rev.WRC-15**) address the detailed procedure when a coordinating Earth station is operating with a Space station in either the GSO or NGSO and the unknown receiving Earth station is always operating with a Space station in the GSO. As the title and text are general and include the case where both the coordinating and the unknown earth stations operate with space stations in the GSO, it is not compatible with § 1.6 of Appendix **7** (**Rev.WRC-15**) nor **Nos. 1.171 – 1.173** to describe propagation mode (1) or propagation mode (2) in the specific terms of the coordination area or coordination contour**.**

Hence the proposals in § 3.9.2.2 and § 3.9.2.3 align § 1 and § 2 of Annex 5 to Appendix **7** (**Rev.WRC‑15**) with § 1.6 and § 3.1 of Appendix **7** and removes an inconsistency with **Nos. 1.171-1.173**.

# 4 Inconsistencies affecting some language versions

## 4.1 Table 7a - The number of equivalent, equal level, equal probability entries of interference, assumed to be uncorrelated for small percentages of the time

### 4.1.1 Issue

The term *the number of equivalent, equal level, equal probability entries of interference, assumed to be uncorrelated for small percentages of the time* is represented by the symbol “N” in the English version of the RR and by the symbol “n” in all other language versions.

### 4.1.2 Proposal

The same symbol should be used in all language versions. If the proposal contained in § 2.2 for a generic change proposal to the symbol used for the term *the number of equivalent, equal level, equal probability entries of interference, assumed to be uncorrelated for small percentages of the time* is adopted, there is no need for any change under this section*.*

### 4.1.3 Reason

The symbol “N” was first used in Table 7a of the 2012 Edition of the Radio Regulations for the term *number of equivalent equal level, equal probability entries of interference, assumed to be uncorrelated for small percentages of the time*. However, WRC-12 documents show no change and no indication of a request to change the symbol in the minutes of the Plenary (see table below).

| Appendix 7 Tables | Minutes | Pinks | Blues | Plenary | To Com 7 |
| --- | --- | --- | --- | --- | --- |
| 8c | Docs 329R1, 279R1 | Doc 219R1 | Doc 181 |  | Doc 174 |
| 7b and 9a | Doc 549 | Doc 444 | Doc 444 |  | Doc 390 |
| 7c | Docs 554, 553 | Doc 538 | Doc 504 |  | Doc 490 |
| 7a, 7c, 8a, 8b and 8d | Doc 554 |  |  | Doc 535 | Doc 452 |

Note 1: Pink documents correspond to WRC documents submitted by the Editorial Committee to the Plenary for second reading; Blue documents correspond to WRC documents submitted by the Editorial Committee to the Plenary for first reading.

Note 2: Document 535 lists Documents 356, 389, 452, 478, 480 and 500. Only Document 452 contains any editorials relating to Tables 1 to 9 of Appendix **7**(**Rev.WRC-07**).

## 4.2 Table 7a - Value of the reference bandwidth in the frequency band 148.0-149.9 MHz

### 4.2.1 Issue

For the frequency band 148.0-149.9 MHz the *reference bandwidth* has the value “14 x 103” Hz in the Arabic version of the RR and the value “4 x 103” Hz in all other language versions.

### 4.2.2 Proposal

The *reference bandwidth* should have the value “4 x 103” Hz in all language versions.

### 4.2.3 Reason

The value “14 x 103” Hz appeared in Table 7a of the 2008 Edition of the Radio Regulations. Table 7a was not included in the WRC-07 Final Acts.

When Appendix **7** was adopted in its current form by **WRC-2000**, the *reference bandwidth* for the frequency band 148.0-149.9 MHz had the value “4 x 103” Hz in all language versions.

## 4.3 Table 7c - Terrestrial station parameter symbols

### 4.3.1 Issue

In the Arabic version of the RR the column containing the parameter symbols is corrupted.

### 4.3.2 Proposal

The parameter symbols should be reinstated.

### 4.3.3 Reason

The parameter symbols should be visible in all language versions.

## 4.4 Table 7c - Frequency limits in the frequency band 24.65‑25.25 GHz

### 4.4.1 Issue

For the fixed-satellite service in the frequency band 24.65‑25.25 GHz, the Chinese version of the RR shows the frequency band limits as 24.75‑25.25 GHz.

### 4.4.2 Proposal

The frequency band limits should be 24.65‑25.25 GHz for all language versions.

### 4.4.3 Reason

The frequency band limits of 24.75‑25.25 GHz were modified by **WRC-12** to include 24.65‑24.75 GHz and therefore the indication in Table 7c should be 24.65‑25.25 GHz.

The change is shown in **WRC-12** documents 490, 504 and 538 (see table in § 1.3) as well as the **WRC-12** Final Acts but the modification was not included in the affected Radio Regulations language version. The frequency band limits remain 24.65‑25.25 GHz in Article **5** of the RR.

## 4.5 Table 8a – Indication of the method to be used

### 4.5.1 Issue

For the frequency band 460-470 MHz the method to be used for developing the coordination contour is stated to be found in § 1 in the Arabic version of the RR and in § 2.1 for all other languages versions.

### 4.5.2 Proposal

The method to be used for developing the coordination contour should be § 2.1 for all language versions**.**

### 4.5.3 Reason

Paragraph 1 of Appendix **7** (**Rev.WRC-15**) is limited to providing a general introduction of the scope and concepts of the Appendix. Identification of § 1 as containing the method to be used for developing the coordination contour first appeared in the 2016 Edition of the Radio Regulations. No modifications were made to Table 8a at **WRC-15** and no editorial corrections that affect the Appendix **7** System Parameter Tables are identified in **WRC-15** Document 502 (353, 388).

| Appendix 7 Tables | Minutes | Pinks | Blues | Plenary | To Com 7 |
| --- | --- | --- | --- | --- | --- |
| 7b, 8c, 9a and 9b | Doc 511 | Doc 464 | Doc 464 |  | Docs 320, 394 |
|  |  |  |  | Doc 502 | Docs 353, 388 |

Note: Pink documents correspond to WRC documents submitted to the plenary for second reading; Blue documents correspond to WRC documents submitted to the plenary for first reading.

## 4.6 Table 8a - The symbol associated with the unknown terrestrial station transmitter power

### 4.6.1 Issue

In the French and Spanish versions, the symbol associated with the unknown terrestrial station transmitter power is “Pr (p) (dBW) in B”, where B is the reference bandwidth. In all other language versions, the symbol associated with the unknown terrestrial station transmitter power is “Pt (dBW) in B”.

### 4.6.2 Proposal

The symbol associated with the unknown terrestrial station transmitter power should be “Pt (dBW) in B” for all language versions.

### 4.6.3 Reason

The tabulated information refers to transmitter power and “Pr (p) (dBW) in B” is the permissible interference power in the reference bandwidth, which is recorded in a different part of the table.

## 4.7 Table 8b - The value of the reference bandwidth B (Hz) in the frequency band 2.200‑2.290 GHz

### 4.7.1 Issue

For the Earth exploration-satellite service (GSO) in the frequency band 2.200-2.290 GHz the *reference bandwidth* has the value “103” Hz in the French and Spanish versions of the RR and “106” Hz in other language versions.

### 4.7.2 Proposal

The *reference bandwidth* should have the value “106” Hz in all language versions.

### 4.7.3 Reason

WRC-12 shows no modifications in Table 8b to the Earth exploration-satellite service (GSO) in the frequency band 2.200-2.290 GHz (see table in § 1.3).

The indication of “103” Hz for the *reference bandwidth* first appeared for one language version of WRC-12 Document 452, one of the editorial texts included in WRC-12 Document535 (see table in § 1.3). However the cell entry for the table in Document452 does not match the corresponding cell entry for that language in the 2008 Edition of the Radio Regulations and there are no revision marks to the *reference bandwidth* value in the table.

A value of “103” Hz for the *reference bandwidth* under the Earth exploration-satellite service in the frequency band 2.200-2.290 GHz appears in more than one language version of Table 8b in the 2012 Edition of the Radio Regulations.

## 4.8 Table 8c – Table note associated with the frequency band 8.025-8.400 GHz

### 4.8.1 Issue

For the Earth exploration satellite service in the band 8.025-8.400 GHz operating in a NGSO, the Chinese version of the RR references table note “6” (*In certain systems in the fixed-satellite service it may be desirable to choose a greater reference bandwidth B. However, a greater bandwidth will result in smaller coordination distances and a later decision to reduce the reference bandwidth may require recoordination of the earth station*). All other language versions reference table note *“*9*”* (*Non-geostationary satellite systems*)*.*

### 4.8.2 Proposal

All language versions should reference table note *“*9*”* (*Non-geostationary satellite systems*).

### 4.8.3 Reason

There are two column entries in Table 8c for the Earth exploration satellite service in the band 8.025-8.400 GHz. One column addresses GSO operation and the service is associated with table note “7” (*Geostationary-satellite systems*) and the methods contained in § 2.1 (*Earth stations operating with geostationary space stations*). The second column refers to the method contained in § 2.2 (*Earth stations operating with non-geostationary space stations*) and therefore the service should be associated with table note “9” (*Non-geostationary satellite systems*).

Further the entries in the band 8.025-8.400 GHz are for receive Earth stations in the Earth exploration satellite service and table note 6 refers to “*certain systems in the fixed-satellite service*”.

Table 8c was modified by WRC-15 but the modifications did not affect the Earth exploration satellite service in the band 8.025-8.400 GHz and no change is shown in WRC-15 Document 464 (see table in § 5.3) or in the WRC-15 Final Acts. There are no editorial changes that affect the Appendix 7 System Parameter Tables in WRC-15 Document 502 (353, 388).

## 4.9 Table 9a - Table note associated with the horizon antenna gain

### 4.9.1 Issue

In the French version of the RR the symbol Gr (dBi) (the *horizon antenna gain*) is associated with table note “2”, the *on-axis gain of the receive earth station antenna*. In all other language versions the symbol Gr (dBi) is associated with table note “4” *Horizon antenna gain for the receive earth station (refer to §3 of the main body of this Appendix)*.

### 4.9.2 Proposal

The symbol Gr (dBi) (*horizon antenna gain*) should reference table note “4” in all language versions.

### 4.9.3 Reason

The symbol Gr (dBi) (*horizon antenna gain*) should not be associated to a table note that defines it as the on-axis antenna gain.

The association of the symbol Gr (dBi) (*horizon antenna gain*) with table note “2” first appeared in one language version of WRC-12 Document390 (see table in § 1.3), although the cell entry for the table in Document390 does not match the corresponding cell entry for that language in the 2008 Edition of the Radio Regulations and there are no revision marks to the table note associated with the symbol Gr (dBi).

## 4.10 Table 9a - Receive earth station horizon antenna gain in the frequency band 0.401‑0.402GHz

### 4.10.1 Issue

The value of *horizon antenna gain* for the Earth exploration-satellite service/Meteorological-satellite service in the frequency band 0.401-0.402 GHz in the Spanish version of the RR is incorrect. In all other language versions the value of *horizon antenna gain* is in dBi.

### 4.10.2 Proposal

The value of *horizon antenna gain* for the Earth exploration-satellite service/Meteorological-satellite service in the frequency band 0.401-0.402 GHz should be aligned at 19 dBi in all language versions.

### 4.10.3 Reason

No modifications to the Table 9a entries for the Earth exploration-satellite service/Meteorological-satellite service in the frequency band 0.401-0.402 GHz are indicated in WRC-15 Documents 320, 394 and 464 (see table in § 5.3) or in the WRC-15 Final Acts. No editorial modifications that affect the Appendix 7 System Parameter Tables are indicated in WRC-15 Document 502 (353, 388).

## 4.11 Table 9a – the value of the reference bandwidth B (Hz) in the frequency band 1.670‑1.675 GHz

### 4.11.1 Issue

For the Mobile-satellite service in the frequency band 1.670-1.675 GHz where the receive Earth station is operating in the Meteorological-satellite service (NGSO), the *reference bandwidth* has the value “103” Hz in the Spanish version of the RR and “106” Hz in all other language versions.

### 4.11.2 Proposal

The *reference bandwidth* should have the value “106” Hz in all language versions.

### 4.11.3 Reason

No modifications to the Mobile-satellite service in the frequency band 1.670-1.675 GHz of Table 9a are shown in WRC-15 Document 464 (see table in § 5.3) or in the WRC-15 Final Acts. No editorial modifications that affect the Appendix 7 System Parameter Tables are shown in WRC-15 Document 502 (353, 388).

## 4.12 Table 9a - The table note associated with the horizon antenna gain in the frequency band 1.670‑1.675 GHz

### 4.12.1 Issues

#### 4.12.1.1 Issue 1

For the Mobile-satellite service in the frequency band 1.670-1.675 GHz, where the receive Earth station is operating in the Metrological-satellite service (GSO), the French version of the RR indicates the entry in the table for the *horizon antenna gain* has a value of 8 dBi. In all other language versions the entry is a reference to table note 8 (*Horizon antenna gain is calculated using the procedure of Annex 5. Where no value of Gm is specified, a value of 42 dBi is to be used*).

#### 4.12.1.2 Issue 2

For those language versions in § 4.12.1.1 where the entry in the table for the *horizon antenna gain* is a reference to table note 8, either the number “8”:

a) is displayed as superscript, in which case it is almost too small to distinguish; or,

b) has had its vertical character spacing position raised, in which case in the PDF version of the Radio Regulations it is impossible to distinguish if the cell entry is a value or a reference to a table note.

### 4.12.2 Proposals

#### 4.12.2.1 Proposal 1

The entry in the table for the *horizon antenna gain* should be a reference to table note 8 in all language versions.

#### 4.12.2.2 Proposal 2

Table notes should be easily identifiable irrespective of the publication format (see also the proposal in § 2.1).

### 4.12.3 Reason

For the affected Radio Regulations language versionthe entry in the table for the *horizon antenna gain* first appeared as a parameter in the 2016 Edition of the Radio Regulations.

WRC-15 made no modifications to the Mobile-satellite service in the frequency band 1.670-1.675 GHz of Table 9a and no change is shown in WRC-15 Document 464 (see table in § 5.3) or in the WRC-15 Final Acts. There were no editorial changes that affect the Appendix 7 System Parameter Tables in WRC‑15 Document 502 (353, 388).

Note: the assumptions in the method (see § 3.1.1 of Appendix **7** (**Rev.WRC-15**)) include that an unknown Earth station operating with a Space station in the GSO is at the same latitude as the coordinating Earth station, so a fixed value of *horizon antenna gain* towards the coordinating Earth station is not possible.

## 4.13 Table 9a - The table note associated with the horizon antenna gain in the frequency band 8.025‑8.400 GHz

### 4.13.1 Issues

#### 4.13.1.1 Issue 1

For the Fixed-satellite service in the frequency band 8.025-8.400 GHz, where the receive Earth station is operating in the Earth exploration-satellite service (GSO), some language versions of the RR indicate the entry in the table for the *horizon antenna gain* has a value of 8 dBi, in some other language versions the entry is a reference to table note 8 (*Horizon antenna gain is calculated using the procedure of Annex 5. Where no value of Gm is specified, a value of 42 dBi is to be used*).

#### 4.13.1.2 Issue 2

For those language versions in § 4.13.1.1 where the entry in the table for the *horizon antenna gain* is a reference to table note 8, either the number “8”:

a) is displayed as superscript, in which case it is almost too small to distinguish; or,

b) has had its vertical character spacing position raised, in which case in the PDF version of the Radio Regulations it is impossible to distinguish if the cell entry is a value or a reference to a table note.

### 4.13.2 Proposals

#### 4.13.2.1 Proposal 1

The entry in the table for the *horizon antenna gain* should be a reference to table note 8 in all language versions.

#### 4.13.2.2 Proposal 2

Table notes should be easily identifiable irrespective of the publication format (see also the proposal in § 2.1).

### 4.13.3 Reason

For one affected Radio Regulations language versionthe entry in the table for the *horizon antenna gain* first appeared as a parameter in the 2012 Edition of the Radio Regulations. In another affected Radio Regulations language version the *horizon antenna gain* first appeared as a parameter in the 2016 Edition of the Radio Regulations.

WRC-12 list no modifications to the Fixed-satellite service in the frequency band 8.025-8.400 GHz of Table 9a. However, the cell entry for the *horizon antenna gain* appeared as a value in one language version of WRC-12 Document 390 (see table in § 1.3). The entry for that cell of the table in WRC-12 Document 390 does not match the corresponding entry for that language in the 2008 Edition of the Radio Regulations and there is no clear indication of a revision to the cell entry (Note there is a format change but rejection of that change does not reinstate the cell entry in the 2008 Edition of the Radio Regulations).

WRC-15 made no modifications to the Fixed-satellite service in the frequency band 8.025-8.400 GHz of Table 9a and no change is shown in WRC-15 Document 464 (see table in § 5.3) or in the WRC-15 Final Acts. There were no editorial changes that affect the Appendix 7 System Parameter Tables in WRC-15 Document 502 (353, 388).

Note: the assumptions in the method (see § 3.1.1 of Appendix **7** (**Rev.WRC-15**)) include that an unknown Earth station operating with a Space station in the GSO is at the same latitude as the coordinating Earth station, so a fixed value of *horizon antenna gain* towards the coordinating Earth station is not possible.

## 4.14 Table 9b - The number of equivalent, equal level, equal probability entries of interference, assumed to be uncorrelated for small percentages of the time

### 4.14.1 Issue

The term *the number of equivalent, equal level, equal probability entries of interference, assumed to be uncorrelated for small percentages of the time* is represented by the symbol “N” in the English version of the RR and by the symbol “n” in all other language versions.

### 4.14.2 Proposal

The same symbol in all language versions (see § 1). See also § 2.2 for a generic change proposal to the symbol used for the term *the number of equivalent, equal level, equal probability entries of interference, assumed to be uncorrelated for small percentages of the time.*

### 4.14.3 Reason

The symbol “N” was first used in Table 9b for the term *“number of equivalent equal level, equal probability entries of interference, assumed to be uncorrelated for small percentages of the time”* in the WRC-15 Final Acts. However, WRC-15 documents show no change to the symbol and no indication of a request to change the symbol in the minutes of the Plenary (see table in § 5.3). There were also no editorial changes that affect the Appendix 7 System Parameter Tables in WRC‑15 Document 502 (353, 388).

## 4.15 Table 9b - Table note associated with the frequency band 19.3-19.6 GHz

### 4.15.1 Issue

For a transmitting Earth station in the fixed satellite service in the band 19.3‑19.6 GHz reference is made to table note 3 (for the case the receive Earth station is operating to a NGSO satellite) and to table note 4 (for the case the receive Earth station is operating to a GSO satellite) in the Chinese and Russian versions of the RR. In other language versions for a transmitting Earth station in the fixed satellite service in the band 19.3‑19.6 GHz reference is made to table note 3, irrespective of the receive Earth station operating to a GSO or NGSO satellite.

Table note 3 states *“Feeder links of non-geostationary satellite systems in the mobile‑satellite service”*.

Table note 4 states *“Geostationary‑satellite systems”*.

### 4.15.2 Proposal

For a transmitting Earth station in the fixed satellite service in the band 19.3‑19.6 GHz reference should be made to table note 3 in all language versions, irrespective of the receive Earth station operating to a GSO or NGSO satellite.

### 4.15.3 Reason

According to **No. 5.523B** “The use of the band 19.3-19.6 GHz (Earth-to-space) by the fixed-satellite service is limited to feeder links for non-geostationary-satellite systems in the mobile-satellite service” and therefore in both cases the reference with respect to the transmitting Earth station should be to table note 3, as the transmitting Earth station is operating to satellites in a Non-GSO irrespective of the orbital location of transmissions in the space-to Earth direction.

## 4.16 Table 9b - Table note associated with the frequency band 10.7-11.7 GHz

### 4.16.1 Issues

#### 4.16.1.1 Issue 1

For the Fixed-satellite service in the frequency band 10.7-11.7 GHz, where the receive Earth station is operating in the Fixed-satellite service (NGSO), the Russian version of the RR indicates the entry in the table for the *horizon antenna gain* is a reference to table note 10 (*Horizon antenna gain is calculated using the procedure of Annex 5, except that the following antenna pattern may be used in place of that given in §3 of Annex 3: G = 32 − 25 log φ for 1° ≤ φ < 48°; and G = −10 for 48° ≤ φ < 180° (refer to Annex 3 for definition of symbols).*). In all other language versions the entry has a value of 10 dBi.

#### 4.16.1.2 Issue 2

For the case in § 4.16.1.1 where the entry in the table for the *horizon antenna gain* is a reference to table note 10, the number “10” has had its vertical character spacing position raised, in which case in the PDF version of the Radio Regulations it is impossible to distinguish if the cell entry is a value or a reference to a table note.

### 4.16.2 Proposals

#### 4.16.2.1 Proposal 1

The entry in the table for the *horizon antenna gain* should be a value of 10 dBi in all language versions.

#### 4.16.2.2 Proposal 2

Table notes should be easily identifiable irrespective of the publication format (see also the proposal in Part I § 1).

### 4.16.3 Reason

For the affected Radio Regulations language versionthe entry in the table for the *horizon antenna gain* first appeared as a reference to a table note in the 2016 Edition of the Radio Regulations.

WRC-15 documents show no modifications to the Fixed-satellite service in the frequency band 8.025-8.400 GHz of Table 9a and no change is shown in WRC-15 Document 464 (see table in § 5.3). There were no editorial changes that affect the Appendix 7 System Parameter Tables in WRC-15 Document 502 (353, 388).

Note: when the unknown receive Earth station is operating with a Space station in a NGSO the method uses the *horizon antenna gain* of the receive Earth station (*Gr*) in place of the terrestrial station gain (*Gx*) in § 2.1.1 or § 2.2 as appropriate (see § 3.2.1 and § 3.2.3 of Appendix **7** (**Rev.WRC‑15**) and requires a fixed value of *horizon antenna gain*.

## 4.17 Table 9b - Table note associated with the frequency band 19.3-19.6 GHz

### 4.17.1 Issues

#### 4.17.1.1 Issue 1

For the Fixed-satellite service in the frequency band 19.3-19.6 GHz, where the receive Earth station is operating in the Fixed-satellite service (NGSO), the Arabic version of the RR indicates the entry in the table for the *horizon antenna gain* is a reference to table note 10 (*Horizon antenna gain is calculated using the procedure of Annex 5, except that the following antenna pattern may be used in place of that given in §3 of Annex 3: G = 32 − 25 log φ for 1° ≤ φ < 48°; and G = −10 for 48° ≤ φ < 180° (refer to Annex 3 for definition of symbols)*). In all other language versions the entry has a value of 10 dBi.

#### 4.17.1.2 Issue 2

For the case in § 4.17.1.1 where the entry in the table for the *horizon antenna gain* is a reference to table note 10, the number “10” has had its vertical character spacing position raised, in which case in the PDF version of the Radio Regulations it is impossible to distinguish if the cell entry is a value or a reference to a table note.

### 4.17.2 Proposals

#### 4.17.2.1 Proposal 1

The entry in the table for the *horizon antenna gain* should be a value of 10 dBi in all language versions.

#### 4.17.2.2 Proposal 2

Table notes should be easily identifiable irrespective of the publication format (see also the proposal in Part I, § 1).

### 4.17.3 Reason

For the affected Radio Regulations language versionthe entry in the table for the *horizon antenna gain* first appeared as a reference to a table note in the 2016 Edition of the Radio Regulations.

WRC-15 documents show no modifications to the Fixed-satellite service in the frequency band 19.3-19.6 GHz of Table 9b and no change is shown in WRC-15 Document 464 (see table in § 5.3). There were no editorial changes that affect the Appendix 7 System Parameter Tables in WRC-15 Document 502 (353, 388).

Note: when the unknown receive Earth station is operating with a Space station in a NGSO the method uses the *horizon antenna gain* of the receive Earth station (*Gr*) in place of the terrestrial station gain (*Gx*) in § 2.2 (see § 3.2.3 of Appendix **7** (**Rev.WRC‑15**) and requires a fixed value of *horizon antenna gain*.

## 4.18 Tables 7a,7c, 8a and 8b - Terrestrial station parameters

### 4.18.1 Issue

In the French version of the RR, the terrestrial station parameters of Tables 7a,7c, 8a and 8b are presented as earth station parameters, whereas the header is correctly translated in Tables 7c, 8c and 8d.

### 4.18.2 Proposal

The terrestrial station parameters of Tables 7a and 7c should be translated as in Table 7b. and those of Tables 8a and 8b as in Tables 8c and 8d.

### 4.18.3 Reason

Tables 7a and 7c contains parameters of terrestrial stations that may be affected by a transmitting earth station. Receiving parameters can therefore not be associated with earth stations.

Tables 8a and 8b parameters of terrestrial stations that may affect a receiving earth station. Transmitting parameters can therefore not be associated with earth stations.

System Parameter Tables 1-9 are proposed to be revised in accordance with the following table.

|  |  |
| --- | --- |
| Colour in Cell/Highlighted text | Meaning |
|  | Table cell contains a table note reference. |
| 3 | Text in red, with or without cell colour, indicates an inconsistency in the tables of one or more language versions of the Radio Regulations Edition 2016. |

# 5 Review of Tables 7a, 7b and 7c

TABLE 7a     (Rev.WRC‑12)

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 |  | 0.01 | |
| ***N*** | 1 |  |  |  | 2 | 2 | 2 | 2 |  | 2 | 2 | 2 | 2 | 2 |  | 2 | |
| *p* (%) | 1.0 |  |  |  | 0.005 | 0.005 | 0.005 | 0.005 |  | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 |  | 0.005 | |
| *NL* (dB) | – |  |  |  | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 |  | 0 | |
| *Ms* (dB) | – |  |  |  | 20 | 20 | 33 | 33 |  | 33 | 33 | 33 | 33 | 26 2 |  | 26 2 | |
| *W* (dB) | – |  |  |  | 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 |  | 49 2 | |
| *Te* (K) | – |  |  |  | 750 | 750 | 750 | 750 |  | 750 | 750 | 750 | 750 | 500 2 |  | 500 2 | |
| Reference bandwidth | *B* (Hz) | **4 × 103** |  |  |  | 12.5 × 103 | 12.5 × 103 | 4 × 103 | 106 |  | 4 × 103 | 106 | 4 × 103 | 106 | 4 × 103 |  | 4 × 103 | |
| Permissible interference power | *Pr*(*p*) (dBW) in *B* | −153 |  |  |  | −139 | −139 | −131 | −107 |  | −131 | −107 | −131 | −107 | −140 |  | −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. | | | | | | | | | | | | | | | | | |

TABLE 7b    (Rev.WRC‑15)

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Transmitting space radiocommunication  service designation | | Fixed-satellite, mobile-satellite | Aero-nautical mobile-satellite (R) service | Aero-nautical mobile-satellite (R) service | Fixed- satellite | Fixed- satellite | Fixed- satellite | Fixed- satellite | | Earth exploration-satellite, space  operation, space  research | | Fixed-satellite, mobile-satellite, meteorological- satellite | | Fixed- satellite | | Fixed- satellite | | Fixed- satellite | Fixed- satellite3 | Fixed- satellite | Fixed- satellite3 |
| Frequency bands (GHz) | | 2.655-2.690 | 5.030-5.091 | 5.030-5.091 | 5.091-5.150 | 5.091-5.150 | 5.725-5.850 | 5.725-7.075 | | 7.100-7.250 5 | | 7.900-8.400 | | 10.7-11.7 | | 12.5-14.8 | | 13.75-14.3 | 15.43-15.65 | 17.7-18.4 | 19.3-19.7 |
| Receiving terrestrial service designations | | Fixed, mobile | Aeronautical radio- navigation | Aeronautical mobile (R) | Aeronautical radio- navigation | Aeronautical mobile (R) | Radiolocation | Fixed, mobile | | Fixed, mobile | | Fixed, mobile | | Fixed, mobile | | Fixed, mobile | | Radiolocation radionavigation (land only) | Aeronautical radionavigation | Fixed, mobile | Fixed, mobile |
| Method to be used | | § 2.1 | § 2.1, § 2.2 | § 2.1, § 2.2 |  |  | § 2.1 | § 2.1 | | § 2.1, § 2.2 | | § 2.1 | | § 2.1 | | § 2.1, § 2.2 | | § 2.1 |  | § 2.1, § 2.2 | § 2.2 |
| Modulation at terrestrial  station 1 | | A |  |  |  |  |  | A | N | A | N | A | N | A | N | A | N | − |  | N | N |
| Terrestrial station interference parameters and criteria | *p*0 (%) | 0.01 |  |  |  |  |  | 0.01 | 0.005 | 0.01 | 0.005 | 0.01 | 0.005 | 0.01 | 0.005 | 0.01 | 0.005 | 0.01 |  | 0.005 | 0.005 |
| *n* | 2 |  |  |  |  |  | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 |  | 2 | 2 |
| *p* (%) | 0.005 |  |  |  |  |  | 0.005 | 0.0025 | 0.005 | 0.0025 | 0.005 | 0.0025 | 0.005 | 0.0025 | 0.005 | 0.0025 | 0.01 |  | 0.0025 | 0.0025 |
| *NL* (dB) | 0 |  |  |  |  |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 |
| *Ms* (dB) | 26 2 |  |  |  |  |  | 33 | 37 | 33 | 37 | 33 | 37 | 33 | 40 | 33 | 40 | 1 |  | 25 | 25 |
| *W* (dB) | 0 |  |  |  |  |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 |
| Terrestrial station parameters | *Gx* (dBi) 4 | 49 2 | 6 | 10 | 6 | 6 |  | 46 | 46 | 46 | 46 | 46 | 46 | 50 | 50 | 52 | 52 | 36 |  | 48 | 48 |
| *Te* (K) | 500 2 |  |  |  |  |  | 750 | 750 | 750 | 750 | 750 | 750 | 1 500 | 1 100 | 1 500 | 1 100 | 2 636 |  | 1 100 | 1 100 |
| Reference bandwidth | *B* (Hz) | 4 × 103 | 150 × 103 | 37.5 × 103 | 150 × 103 | 106 |  | 4 × 103 | 106 | 4 × 103 | 106 | 4 × 103 | 106 | 4 × 103 | 106 | 4 × 103 | 106 | 107 |  | 106 | 106 |
| Permissible interference power | *Pr*( *p*) (dBW) in *B* | −140 | −160 | −157 | −160 | −143 |  | −131 | −103 | −131 | −103 | −131 | −103 | −128 | −98 | −128 | −98 | −131 |  | −113 | −113 |
| 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 5 725‑7 075 MHz may also be used to determine a supplementary contour with the exception that *Gx* = 37 dBi.  3 Feeder links of non-geostationary satellite systems in the mobile‑satellite service.  4 Feeder losses are not included.  5 Actual frequency bands are 7 190-7 250 MHz for the Earth exploration-satellite service, 7 100-7 155 MHz and 7 190-7 235 MHz for the space operation service and 7 145‑7 235 MHz for the space research service. | | | | | | | | | | | | | | | | | | | | | |

TABLE 7c    (Rev.WRC‑12)

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

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Transmitting space radiocommunication service designation | | Fixed- satellite | Fixed- satellite2 | Fixed- satellite3 | Space research | Earth  exploration-satellite, space research | Fixed-satellite, mobile-satellite, radionavigation-satellite | Fixed- satellite2 | |
| Frequency bands (GHz) | | **24.65-25.25 27.0-29.5** | 28.6-29.1 | 29.1-29.5 | 34.2-34.7 | 40.0-40.5 | 42.5-47 47.2-50.2 50.4-51.4 | 47.2-50.2 | |
| Receiving terrestrial  service designations | | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile, radiolocation | Fixed, mobile | Fixed, mobile, radionavigation | Fixed, mobile | |
| Method to be used | | § 2.1 | § 2.2 | § 2.2 |  | § 2.1, § 2.2 | § 2.1, § 2.2 | § 2.2 | |
| Modulation at terrestrial station1 | | N | N | N |  | N | N | N | |
| Terrestrial station interference parameters and criteria | ***p*0 (%)** | 0.005 | 0.005 | 0.005 |  | 0.005 | 0.005 | 0.001 | |
| ***n*** | 1 | 2 | 1 |  | 1 | 1 | 1 | |
| ***p* (%)** | 0.005 | 0.0025 | 0.005 |  | 0.005 | 0.005 | 0.001 | |
| ***NL* (dB)** | 0 | 0 | 0 |  | 0 | 0 | 0 | |
| ***Ms* (dB)** | 25 | 25 | 25 |  | 25 | 25 | 25 | |
| ***W* (dB)** | 0 | 0 | 0 |  | 0 | 0 | 0 | |
| Terrestrial station parameters | ***Gx* (dBi) 4** | 50 | 50 | 50 |  | 42 | 42 | 46 | |
| ***Te* (K)** | 2 000 | 2 000 | 2 000 |  | 2 600 | 2 600 | 2 000 | |
| Reference bandwidth | ***B* (Hz)** | 106 | 106 | 106 |  | 106 | 106 | 106 | |
| Permissible interference power | ***Pr*( *p*) (dBW) in *B*** | −111 | −111 | −111 |  | −110 | −110 | −111 | |
| 1 A: analogue modulation; N: digital modulation.  2 Non-geostationary satellites in the fixed-satellite service.  3 Feeder links to non-geostationary-satellite systems in the mobile-satellite service.  4 Feeder losses are not included. | | | | | | | | |

# 6 Review of Tables 8a, 8b, 8c and 8d

TABLE 8a     (Rev.WRC‑12)

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Receiving space radiocommunication service designation | | | Space operation, space research | Meteoro-logical- satellite, mobile-satellite | | Space research | Space research, space operation | Space operation | Mobile-satellite | Meteoro-logical-satellite | Mobile-satellite | Space research | Space operation | Meteoro-logical- satellite | Broad-casting- satellite | Mobile-satellite | Broadcasting- satellite (DAB) | Mobile-satellite, land-mobile satellite, maritime mobile-satellite |
| Frequency bands (MHz) | | | 137-138 | 137-138 | | 143.6-143.65 | 174-184 | 163-167 272-2735 | 335.4-399.9 | 400.15-401 | 400.15-401 | 400.15-401 | 401-402 | 460-470 | 620-790 | 856-890 | 1 452-1 492 | 1 518-1 530 1 555-1 559 2 160-2 2001 |
| Transmitting terrestrial  service designations | | | Fixed, mobile | Fixed, mobile | | Fixed, mobile, radio-location | Fixed, mobile, broad-casting | Fixed, mobile | Fixed, mobile | Meteoro-logical  aids | Meteoro- logical  aids | Meteoro-logical  aids | Meteoro-logical aids, fixed, mobile | Fixed, mobile | Fixed, mobile, broad-casting | Fixed, mobile, broad casting | Fixed, mobile, broadcasting | Fixed, mobile |
| Method to be used | | | § 2.1 | § 2.1 | | § 2.1 | § 2.1 | § 2.1 | § 1.4.6 | § 1.4.6 | § 1.4.6 | – | § 2.1 | **§ 2.1** | § 1.4.5 | § 1.4.6 | § 1.4.5 | § 1.4.6 |
| Modulation at earth station2 | | | N |  | | N |  | N |  |  |  | N | N |  |  |  | N | N |
| Earth station interference parameters and criteria | *p*0 (%) |  | 0.1 | |  | 0.1 |  | 1.0 |  | 0.012 |  | 0.1 | 0.1 | 0.012 |  |  |  | 10 |
| *n* |  | 2 | |  | 2 |  | 1 |  | 1 |  | 2 | 2 | 1 |  |  |  | 1 |
| *p* (%) |  | 0.05 | |  | 0.05 |  | 1.0 |  | 0.012 |  | 0.05 | 0.05 | 0.012 |  |  |  | 10 |
| *NL* (dB) |  | 0 | |  | 0 |  | 0 |  | 0 |  | 0 | 0 |  |  |  |  | 0 |
| *Ms* (dB) |  | 1 | |  | 1 |  | 1 |  | 4.3 |  | 1 | 1 |  |  |  |  | 1 |
| *W* (dB) |  | 0 | |  | 0 |  | 0 |  | 0 |  | 0 | 0 |  |  |  |  | 0 |
| Terrestrial station parameters | *E* (dBW) in *B* 3 | A | – | |  | – |  | 15 |  |  |  | – | – | 5 |  |  | 38 | 374 |
| N | – | |  | – |  | 15 |  |  |  | – | – | 5 |  |  | 38 | 37 |
| *Pt* (dBW)  in *B* | A | – | |  | – |  | –1 |  |  |  | – | – | –11 |  |  | 3 | 0 |
| N | – | |  | – |  | –1 |  |  |  | – | – | –11 |  |  | 3 | 0 |
| *Gx* (dBi) |  | – | |  | – |  | 16 |  |  |  | – | – | 16 |  |  | 35 | 37 |
| Reference bandwidth | *B* (Hz) |  | 1 | |  | 1 |  | 103 |  | 177.5 × 103 |  | 1 | 1 | 85 |  |  | 25 × 103 | 4 × 103 |
| Permissible interference power | *Pr*( *p*) (dBW) in *B* |  | −199 | |  | −199 |  | −173 |  | −148 |  | −208 | −208 | −178 |  |  |  | −176 |
| 1 In the band 2 160-2 200 MHz, the terrestrial station parameters of line-of-sight radio-relay systems have been used. If an administration believes that, in this band transhorizon systems need to be considered, the parameters associated with the frequency band 2 500-2 690 MHz may be used to determine the coordination area.  2 A: analogue modulation; N: digital modulation.  3 *E* is defined as the equivalent isotropically radiated power of the interfering terrestrial station in the reference bandwidth.  4 This value is reduced from the nominal value of 50 dBW for the purposes of determination of coordination area, recognizing the low probability of high power emissions falling fully within the relatively narrow bandwidth of the earth station.  5 The fixed-service parameters provided in the column for 163-167 MHz and 272-273 MHz are only applicable to the band 163-167 MHz. | | | | | | | | | | | | | | | | | | | |

TABLE 8b    (Rev.WRC‑12)

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Receiving space radiocommunication service designation | | | | Space operation (GSO and non-GSO) | Meteoro-logical- satellite (non-GSO) | Meteoro-logical- satellite (GSO) | Space research near-Earth (non-GSO and  GSO) | | Space research deep space (non-GSO) | Space operation (non-GSO  and GSO) | Earth exploration- satellite (GSO) | Broadcasting- satellite | Mobile-satellite, radio- determination- satellite | Fixed-satellite, broadcasting satellite | | Fixed-satellite | |
|  | | | |  |  |  | Unmanned | Manned |  |  |  |  |  |  | |  | |
| Frequency bands (GHz) | | | | 1.525-1.535 | 1.670-1.710 | 1.670-1.710 | 1.700-1.710 2.200-2.290 | | 2.290-2.300 | 2.200-2.290 | 2.200-2.290 | 2.310-2.360 | 2.4835-2.5006 | 2.500-2.690 | | 3.400-4.200 | |
| Transmitting terrestrial  service designations | | | | Fixed | Fixed, mobile, meteoro-logical aids | Fixed, mobile, meteoro- logical  aids | Fixed, mobile | | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile, radiolocation | Fixed, mobile, radiolocation | Fixed, mobile radiolocation | | Fixed, mobile | |
| Method to be used | | | | § 2.1, § 2.2 | § 2.2 and1 | § 2.1 and1 | § 2.1, § 2.2 | | § 2.2 | § 2.1, § 2.2 | § 2.1 | § 1.4.5 | § 1.4.6 | § 1.4.5 and § 2.1 | | § 2.1 | |
| Modulation at earth station2 | | | | N | N | N | N | | N | N | N |  | N | A | N | A | N |
| Earth station interference parameters and criteria | | *p*0 (%) | | 1.0 | 0.006 | 0.011 | 0.1 | 0.001 | 0.001 | 1.0 | 1.0 |  | 10 | 0.03 | 0.003 | 0.03 | 0.005 |
| *n* | | 1 | 3 | 2 | 2 | 1 | 1 | 2 | 2 |  | 1 | 3 | 3 | 3 | 3 |
| *p* (%) | | 1.0 | 0.002 | 0.0055 | 0.05 | 0.001 | 0.001 | 0.5 | 0.5 |  | 10 | 0.01 | 0.001 | 0.01 | 0.0017 |
| *NL* (dB) | | 0 | 0 | 0 | 0 | | 0 | 0 |  |  | 0 | 1 | 1 | 1 | 1 |
| *Ms* (dB) | | 1 | 2.8 | 0.9 | 1 | | 0.5 | 1 |  |  | 1 | 7 | 2 | 7 | 2 |
| *W* (dB) | | 0 | 0 | 0 | 0 | | 0 | 0 |  |  | 0 | 4 | 0 | 4 | 0 |
| Terrestrial station parameters | | *E* (dBW) in *B*3 | A | 50 | 924 | 924 | −274,5 | | −275 | 72 | 724 |  | 37 | 724 | 724 | 55 | 55 |
| N | 37 | – | – | –27 | | −27 | 76 | 76 |  | 37 | 76 | 76 | 42 | 42 |
| *Pt* (dBW)  in *B* | A | 13 | 404 | 404 | −714,5 | | −715 | 28 | 284 |  | 0 | 284 | 284 | 13 | 13 |
| N | 0 | – | – | −71 | | −71 | 32 | 32 |  | 0 | 32 | 32 | 0 | 0 |
| *Gx* (dBi) | | 37 | 52 | 52 | 44 | | 44 | 44 | 44 |  | 37 | 44 | 44 | 42 | 42 |
| Reference bandwidth | | *B* (Hz) | | 103 | 106 | 4 × 103 | 1 | | 1 | 106 | **106** |  | 4 × 103 | 106 | 106 | 106 | 106 |
| Permissible interference power | | *Pr*( *p*) (dBW) in *B* | | −184 | −142 | −177 | −216 | | −222 | −154 | −154 |  | −176 |  |  |  |  |
| 1 See Table 10.  2 A: analogue modulation; N: digital modulation.  3 *E* is defined as the equivalent isotropically radiated power of the interfering terrestrial station in the reference bandwidth.  4 In this band, the parameters for the terrestrial stations associated with transhorizon systems have been used. If an administration believes that transhorizon systems do not need to be considered, the line-of-sight radio-relay parameters associated with the frequency band 3.4‑4.2 GHz may be used to determine the coordination area, with the exception that *E* = 50 dBW for analogue terrestrial stations; and *Gx* = 37 dBi. However, for the space research service only, noting footnote 5 when transhorizon systems are not considered, *E* = 20 dBW and *Pt* = −17 dBW for analogue terrestrial stations, *E* = −23 dBW and *Pt* = −60 dBW for digital terrestrial stations; and *Gx* = 37 dBi.  5 These values are estimated for 1 Hz bandwidth and are 30 dB below the total power assumed for emission.  6 In the band 2.4835-2.5 GHz the terrestrial station parameters of line-of-sight radio-relay systems have been used. If an administration believes that, in this band, transhorizon systems need to be considered, the parameters associated with the frequency band 2 500-2 690 MHz may be used to determine the coordination area. | | | | | | | | | | | | | | | | | |

TABLE 8c    (Rev.WRC‑15)

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Receiving space radiocommunication service designation** | | | **Fixed-satellite** | | **Fixed-satellite, radio- determination satellite** | **Fixed-satellite** | **Fixed- satellite** | | **Meteoro- logical-satellite**7,8 | **Meteoro- logical-satellite**9 | **Earth exploration- satellite**7 | **Earth exploration- satellite9** | **Space research**10 | | **Fixed-satellite** | | **Broadcasting-satellite** | | **Broadcasting-satellite** | **Fixed-satellite**7 |
|  | | |  | |  |  |  | |  |  |  |  | Deep space |  |  | |  | |  |  |
| Frequency bands (GHz) | | | 4.500-4.800 | | 5.150-5.216 | 6.700-7.075 | 7.250-7.750 | | 7.450-7.550 | 7.750-7.900 | 8.025-8.400 | 8.025-8.400 | 8.400-8.450 | 8.450-8.500 | 10.7-12.75 13.4-13.67 | | 12.5-12.7512 | | 17.7-17.8 | 17.7-18.8 19.3-19.7 |
| Transmitting terrestrial  service designations | | | Fixed, mobile | | Aeronautical radionavigation | Fixed, mobile | Fixed, mobile | | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile | | Fixed, mobile | | Fixed, mobile | | Fixed | Fixed, mobile |
| Method to be used | | | § 2.1 | | § 2.1 | § 2.2 | § 2.1 | | § 2.1, § 2.2 | § 2.2 | § 2.1 | § 2.2 | § 2.2 | | § 2.1, § 2.2 | | § 1.4.5 | | § 1.4.5 | § 2.1 |
| Modulation at earth  station1 | | | A | N |  | N | A | N | N | N | N | N | N | N | A | N | A | N |  | N |
| Earth station interference parameters and criteria | *p*0 (%) | | 0.03 | 0.005 |  | 0.005 | 0.03 | 0.005 | 0.002 | 0.001 | 0.083 | 0.011 | 0.001 | 0.1 | 0.03 | 0.003 | 0.03 | 0.003 |  | 0.003 |
| *n* | | 3 | 3 |  | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 1 |  | 2 |
| *p* (%) | | 0.01 | 0.0017 |  | 0.0017 | 0.01 | 0.0017 | 0.001 | 0.0005 | 0.0415 | 0.0055 | 0.001 | 0.05 | 0.015 | 0.0015 | 0.03 | 0.003 |  | 0.0015 |
| *NL* (dB) | | 1 | 1 |  | 1 | 1 | 1 | – | – | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |  | 1 |
| *Ms* (dB) | | 7 | 2 |  | 2 | 7 | 2 | – | – | 2 | 4.7 | 0.5 | 1 | 7 | 4 | 7 | 4 |  | 6 |
| *W* (dB) | | 4 | 0 |  | 0 | 4 | 0 | – | – | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 0 |  | 0 |
| Terrestrial station parameters | *E* (dBW) in *B*2 | A | 923 | 923 |  | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 255 | 255 | 40 | 40 | 55 | 55 |  | 35 |
| N | 424 | 424 |  | 42 | 42 | 42 | 42 | 42 | 42 | 42 | −18 | −18 | 43 | 43 | 42 | 42 | 40 | 40 |
| *Pt* (dBW)  in *B* | A | 403 | 403 |  | 13 | 13 | 13 | 13 | 13 | 13 | 13 | −175 | −175 | −5 | −5 | 10 | 10 |  | −10 |
| N | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | −60 | −60 | −2 | −2 | −3 | −3 | −7 | −5 |
| *Gx* (dBi) | | 523, 4 | 523, 4 |  | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 45 | 45 | 45 | 45 | 47 | 45 |
| Reference band- width6 | *B* (Hz) | | 106 | 106 |  | 106 | 106 | 106 | 107 | 107 | 106 | 106 | 1 | 1 | 106 | 106 | 27 × 106 | 27 × 106 |  | 106 |
| Permissible interference power | *Pr*( *p*) (dBW) in *B* | |  |  |  | −151.2 |  |  | −125 | −125 | −15411 | −142 | −220 | −216 |  |  | −131 | −131 |  |  |

*Notes to Table 8c*:

1 A: analogue modulation; N: digital modulation.

2 *E* is defined as the equivalent isotropically radiated power of the interfering terrestrial station in the reference bandwidth.

3 In this band, the parameters for the terrestrial stations associated with transhorizon systems have been used. If an administration believes that transhorizon systems do not need to be considered, the line-of-sight radio-relay parameters associated with the frequency band 3.4-4.2 GHz may be used to determine the coordination area.

4 Digital systems assumed to be non-transhorizon. Therefore *Gx* = 42.0 dBi. For digital transhorizon systems, parameters for analogue transhorizon systems above have been used.

5 These values are estimated for 1 Hz bandwidth and are 30 dB below the total power assumed for emission.

6 In certain systems in the fixed-satellite service it may be desirable to choose a greater reference bandwidth *B*. However, a greater bandwidth will result in smaller coordination distances and a later decision to reduce the reference bandwidth may require recoordination of the earth station.

7 Geostationary-satellite systems.

8 Non-geostationary satellites in the meteorological-satellite service notified in accordance with No. **5.461A** may use the same coordination parameters.

9 Non-geostationary satellite systems.

10 Space research earth stations in the frequency band 8.4-8.5 GHz operate with non-geostationary satellites.

11 For large earth stations: *Pr*(*p*) = (*G* − 180) dBW

For small earth stations: *Pr*(20%) = 2 (*G* − 26) − 140 dBW for  26 < *G* ≤ 29 dBi

*Pr*(20%) = *G* − 163 dBW for          *G*  29 dBi

*Pr*(*p*)% = *G* − 163 dBW for          *G* ≤ 26 dBi

12 Applies to the broadcasting-satellite service in unplanned bands in Region 3.

TABLE 8d     (Rev.WRC‑12)

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

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

# 7 Review of Tables 9a and 9b

TABLE 9a    (Rev.WRC‑15)

**Parameters required for the determination of coordination distance for a transmitting earth station  
in bands shared bidirectionally with receiving earth stations**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Space service designation  in which the transmitting  earth station operates** | | **Mobile-satellite** | **Earth  exploration-satellite, meteorological-satellite** | **Mobile-satellite** | | **Fixed-satellite, mobile-satellite** | **Aeronautical mobile-satellite (R) service** | | **Fixed- satellite**3 | | **Fixed-satellite** | **Fixed-satellite, meteorological-satellite** | **Fixed-satellite** |
| Frequency bands (GHz) | | 0.272-0.273 | 0.401-0.402 | 1.670‑1.675 | | 2.655-2.690 | 5.030-5.091 | | 5.150-5.216 | | 6.700-7.075 | 8.025-8.400 | 8.025-8.400 |
| Space service designation in which the *receiving* earth station operates | | Space operation | Space operation | Meteorological-satellite | | Fixed-satellite, broadcasting-satellite | Aeronautical mobile-satellite (R) service | | Fixed-satellite | Radiodetermination-satellite | Fixed-satellite | Earth  exploration- satellite | Earth exploration- satellite |
| Orbit6 | | Non-GSO | Non-GSO | Non-GSO | GSO |  | Non-GSO | GSO | Non-GSO |  | Non-GSO | Non-GSO | GSO |
| Modulation at *receiving* earth station1 | | N | N | N | N |  |  |  |  |  | N | N | N |
| Receiving earth station interference parameters and criteria | *p*0 (%) | 1.0 | 0.1 | 0.006 | 0.011 |  |  |  |  |  | 0.005 | 0.011 | 0.083 |
| *n* | 1 | 2 | 3 | 2 |  |  |  |  |  | 3 | 2 | 2 |
| *p* (%) | 1.0 | 0.05 | 0.002 | 0.0055 |  |  |  |  |  | 0.0017 | 0.0055 | 0.0415 |
| *NL* (dB) | 0 | 0 | 0 | 0 |  |  |  |  |  | 1 | 0 | 1 |
| *Ms* (dB) | 1 | 1 | 2.8 | 0.9 | 2 |  |  | 2 | 2 | 2 | 4.7 | 2 |
| *W* (dB) | 0 | 0 | 0 | 0 |  |  |  |  |  | 0 | 0 | 0 |
| Receiving earth station parameters | *Gm* (dBi) 2 | 20 | 20 | 30 | 45 |  | 45 | 45 | 48.5 |  | 50.7 |  |  |
| ***Gr* (dBi) 4** | 19 | **19** | 19 9 | **8** |  | 8 | 8 | 10 |  | 10 | 10 | **8** |
| ε*min* 5 | 10° | 10° | 5° | 3° | 3° | 10° | 10° | 3° | 3° | 3° | 5° | 3° |
| *Te* (K) 7 | 500 | 500 | 370 | 118 | 75 | 340 | 340 | 75 | 75 | 75 |  |  |
| Reference bandwidth | *B* (Hz) | 103 | 1 | **106** | 4 × 103 |  | 37.5 × 103 | 37.5 × 103 |  |  | 106 | 106 | 106 |
| Permissible interference power | *Pr*( *p*) (dBW) in *B* | −177 | −208 | −145 | −178 |  | −163.5 | −163.5 |  |  | −151 | −142 | −154 |

*Notes to Table 9a*:

1 A: analogue modulation; N: digital modulation.

2 On-axis gain of the receive earth station antenna.

3 Feeder links of non-geostationary-satellite systems in the mobile‑satellite service.

4 Horizon antenna gain for the receive earth station (refer to § 3 of the main body of this Appendix).

5 Minimum elevation angle of operation in degrees (non-geostationary or geostationary).

6 Orbit of the space service in which the receiving earth station operates (non-geostationary or geostationary).

7 The thermal noise temperature of the receiving system at the terminal of the receiving antenna (under clear-sky conditions). Refer to § 2.1 of this Annex for missing values.

8 Horizon antenna gain is calculated using the procedure of Annex 5. Where no value of *Gm* is specified, a value of 42 dBi is to be used.

9 Non-geostationary horizon antenna gain, *Ge* = *Gmin* + 20 dB (see § 2.2), with *Gmin* = 10 – 10 log (*D*/), *D*/ = 13 (refer to Annex 3 for definition of symbols).

**10 Unmanned space research is not a separate radiocommunication service and the system parameters are only to be used for the generation of supplementary contours.**

TABLE 9b    (Rev.WRC‑15)

**Parameters required for the determination of coordination distance for a transmitting earth station  
in bands shared bidirectionally with receiving earth stations**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Space service designation  in which the transmitting earth station operates** | | **Fixed-satellite** | | | **Fixed-satellite** | | | **Fixed-satellite** | **Fixed-satellite** | **Fixed- satellite**3 | **Fixed- satellite3** | **Earth exploration- satellite, space research** | |
| Frequency bands (GHz) | | 10.7-11.7 | | | 12.5-12.75 | | | 17.3-17.8 | 17.7-18.4 | 19.3-19.6 | 19.3-19.6 | 40.0-40.5 | |
| Space service designation in which the *receiving* earth station operates | | Fixed-satellite | | | Fixed-satellite | | | Broadcasting-satellite | Fixed-satellite, meteorological- satellite | Fixed-satellite3 | Fixed-satellite4 | Fixed-satellite, mobile‑satellite | |
| Orbit7 | | GSO | | Non-GSO | GSO | | Non-GSO |  | GSO | Non-GSO | GSO | GSO | Non-GSO |
| Modulation at *receiving* earth station1 | | A | N | N | A | N |  |  | N | N |  |  |  |
| Receiving earth station interference parameters and criteria | *p*0 (%) | 0.03 | 0.003 | | 0.03 | 0.003 | |  | 0.003 | 0.01 | 0.003 | 0.003 | |
| ***N*** | 2 | 2 | | 2 | 2 | |  | 2 | 1 | 2 | 2 | |
| *p* (%) | 0.015 | 0.0015 | | 0.015 | 0.0015 | |  | 0.0015 | 0.01 | 0.0015 | 0.0015 | |
| *NL* (dB) | 1 | 1 | | 1 | 1 | |  | 1 | 0 | 1 | 1 | |
| *Ms* (dB) | 7 | 4 | | 7 | 4 | |  | 6 | 5 | 6 | 6 | |
| *W* (dB) | 4 | 0 | | 4 | 0 | |  | 0 | 0 | 0 | 0 | |
| Receiving earth station parameters | *Gm* (dBi)2 |  |  | 51.9 |  |  | 31.2 |  | 58.6 | 53.2 | 49.5 | 50.8 | 54.4 |
| ***Gr* 5** | 9 | 9 | **10** | 9 | 9 | 1111 |  | 9 | **10** | 10 | 9 | 712 |
| ε*min*6 | 5° | 5° | 6° | 5° | 5° | 10° |  | 5° | 5° | 10° | 10° | 10° |
| *Te* (K)8 | 150 | 150 | | 150 | 150 | |  | 300 | 300 | 300 | 300 | |
| Reference bandwidth | *B* (Hz) | 106 | 106 | | 106 | 106 | |  | 106 | 106 |  |  | |
| Permissible interference power | *Pr*( *p*) (dBW)  in *B* | −144 | −144 | −144 | −144 | −144 | −144 |  | −138 | −141 |  |  | |

*Notes to Table 9b*:

1 A: analogue modulation; N: digital modulation.

2 On-axis gain of the receive earth station antenna.

3 Feeder links of non-geostationary satellite systems in the mobile‑satellite service.

4 Geostationary‑satellite systems.

5 Horizon antenna gain for the receive earth station (refer to § 3 of the main body of the Appendix).

6 Minimum elevation angle of operation in degrees (non-GSO or GSO).

7 Orbit of the space service in which the receiving earth station operates (GSO or non-GSO).

8 The thermal noise temperature of the receiving system at the terminal of the receiving antenna (under clear-sky conditions). Refer to § 2.1 of this Annex for missing values.

9 Horizon antenna gain is calculated using the procedure of Annex 5. Where no value of *Gm* is specified, a value of 42 dBi is to be used.

10 Horizon antenna gain is calculated using the procedure of Annex 5, except that the following antenna pattern may be used in place of that given in § 3 of Annex 3: *G* = 32 − 25 log φ for 1° ≤ φ < 48°; and *G* = −10 for 48° ≤ φ < 180° (refer to Annex 3 for definition of symbols).

11 Non-geostationary horizon antenna gain. *Ge* = *Gmax* (see § 2.2 of the main body of this Appendix) for *G* = 36 − 25 log (φ) > −6 (refer to Annex 3 for definition of symbols).

12 Non-geostationary horizon antenna gain. *Ge* = *Gmax* (see § 2.2 of the main body of this Appendix) for *G* = 32 − 25 log (φ) > −10 (refer to Annex 3 for definition of symbols).

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

1. Prior to revision of Appendix **7** at WRC-2000, Table 10 of Appendix **7** was part of Appendix **S5**. [↑](#footnote-ref-1)
2. As used in Recommendation ITU-R SM.1448-0 that formed the basis for the text of Appendix **7**. [↑](#footnote-ref-2)
3. Appendix **7** (**Rev.WRC-15**) was based on Recommendation ITU-R SM. 1448-0 [↑](#footnote-ref-3)
4. Appendix **28** covered the frequency range 1-40 GHz, Appendix **7** covers the frequency range 100 MHz - 100 GHz. [↑](#footnote-ref-4)
5. 6 The same procedures are also used to develop supplementary and auxiliary contours (see Annex 6). [↑](#footnote-ref-5)