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## Radiocommunication Bureau (BR)

Administrative Circular  
**CACE/1065**

23 June 2023

**To Administrations of Member States of the ITU, Radiocommunication Sector Members,  
ITU-R Associates participating in the work of Radiocommunication Study Group 3  
and ITU Academia**

Subject: **Radiocommunication Study Group 3 (Radiowave Propagation)**

- **Proposed adoption of 15 draft revised ITU-R Recommendations and their simultaneous approval by correspondence in accordance with § A2.6.2.4 of Resolution ITU-R 1-8 (Procedure for the simultaneous adoption and approval by correspondence)**

At the meeting of Radiocommunication Study Group 3, held on 2 June 2023, the Study Group decided to seek adoption of 15 draft revised ITU-R Recommendations by correspondence (§ A2.6.2 of Resolution ITU-R 1-8) and further decided to apply the procedure for simultaneous adoption and approval by correspondence (PSAA, § A2.6.2.4 of Resolution ITU-R 1-8). The titles and summaries of the draft Recommendations are given in the Annex to this letter. Any Member State raising an objection to the adoption of a draft Recommendation is requested to inform the Director and the Chairman of the Study Group of the reasons for the objection.

The consideration period shall extend for 2 months ending on 23 August 2023. If within this period no objections are received from Member States, the draft Recommendations shall be considered to be adopted by Study Group 3. Furthermore, since the PSAA has been followed, the draft Recommendations shall also be considered as approved.

After the above-mentioned deadline, the results of the above procedures will be announced in an Administrative Circular and the approved Recommendations will be published as soon as practicable (see [www.itu.int/pub/R-REC](http://www.itu.int/pub/R-REC)).

Any ITU member organization aware of a patent held by itself or others which may fully or partly cover elements of the draft Recommendations mentioned in this letter is requested to disclose such information to the Secretariat as soon as possible. The Common Patent Policy for ITU-T/ITU-R/ISO/IEC is available at [www.itu.int/en/ITU-T/ipr/Pages/policy.aspx](http://www.itu.int/en/ITU-T/ipr/Pages/policy.aspx).

Mario Maniewicz  
Director

**Annex:** Titles and summaries of the draft Recommendations

**Documents:** Documents 3/106(Rev.1), 3/107(Rev.1), 3/108(Rev.1), 3/114 (Rev.1), 3/115(Rev.1), 3/117(Rev.1), 3/118(Rev.1), 3/119(Rev.1), 3/120(Rev.1), 3/121(Rev.1), 3/122(Rev.1), 3/123(Rev.1), 3/124(Rev.1), 3/126(Rev.1) and 3/129(Rev.1)

These documents are available in electronic format at: [www.itu.int/md/R19-SG03-C/en](http://www.itu.int/md/R19-SG03-C/en)

## Annex

### Titles and summaries of the draft ITU-R Recommendations

Draft revision of Recommendation ITU-R P.371-8

Doc. 3/106(Rev.1)

#### Choice of indices for long-term ionospheric predictions

On 1<sup>st</sup> July 2015, the World Data Center SILSO replaced the sunspot number series by a new improved version. This draft revision of Recommendation ITU-R P.371-8 revises accordingly the method to derive the sunspot number in § 2.

Draft revision of Recommendation ITU-R P.1239-3

Doc. 3/107(Rev.1)

#### ITU-R reference ionospheric characteristics

On 1<sup>st</sup> July 2015, the World Data Center SILSO replaced the sunspot number series by a new improved version. This draft revision of Recommendation ITU-R P.1239-3 clarifies the convention used to compute the twelve-month running mean value of the monthly sunspot numbers,  $R_{12}$ .

Draft revision of Recommendation ITU-R P.531-14

Doc. 3/108(Rev.1)

#### Ionospheric propagation data and prediction methods required for the design of satellite networks and systems

This document presents the changes proposed to Recommendation ITU-R P.531-14.

##### 1 Draft modification of § 5.4.1

Where the Nakagami “ $m$ -coefficient” is related to the scintillation index,  $S_4$ , by:

$$m = \exp(5.69 * \exp(-3.055 * S_4) + 0.292 * \exp(0.344 * S_4)) \quad (8)$$

where  $0.1 \leq S_4 \leq 1.0$

##### 2 Draft modification of § 5.6

$$m_i = \exp(5.69 * \exp(-3.055 * S_{4i}) + 0.292 * \exp(0.344 * S_{4i})) \quad (11e)$$

##### 3 Added Abbreviations/Glossary and a list of related Recommendations/Reports.

## **Attenuation due to clouds and fog**

This draft revision of Recommendation ITU-R P.840-8 revises the Scope and *recommends* and proposes new prediction methods to compute cloud attenuation.

The proposed revision provides instantaneous (§ 3.1) and statistical (§ 3.2) prediction methods for the slant path cloud attenuation as well as an approximation (§ 3.3) to the slant path cloud attenuation approximated by a log-normal probability distribution used by Recommendation ITU-R P.1853. The statistical prediction methods can use the digital maps in (§ 4).

## **Effects of building materials and structures on radiowave propagation above about 100 MHz**

This revision updates section 2.2.2.1 and Attachment 1 of Recommendation ITU-R P.2040-2 modelling plane wave reflection and transmission for a multi-layer slab. Section 2.2.2.1 is updated by:

- Replacing the four recurrence relations reported in equations (40a) – (40d) by a single equation describing the reflection coefficients at the interfaces of the multi-layer slab.
- Correcting the transmission coefficient formulations reported in equations (42c) and (42d).

Attachment 1 is updated by correcting the transmission coefficient formulation given in equation (60b).

In updating section 2.2.2.1, Maxwell's equations are exploited in re-deriving equations (40a) – (40d) of Recommendation ITU-R P.2040-2. Those equations are then reduced to get the reflection and transmission coefficients at the multi-layer slab interfaces. In updating Attachment 1, the elements of an ABCD transmission matrix of an equivalent transmission line are exploited in deriving the reflection and transmission coefficients of the multi-layer slab.

As a validation, both the update of section 2.2.2.1 and the update of Attachment 1 are reduced to obtain the reflection and the transmission coefficients of a single layer.

Annex 2 is being transferred to Recommendation ITU-R P.2109, see Doc. 3/117(Rev.1).

Approval of this draft revision is dependent on the approval of the draft revision of Recommendation ITU-R P.2109-1 in Doc. 3/117(Rev.1).

### **Prediction of building entry loss**

A definition of terms associated with building loss, and a methodology for the measurement of building loss are given in Annex 2 of Recommendation ITU-R P.2040-2. The text was developed prior to the development of Recommendation ITU-R P.2109, which deals specifically with these issues and which would now be the logical location for the material.

Annex 2 of Recommendation ITU-R P.2040-2 is to be moved to Recommendation ITU-R P.2109.

Lists of abbreviations and related Recommendations and Reports are also added.

Approval of this draft revision is dependent on the approval of the draft revision of Recommendation ITU-R P.2040-2 in Doc. 3/115(Rev.1).

### **A path-specific propagation prediction method for point-to-area terrestrial services in the frequency range 30 MHz to 6 GHz**

The draft revision proposes to:

- 1 Harmonize the troposcatter propagation prediction method in Recommendation ITU-R P.1812-6 with the one from Recommendation ITU-R P.617-5. This revision is in conjunction with the simultaneous revision of the troposcatter propagation prediction method in Recommendations ITU-R P.452-17 and ITU-R P.2001-4.
- 2 Include text to address the use of surface height data in § 3.2 – *Radio path profile*. Correct an error in the text of section 4.10, which referred to location percentage 50% instead of  $p_l\%$ .
- 4 Extend the validity of equation (40) over the full range of time percentages  $1\% \leq p \leq 50\%$ .
- 5 Remove inconsistencies throughout Recommendation when referring to percentages of location,  $p_l\%$ .
- 6 Update cross-references to equation (40) (instead of previously used equations (40a-b)).
- 7 Include the sections “Abbreviations/Glossary” and “Related ITU Recommendations, Reports” that were previously missing.

### **Method for point-to-area predictions for terrestrial services in the frequency range 30 MHz to 6 GHz**

The draft revisions introduced into this Recommendation are listed below:

- 1 Extended the upper frequency limit from 4 GHz to 6 GHz.
- 2 Introduced an approximation for estimating field strength values exceeded for percentage times in the range 50% to 99%.
- 3 Introduced a consistent definition of elevation angles relative to the local horizontal in sections 4.3, 11, and 13 of Annex 5 and deleted the superfluous equation (31).
- 4 Referred to Recommendation ITU-R P.1057 in section 16 of Annex 5 for a more accurate calculation of the inverse complementary cumulative normal distribution function.
- 5 In order to avoid overestimation of the total basic transmission loss for short paths, the clutter correction at the transmitter is not applied for path lengths smaller than 1 km (section 10 of Annex 5).
- 6 Renumbered equation and table numbers and cross-references to those.
- 7 Included the sections “Abbreviations/Glossary” and “Related ITU Recommendations, Reports” that were previously missing.

### **Propagation data and prediction methods required for the design of Earth-space telecommunication systems**

The draft revision of Recommendation ITU-R P.618-13 includes the following modifications:

- § 2.4.1: extends the upper limit of the frequency range to 55 GHz for the scintillation prediction method;
- § 2.5: revises the probability threshold for gaseous attenuation and attenuation due to clouds in the calculation of total attenuation, from 1% to 5%;
- updates of the scope.

**Propagation data and prediction methods for the planning of indoor  
radiocommunication systems and radio local area networks  
in the frequency range 300 MHz to 450 GHz**

This draft revision proposes five modifications as follows:

- 1 The modification of Table 2 for basic transmission loss coefficients in section 3.1 to correct the values and add conference/lecture room as a new environment based on contributed measurement datasets.
- 2 The modification of section 3.2 to re-organize the section.
- 3 The modification of Table 6 for r.m.s. delay spread parameters in section 4.3 to provide values.
- 4 The modification of Table 10 for typical coefficients for r.m.s. delay spread, Table 11 for typical coefficients for r.m.s. angular spread and a description in section 6.2 to provide the values and the addition of a description related to these two tables.
- 5 Re-numbering Tables throughout this recommendation.

**A general purpose wide-range terrestrial propagation model  
in the frequency range 30 MHz to 50 GHz**

This draft revision harmonizes the troposcatter propagation prediction method in Recommendation ITU-R P.2001-4 with the one from Recommendation ITU-R P.617-5. This revision is in conjunction with the simultaneous revision of the troposcatter propagation prediction method in Recommendations ITU-R P.1812-6 and ITU-R P.452-17.

In this draft revision, the sections “Abbreviations/Glossary” and “Related ITU Recommendations, Reports” that were previously missing, are included.

Resulting from the proposed changes, the file “TropoClim.txt” is no longer used in the recommendation. Additionally, the average annual sea-level surface refractivity  $N_0$  is not provided in Recommendation ITU-R P.2001-4 and would need to be included from either from Recommendations ITU-R P.617-5, ITU-R P.452-17, or ITU-R P.1812-6.

**Propagation data and prediction methods required for the design  
of terrestrial broadband radio access systems operating  
in a frequency range from 3 to 60 GHz**

This draft revision proposes two modifications as follows:

- 1 The modification of section 2.4 to extend the reflection coefficient.
- 2 The correction of the term “path loss” to “basic transmission loss” for this entire Recommendation.

**Propagation data and prediction methods for the planning of short-range  
outdoor radiocommunication systems and radio local area networks  
in the frequency range 300 MHz to 100 GHz**

This draft revision of Recommendation ITU-R P.1411-11 proposes four modifications as follows:

- 1 Modification of § 5.1.2.1 and Table 12 to include new coefficient values for the prediction of distance characteristics of r.m.s. delay spread based on measurements at 28.5 GHz in a residential area.
- 2 Modification of § 5.2.1 and Table 15 to include new measurement data of r.m.s. angular spread taken at 28.5 GHz in urban low-rise and residential environments.
- 3 Modification of § 5.3.2 and Table 19 to include new coefficient values for the prediction of r.m.s. delay spread with respect to antenna beamwidth based on measurements at 28.5 GHz in urban low-rise and residential environments.
- 4 A number of editorial corrections.

**Propagation data and prediction methods for systems using high-altitude platform stations and other elevated stations in the stratosphere at frequencies greater than about 700 MHz**

The changes proposed in this revision of Recommendation ITU-R P.1409-2 include the following:

- 1 Addition of a brief description of section 2 (advice on interference) and section 3 (advice on propagation issues in the design of systems using high-altitude stations) in section 1.
- 2 Improvements on wording regarding diffraction due to terrain and/or specific obstruction in section 2.1.
- 3 Modification to the recommended use of models to be consistent with the guidance provided to other ITU-R Working Parties relating to the use of Recommendations ITU-R P.528 and ITU-R P.619 in section 2.1.
- 4 Addition of a method for estimating the received power of each arrival path, which is the basis of the human shielding loss model in section 3.
- 5 Editorial improvements.

**Guide to the application of the propagation methods of Radiocommunication Study Group 3**

The draft revision of Recommendation ITU-R P.1144-11 reflects revisions to other Recommendations adopted by Study Group 3 at its meeting in 2023 or approved in 2022.

The specific changes, as shown in the attachment, are:

- change of wording to *recommends* 1 and 2;
- revising the row in Table 1 related to Recommendation ITU-R P.1546 to reflect the increases in upper frequency range and upper time percentage;
- revising the row in Table 2 related to Recommendation ITU-R P.840 to reflect changes in terminology and in the spatial resolution of the data;
- adding rows in Table 2 related to Recommendations ITU-R P.2145 and ITU-R P.2148 for which revisions were approved in 2022.

The second and third points above are dependent on the approval of the revisions to Recommendations ITU-R P.1546 in Doc. 3/119(Rev.1) and ITU-R P.840 in Doc. 3/114(Rev.1), respectively.

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