INTERNATIONAL TELECOMMUNICATION UNION

Radiocommunication Bureau

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Administrative Circular **CAR/328**	23 November 2011

To Administrations of Member States of the ITU

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

–   **Proposed adoption of 1 draft new Recommendation and 27 draft revised Recommendations and their simultaneous approval by correspondence in accordance with § 10.3 of Resolution ITU-R 1-5 (Procedure for the simultaneous adoption and approval by correspondence)**

At the meeting of Radiocommunication Study Group 3, held on 27 and 28 October 2011, the Study Group decided to seek adoption of 1 draft new Recommendation and 27 draft revised Recommendations by correspondence (§ 10.2.3 of Resolution ITU-R 1-5) and further decided to apply the procedure for simultaneous adoption and approval by correspondence (PSAA), (§ 10.3 of Resolution ITU-R 1-5). The titles and summaries of the draft Recommendations are given in Annex 1.

The consideration period shall extend for 3 months ending on <u>23 February 2012</u>. 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 procedure has been followed, the draft Recommendations shall also be considered as approved. However, if any objection is received from a Member State during the consideration period, the procedures given in § 10.2.1.2 of Resolution ITU-R 1-5 shall apply.

After the above-mentioned deadline, the results of the PSAA procedure shall be announced in an Administrative Circular (CACE) and the approved Recommendations published as soon as practicable.

Any ITU member organization aware of a patent held by itself or others which may fully or partly cover elements of the draft Recommendation(s) 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 http://www.itu.int/ITU-T/dbase/patent/patent-policy.html.

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Annex 1:   Titles and summaries of the draft Recommendations

Documents attached: 3/95(Rev.1), 3/60(Rev.1), 3/61(Rev.1), 3/64(Rev.1), 3/65(Rev.1), 3/67(Rev.1), 3/69(Rev.1), 3/70(Rev.1), 3/71(Rev.1), 3/72(Rev.1), 3/73(Rev.1), 3/74(Rev.1), 3/75(Rev.1), 3/76(Rev.1), 3/78(Rev.1), 3/79(Rev.1), 3/80(Rev.1), 3/81(Rev.1), 3/82(Rev.1), 3/92(Rev.1), 3/94(Rev.1), 3/97(Rev.1), 3/98(Rev.1), 3/100(Rev.1), 3/102(Rev.1), 3/103(Rev.1), 3/104(Rev.1) and 3/107(Rev.1) on CD-ROM

Distribution:
–   Administrations of Member States of the ITU
–   Radiommunication Sector Members participating in the work of Radiocommunication Study Group 3
–   ITU-R Associates participating in the work of Radiocommunication Study Group 3
–   ITU-R Academia

Annex 1

Titles and summaries of the draft Recommendations

Draft new Recommendation ITU-R P.[WRPM]   Doc. 3/95(Rev.1)

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

This Recommendation contains a general purpose wide-range model for terrestrial propagation which predicts path loss due to both signal enhancements and fading over effectively the range from 0% to 100% of an average year. This makes the model particularly suitable for Monte Carlo methods, and studies in which it is desirable to use the same propagation model, with no discontinuities in its output, for signals which may be either wanted or potentially interfering. The model covers the frequency range from 30 MHz to 50 GHz, and distances from 3 km to at least 1 000 km.

Draft revision of Recommendation ITU-R P.1410-4   Doc. 3/60(Rev.1)

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 adds a new Section 2.4 to estimate the height gain in residential areas. A new Section 2.5 is also added to predict the path loss itself by considering together the height gain at the SS at an arbitrary SS antenna height using the calculation method described in Section 2.4 and the conventional path loss prediction method for the over-rooftop NLOS environment such as in Recommendation ITU-R P.1411. The revision to Section 3.2 is a new model that is applicable to a wider range of rain climates that has been developed based on a physical/statistical based route diversity model for rain attenuation. This improves on the current model which was based on analysis of measurements made in the UK and Norway.

Draft revision of Recommendation ITU-R P.1411-5   Doc. 3/61(Rev.1)

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 proposes six modifications:

1)   The revision of Table 1 in Section 2 "Physical operating environments and definition of cell types" to add a new definition of urban very high-rise environment.

2)   The correction of formulas provided in Section 4.2.2 "Propagation over roof-tops for suburban area".

3)   The revision of Section 6.1 "Multipath models for street canyon environments".

In subsection 6.1.1, new data is added in Table 9 and the sub-section title is changed to "Omnidirectional antenna case". New subsection 6.1.2 "Directional antenna case" is added with a new Table 10 and sentences.

4)   The revision of Section 6.2 "Multipath models for over-rooftops propagation environments" to add new tables and sentences.

5)   The revision of Section 9 "Characteristics of direction of arrival" to add information with data in new Table 16.

6)   The addition of a new Section 11 "Propagation data and prediction methods for the path morphology approach.

Renumbering tables, figures and equations are also included in this draft revision.

Draft revision of Recommendation ITU-R P.835-4   Doc. 3/64(Rev.1)

Reference standard atmospheres

This draft revision:

–   Corrects the equation in section 3.1 on the dependence of temperature (T) with height in the range $13 < h < 17$ km.

–   Corrects the range of applicability of the expression for water vapour density (g/m^3) in section 3.1 to $0 \le h \le 15$.

Draft revision of Recommendation ITU-R P.676-8   Doc. 3/65(Rev.1)

Attenuation by atmospheric gases

This draft revision:

•   aligns the name of variables in Annexes 1 and 2;

•   clarifies the summation of oxygen lines for frequencies above the 118.75 GHz oxygen line;

•   corrects the omission of water vapour pressure in equation (9);

•   adds text after equation (19);

•   corrects typographical errors in equations (29) and (37);

•   replaces the existing title of section 2.3;

•   removes reference to software code available.

Draft revision of Recommendation ITU-R P.837-5   Doc. 3/67(Rev.1)

Characteristics of precipitation for propagation modelling

This draft revision:

–   Introduces a new *considering* clause (e), referencing the findings of Document 3J/161, that using a model to convert local measurements with integration times of up to 1 hour has been observed to provide higher accuracy than the use of the global digital maps in Annex 1 of this Recommendation.

–   Introduces a new *recommends* clause 5, referring to the guidelines for using local measurements and the period of collection of said measurements (experiment duration) as it affects the statistical stability of the empirical distributions.

–   Proposes a new Annex 3, corresponding to the new method to perform a conversion of cumulative distributions of rainfall and directs the user to the appropriate software in the website of Study Group 3.

Draft revision of Recommendation ITU-R P.453-9   Doc. 3/69(Rev.1)

The radio refractive index: its formula and refractivity data

This draft revision:

•   adds a scope to the Recommendation;

•   updates the formulation of the saturated water vapour pressure, e_s in equation (6);

•   correctly details the enhancement factors needed for the application of equation (6).

Draft revision of Recommendation ITU-R P.833-6   Doc. 3/70(Rev.1)

Attenuation in vegetation

This draft revision consists of:

1)   Results from terrestrial-path woodland measurements in Russia and the addition of Table 1.

2)   A proposed model and results from measurements in Austria for woodland slant-path attenuation, including the addition of Figure 3.

Draft revision of Recommendation ITU-R P.840-4   Doc. 3/71(Rev.1)

Attenuation due to clouds and fog

This draft revision proposes editorial corrections of sections 4 and 5 of Annex 1 where "water vapour content" is used instead of "liquid water content" while there is no doubt that the text is actually related to "liquid water content".

Draft revision of Recommendation ITU-R P.526-11   Doc. 3/72(Rev.1)

Propagation by diffraction

This draft revision includes:

a)   A correction to equation (17a) of an error which appears to have been made in the previous revision to Recommendation ITU-R P.526-11.

b)   A revision to the method for spherical-earth diffraction to avoid discontinuities.

c)   Following extensive study of comparative diffraction models, the previous cascaded knife-edge model for a general terrain path has been deleted, and a model based on the Bullington construction has been put in its place.

d)   A number of small editorial corrections.

Draft revision of Recommendation ITU-R P.1144-5   Doc. 3/73(Rev.1)

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

This draft revision reflects changes to existing Recommendations agreed at the Working Party 3M meeting and the introduction of the new Recommendation ITU-R P.[WRPM].

Draft revision of Recommendation ITU-R P.528-2   Doc. 3/74(Rev.1)

Propagation curves for aeronautical mobile and radionavigation services using the VHF, UHF and SHF bands

This draft revision:

–   Adds a scope

–   Adds an Annex that defines an interpolation method for the data

–   Adds frequencies 600 MHz and 2 400 MHz to the curves

–   Replaces existing figures with an expanded set of figures that are reformatted to simplify their use

–   Provides tabulated data

–   Makes editorial changes to the rest of the text in the Recommendation to make it consistent with the changes.

Draft revision of Recommendation ITU-R P.1816   Doc. 3/75(Rev.1)

The prediction of the time and the spatial profile for broadband land mobile services using UHF and SHF bands

This draft revision:

1)   Revises the scope by adding information on the LOS condition because both Annex 1 and Annex 2 are extended to be applicable to LOS paths. The environment for the new Annex 3 is covered by above path categories.

2)   Adds item 3 to the *recommends* on the use of the new Annex 3.

3)   Adds Annex 1 of delay profile estimation at BS and Annex 2 of angular profile estimation at BS, definitions of parameters are revised according to the revision of Recommendation ITU-R P.1407, extends the applicable environment to the LOS condition. Current Annexes 1 and 2 are proposed for the estimation at a BS (base station) and adds Section 4 in Annex 1 and Section 4 in Annex 2 to propose estimation methods for the LoS condition.

4)   Adds Annex 3 for estimating the long-term arrival angular profile at MS (mobile station) in urban and suburban areas.

Draft revision of Recommendation ITU-R P.1238-6   Doc. 3/76(Rev.1)

Propagation data and prediction methods for the planning of indoor radiocommunication systems and radio local area networks in the frequency range 900 MHz to 100 GHz

The draft revision changes five tables with new data.

Table 2:"Power loss coefficients"

Table 3:"Floor penetration factors"

Table 4:"Shadow fading statistics, standard deviation (dB), for indoor transmission loss calculation"

Table 5:"r.m.s. delay spread parameters"

Table 7:"Examples of antenna directivity dependence of static r.m.s delay spread".

Draft revision of Recommendation ITU-R P.684-5   Doc. 3/78(Rev.1)

Prediction of field strength at frequencies below about 150 kHz

This draft revision makes a minor change to clarify the use of the alternative waveguide mode, or wave-hop method, for VLF prediction.

Draft revision of Recommendation ITU-R P.534-4   Doc. 3/79(Rev.1)

Method for calculating sporadic-E field strength

This draft revision adds a new section that provides the annual statistics of occurrence of sporadic-E ionization and a calculation procedure.

Draft revision of Recommendation ITU-R P.832-2   Doc. 3/80(Rev.1)

World atlas of ground conductivities

This draft revision provides an improved map as a replacement of an existing map of the UK in the atlas of ground conductivity.

Draft revision of Recommendation ITU-R P.533-10   Doc. 3/81(Rev.1)

Method for the prediction of the performance of HF circuits

This draft revision clarifies the definitions of system parameters used in performance calculations and also amends the limiting sunspot number used for F2 region prediction.

Draft revision of Recommendation ITU-R P.1239-2   Doc. 3/82(Rev.1)

ITU-R Reference Ionospheric Characteristics

This draft revision proposes a change corresponding to that proposed in Recommendation ITU-R P.533, which is to change the limiting sunspot number used for the prediction of the F2 region of the ionosphere from 150 to 160.

Draft revision of Recommendation ITU-R P.531-10   Doc. 3/92(Rev.1)

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

This draft revision presents a number of changes to Recommendation ITU-R P.531-10 primarily to resolve ambiguities in the text related to the version of the associated ionospheric model mentioned in that Recommendation.

Draft revision of Recommendation ITU-R P.1812-1 Doc. 3/94(Rev.1)

A path-specific propagation prediction method for point-to-area terrestrial services in the VHF and UHF bands

This draft revision:

Clarifies that the purpose of the method is point-to-area prediction of the median of the multi-path signal-strength distribution exceeded for given percentage times and locations. This is to accommodate an alternative method for the terminal height-gain correction based on two-ray ground reflection described in a new Appendix 4. It is explained that the use of the new method is not suitable for point-to-area predictions, and should not be used in conjunction with the location-variability part of the method.

Includes more information and explanation on the use of ground cover ("clutter") data, which is used both to adjust profile height and to calculate terminal clutter losses (or "height-gain" function).

Replaces, following extensive study and comparison between various diffraction models, the cascaded knife-edge model in Recommendation ITU-R P.526-11 § 4.4.2 by the "delta-Bullington" model, which appears in Annex A to Document 3M/124, modified by the "obstacle-gain" correction described in Document 3J/112.

Includes a number of editorial corrections.

Draft revision of Recommendation ITU-R P.682-2 Doc. 3/97(Rev.1)

Propagation data required for the design of Earth-space aeronautical mobile telecommunication systems

This draft revision presents a number of changes in Sections 4.2 and 4.5, primarily editorial or clarifications.

Draft revision of Recommendation ITU-R P.1817 Doc. 3/98(Rev.1)

Propagation data required for the design of terrestrial free-space optical links

This draft revision replaces Annex 1 sections 10 and 11 which provides cumulative attenuation distributions from a one-year measurement on FSO and hybrid RF/FSO in Prague with the six-year results from the same experimental set-up. Changes to the experimental description and results are also provided.

<u>Draft revision of Recommendation ITU-R P.530-13</u>   Doc. 3/100(Rev.1)

Propagation data and prediction methods required for
the design of terrestrial line-of-sight systems

This draft revision includes:

•   Replacement of the method for predicting rain attenuation distribution.

•   Replacement of the method for estimating outage intensity, and limiting it to those caused
          by rain attenuation.

•   Replacement of the method for predicting differential rain attenuation cumulative
          distribution for two convergent links.

•   Inclusion of a method for deriving the diversity improvement I and the diversity gain G for
          parallel paths.

<u>Draft revision of Recommendation ITU-R P.1409</u>   Doc. 3/102(Rev.1)

Propagation data and prediction methods required for the design of systems
using high altitude platform stations at about 47 GHz

This draft revision broadens the Recommendation to provide propagation information covering a
wider frequency range above 1 GHz and including platforms at lower heights in the stratosphere.

<u>Draft revision of Recommendation ITU-R P.617-1</u>   Doc. 3/103(Rev.1)

Propagation prediction techniques and data required for the
design of trans-horizon radio-relay systems

This draft revision amends the troposcatter transmission loss method given in § 3.1. It introduces a
new climatic zone map, which is available electronically, to replace the climate classification text
and provides a set of equations to replace the graphical look up required to evaluate the parameter
Y(90).

<u>Draft revision of Recommendation ITU-R P.1853</u>   Doc. 3/104(Rev.1)

Tropospheric attenuation time series synthesis

The draft revision proposes:

–   Complement of a section "Scope".

–   Creation of item 3 in section *recommends*.

–   Creation of a section 4 related to the synthesis of integrated cloud liquid water content.

–   Creation of a section 5 related to integrated water vapour content.

–   Creation of a section 6 related to the synthesis of time series of total attenuation and
          tropospheric scintillation.

Exchange of information for short-term forecasts and transmission of ionospheric disturbance warnings

This draft revision presents a number of minor revisions. The modifications to the Recommendation take into account the availability of near real-time information on space weather from the World Meteorological Organisation Inter-programme Coordination Team on Space Weather that can be used in short-term forecasting. Additionally, it is indicated that Recommendation ITU-R P.531 contains the method required for the design of satellite services and systems.

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