INTERNATIONAL TELECOMMUNICATION UNION

Radiocommunication Bureau
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Administrative Circular
CAR/181

15 December 2004

To Administrations of Member States of the ITU

Subject: **Proposed approval of 1 draft new and 4 draft revised Questions adopted by Radiocommunication Study Group 3 proposed at its meeting held on 28 and 29 October 2004**

At the meeting of Radiocommunication Study Group 3 held on 28 and 29 October 2004, 1 draft new and 4 draft revised Questions were adopted and it was agreed to apply the procedure of Resolution ITU-R 1-4 (see § 3) for approval of Questions in the interval between Radiocommunication Assemblies.

With regards to the provisions of § 3 of Resolution ITU-R 1-4, I should be grateful if you would inform me by 15 March 2005, whether your Administration approves or does not approve these Questions.

After the above-mentioned deadline, the Director of the Radiocommunication Bureau will notify the results of this consultation by Administrative Circular. If the Questions are approved, they will have the same status as Questions approved at a Radiocommunication Assembly and will become official texts attributed to Radiocommunication Study Group 3 (see http://www.itu.int/ITU-R/publications/download.asp?product=que03&lang=e).

Valery Timofeev
Director, Radiocommunication Bureau

Annexes: 5

– 5 draft new and revised ITU-R Questions

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

ANNEX 1

Source: Document 3/24

DRAFT REVISION OF QUESTION ITU-R 208-2/3

Propagation factors in frequency sharing issues affecting fixed-satellite services and terrestrial services

(1990-1993-1995-2002)

The ITU Radiocommunication Assembly,

considering

a) that propagation data for radio paths are required when planning the sharing of frequency channels in radiocommunication systems;

b) that, in accordance with the Radio Regulations (RR), a coordination distance or coordination area should be determined for earth stations in the frequency bands shared between space radiocommunication services and terrestrial services;

c) that in the calculation of coordination distances, all pertinent propagation mechanisms and system factors should be taken into account;

d) that in the calculation of interference between systems, more detailed consideration of the contributing propagation mechanisms is required;

e) that the World Radiocommunication Conference (WRC-2000) approved a revision of Appendix 7 (subsequently modified by WRC-03) based on material in Recommendation ITU-R SM.1448 which in turn is based on material in Recommendation ITU-R P.620 covering the frequency range 100 MHz to 105 GHz;

f) that Resolution 74 (~~WRC-2000~~ Rev.WRC-03) describes a process to keep the technical bases of Appendix 7 current,

decides that the following Question should be studied

1 What is the distribution of signal level variations (both fading and enhancement) and their duration due to:

– diffraction;
– atmospheric mechanisms such as ducting, precipitation scatter, troposcatter and reflecting atmospheric layers;
– reflections from the ground and man-made structures;
– combinations of these mechanisms?

2 What is the dependence of these effects on location, time, path length and frequency, taking into consideration the following points:

– the percentage range of greatest interest is from 0.001% to 50%;
– the reference periods of interest are worst month and average year;

– path lengths of greatest interest are those up to 1 000 km; however, in areas where ducting is prevalent (e.g. oceans in tropical and equatorial regions) much greater distances should also be considered;

– the frequency range of interest is approximately 100 MHz to 500 GHz?

3 How may improved models and prediction procedures be developed for precipitation scatter to determine the practical significance of this mode, and how does it depend on rainfall rate and structure and on system geometry?

4 What precipitation parameters, in addition to rainfall intensity and height of the 0°C isotherm, can be applied to precipitation-related prediction methods to take account of different climates?

5 What refractivity parameters can be applied to clear-air prediction methods to take account of different climates?

6 How can scatter from irregular terrain be quantified (including the effect of vegetation and man-made structures such as buildings)?

7 How can interaction between an antenna and the propagation medium be taken into account when considering modes of anomalous propagation (e.g. coupling into and out of ducts and the impact of use of omnidirectional, sector and high-gain antennas)?

8 How may site shielding be evaluated, with special emphasis on a practical procedure for calculating its magnitude in particular situations (e.g. small earth stations in urban areas)?

9 What is the correlation of fading and enhancements of the signal on separate radio links, and its influence on the statistics of interference?

10 What method best describes the differential rain attenuation statistics between a wanted path and an unwanted path?

~~10~~11 What is a suitable method by which the total effect of the above-mentioned mechanisms can be taken into account when evaluating interference between terrestrial and Earth-space systems; in particular, what improvements can be recommended to the interference prediction methods contained in Recommendation ITU-R P.452 and to the propagation prediction procedures for determining coordination distance contained in Recommendation ITU-R P.620, including the alignment of these two methods in order to obtain consistency between the determination of coordination area and detailed evaluation of interference in individual cases?

~~11~~12 Which are the most effective clear-air and hydrometeor-scatter propagation models to allow effective frequency coordination and interference potential evaluation between earth stations for geostationary-satellite systems and those for non-geostationary satellite systems sharing the same frequencies on a "bidirectional working" basis?

NOTE 1 – Priority will be given to studies relating to §§ 2, 5, 6, 8, ~~and~~ 9 and 10.

Category: S2

ANNEX 2

Source: Document 3/9

DRAFT REVISION OF QUESTION ITU-R 211-2/3

Propagation data and propagation models for the design of short-range wireless communication and access systems and wireless local area networks (WLAN) in the frequency range 300 MHz to 100 GHz

(1993-2000-2002)

The ITU Radiocommunication Assembly,

considering

a) that many new short-range personal communication systems are being developed which will operate indoors as well as outdoors;

b) that future mobile systems (e.g. beyond IMT-2000) will provide personal communications, indoors (office or residential) as well as outdoors;

c) that there is a high demand for wireless local area networks (WLANs) and wireless private business exchanges (WPBXs), as demonstrated by existing products and intense research activities;

d) that it is desirable to establish WLAN standards which are compatible with both wireless and wired telecommunications;

e) that short-range systems using very low power have many advantages for providing services in the mobile and personal environment;

f) that ultra-wideband (UWB) is a rapidly emerging wireless technology and it differs substantially from conventional radio-frequency technologies;

~~f~~g) that knowledge of the propagation characteristics within buildings and the interference arising from multiple users in the same area is critical to the efficient design of systems;

~~g~~h) that while multipath propagation may cause impairments, it may also be used to advantage in a mobile or indoor environment;

~~h~~j) that frequencies proposed for the systems described in § a), b) and c) range from about 300 MHz to 100 GHz;

~~j~~k) that there are only limited propagation measurements available in some of the frequency bands being considered for short-range systems;

~~k~~l) that information regarding indoor and indoor-to-outdoor propagation may also be of interest to other services, *decides* that the following Question should be studied

1 What propagation models should be used for the design of short-range systems (operating range less than 1 km) including wireless communication and access systems, WLANs and UWB applications operating indoors, outdoors, and indoor-to-outdoors ~~and indoor WLANs~~?

2 What propagation characteristics of a channel are most appropriate to describe its quality for different services, such as:

– voice communications;

– facsimile services;

– data transfer services (both high bit rate and low bit rate);

– paging and messaging services;

– video services?

3 What are the characteristics of the impulse response of the channel?

4 What effect does the choice of polarization have on the propagation characteristics?

5 What effect does the performance of the base station and terminal antennas (e.g. directivity, beam-steering) have on the propagation characteristics?

6 What are the effects of various diversity schemes?

7 What are the effects of the siting of the transmitter and receiver?

8 In the indoor environment, what is the effect of different building and furnishing materials as regards shadowing, diffraction, and reflection?

9 In the outdoor environment, what is the effect of building structures and vegetation as regards shadowing, diffraction, and reflection?

10 What effect does the movement of persons and objects within the room, possibly including the movement of one or both ends of the radio link, have on the propagation characteristics?

11 What variables are necessary in the model to account for different types of buildings (e.g. open-plan, single-storey, multi-storey) in which one or both of the terminals are situated?

12 How may building entry loss be characterized for system design, and what is its effect on indoor-to-outdoor transmission?

13 What factors can be used for frequency scaling, and over what ranges are they appropriate?

14 What are the best ways of presenting the required data?

Category: S1

ANNEX 3

Source: Document 3/6

DRAFT REVISION OF QUESTION ITU-R 225-3/3

The prediction of propagation factors affecting systems at LF and MF including the use of digital modulation techniques

(1995-1997-2000-2000)

The ITU Radiocommunication Assembly,

considering

a) that Recommendation ITU-R P.368 presents ground-wave propagation curves for frequencies between 10 kHz and 30 MHz and that Recommendation ITU-R P.684 and Recommendation ITU-R P.1147 describe procedures for predicting sky-wave propagation at frequencies below about 150 kHz and at frequencies between about 150 and 1 700 kHz, respectively;

b) that most of these and other available prediction methods are intended primarily for narrow-band or analogue systems;

c) that under certain conditions, ground-wave and sky-wave signals of the same source may be comparable in amplitude;

d) that there is an increasing use of digital modulation techniques, including those that use fast signalling speeds or which require good phase or frequency stability;

e) that Recommendation ITU-R P.1321 summarizes some results of studies on propagation factors affecting systems using digital techniques at LF and MF;

f) that, for digital systems, information will be required of the signal level and its variation as well as of time and frequency spreads within the channel,

decides that the following Question should be studied

1 What improvements may be made to the methods of predicting the sky-wave field strength and circuit performance at frequencies below about 1.7 MHz?

2 Are there significant variations in ground-wave field strength with location or with time?

3 How does the coexistence of ground-wave and sky-wave signals affect digital systems at LF and MF?

4 What are the amplitude and phase characteristics of time and frequency spreads (multipath and Doppler) of the LF/MF sky-wave signals?

5 What are the appropriate parameters for these signal characteristics for incorporation into a measurement data bank?

6 How do the sky-wave parameters vary with time, frequency, path length and other factors?

7 What are the appropriate methods for predicting these parameters and to what extent should different prediction models be used, dependent on the modulation methods employed for the signal?

8 What service reliability results from the above parameters?

Category: S1

ANNEX 4

Source: Document 3/22

DRAFT REVISION OF QUESTION ITU-R 228/3*

Propagation data required for the planning of ~~space~~ radiocommunication systems ~~and space science service* systems~~ operating above 275 GHz**

(2000)

The ITU Radiocommunication Assembly,

considering

a) that the spectrum in many of the frequency bands used for ~~space~~ radiocommunication is increasingly congested and this problem is expected to get worse;

b) that telecommunication links are being used or planned for use on some terrestrial applications at frequencies above 275 GHz;

~~b~~c) that telecommunication links are being used or planned for use on some satellite systems for inter-satellite communications at frequencies above 275 GHz;

~~c~~d) that the viability of telecommunication links operating above 275 GHz (space-to-Earth and Earth-to-space) is currently being investigated;

~~d~~e) that remote sensing and astronomical applications are using frequencies above 275 GHz;

~~e~~f) that interest exists in extending the range of frequencies used for telecommunication applications;

~~f~~g) that the focus of study of Questions by Radiocommunication Study Groups includes the following:

– use of the radio-frequency spectrum in ~~space~~ radiocommunication;

– characteristics and performance of radio systems;

– operation of radio systems;

* This Question should be brought to the attention of Radiocommunication Study Groups 1, 7 and 9.

~~* The phrase "Space science services" refers to Earth exploration-satellite (EESS), space research (SRS), space operation (SOS), and meteorological-satellite services (MetSat).~~

** The frequency spectrum above 275 GHz is currently not allocated (see also No. 5.565 of the Radio Regulations).

~~g~~h) that propagation models are urgently required for planning and design of telecommunication systems at frequencies above 275 GHz,

noting

that according to No. 78 of the ITU Constitution and Note 2 of No. 1005 of the ITU Convention, study groups may adopt Recommendations without limit of frequency range,

decides that the following Question should be studied

1 What models best describe the relationship between atmospheric parameters and electromagnetic wave characteristics on terrestrial, space-to-Earth and Earth-to-space links operating at frequencies above 275 GHz?

2 What models best describe the relationship between free-space parameters and electromagnetic wave characteristics on inter-satellite links operating at frequencies above 275 GHz?

3 What models best describe the relationship between atmospheric parameters and electromagnetic wave characteristics on science service links operating at frequencies above 275 GHz?

4 What models best describe the relationship between atmospheric parameters and the minimum practical altitude for space-to-space links operating at frequencies above 275 GHz?

further decides

1 that the results of studies above 275 GHz should be brought to the attention of the other Study Groups;

2 that the results of the above studies should be included in one or more Recommendations; ~~and~~

3 that the results ~~should be available by 2003.~~ related to terrestrial applications should be available by 2006, and should be included in future Recommendation(s) or Report(s).

Category: C1

ANNEX 5

Source: Document 3/2

DRAFT NEW QUESTION ITU-R [Doc. 3/2]*

Prediction methods and models applicable to power line telecommunications systems

The ITU Radiocommunication Assembly,

considering

a) that power line telecommunications systems (PLT) and other wired communication systems may use base-band frequencies up to 80 MHz, and that a wide variety of PLT architectures and components will be present, even in one administrative jurisdiction;

b) that radio frequency energy will be radiated by a number of mechanisms and in several modes, particularly from unbalanced, variable impedance and poorly terminated lines;

decides that the following Question should be studied

1 What are the mechanisms in PLT systems that cause radio frequency energy to be radiated?

2 Which modelling techniques may be best used to estimate radiated energy from a generic portion of a complete network?

3 What are the effects of the position of the ground plane and other structures relative to the line on radiated energy and its spatial distribution?

4 What techniques are most appropriate in aggregating the total radiated energy in space from such a system or multitude of systems?

5 Which signal level propagation models are most appropriate in the determination of interference?

6 What advice may be given to enable practical measurement of radiating fields at short distances (within the near field)?

Category: S1

* This Question should be brought to the attention of Radiocommunication Study Group 1 (Working Party 1A).