INTERNATIONAL TELECOMMUNICATION UNION

Radiocommunication Bureau
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Administrative Circular
CACE/416

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To Administrations of Member States of the ITU and Radiocommunication Sector Members participating in the work of the Radiocommunication Study Groups and the Special Committee on Regulatory/Procedural Matters

Subject: **Radiocommunication Study Group 3**

– **Approval of 6 revised ITU-R Questions**

By Administrative Circular CAR/227 of 2 November 2006, 6 draft revised ITU-R Questions were submitted for approval by correspondence in accordance with Resolution ITU-R 1-4 (§ 3.4).

The conditions governing these procedures were met on 2 February 2007.

The texts of the approved Questions are attached for your reference (Annexes 1 to 6) and will be published in Addendum 2 to Document 3/1 which contains the ITU-R Questions approved by the 2003 Radiocommunication Assembly and assigned to Radiocommunication Study Group 3.

Valery Timofeev
Director, Radiocommunication Bureau

Annexes: 6

Distribution:

- Administrations of Member States and Radiocommunication Sector Members
- Chairmen and Vice-Chairmen of Radiocommunication Study Groups and Special Committee on Regulatory/Procedural Matters
- Chairman and Vice-Chairmen of the Conference Preparatory Meeting
- Members of the Radio Regulations Board
- ITU-R Associates in the work of Radiocommunication Study Group 3
- Secretary-General of the ITU, Director of the Telecommunication Standardization Bureau, Director of the Telecommunication Development Bureau

Annex 1

QUESTION ITU-R 214-2/3

Radio noise

(1978-1982-1990-1993-2000-2000-2007)

The ITU Radiocommunication Assembly,

considering

a) that radio noise of natural or man-made origin often determines the practical limit of performance for radio systems and thus is an important factor in planning efficient use of the spectrum;

b) that much has been learned about the origin, statistical characteristics, and general intensities of both natural and man-made noise, but that additional information is needed, particularly for parts of the world not previously studied, for the planning of telecommunications systems;

c) that for system design, determination of system performance and spectrum utilization factors, it is essential to determine the noise parameters appropriate in considering various modulation methods, including, as a minimum, the noise parameters described in Recommendation ITU-R P.372,

decides that the following Question should be studied

1 What are the intensities and the values of other parameters of natural and man-made noise from local and distant sources, in both indoor and outdoor locations; what are the temporal and geographical variations, the directions of arrival, and the relationship to changes in geophysical phenomena, such as solar activity; and how should measurements be made?

further decides

1 that appropriate information concerning radio noise resulting from studies within the ITU-R shall be contained in a single Recommendation;

2 that the above studies should be completed by 2010.

Category: S2

Annex 2

QUESTION ITU-R 202-2/3

Methods for predicting propagation over the surface of the Earth

(1990-2000-2007)

The ITU Radiocommunication Assembly,

considering

a) that the presence of obstacles on the propagation path may modify, to a large extent, the mean value of the transmission loss, as well as the fading amplitude and characteristics;

b) that, with increase in frequency, the influence of the detailed roughness of the surface of the Earth as well as that of vegetation and natural or man-made structures on or above the surface of the Earth becomes more significant;

c) that propagation over high mountain ridges is sometimes of great practical importance;

d) that diffraction and site shielding are of practical significance in interference studies;

e) that the increase in performance and storage capacity of computers, permits the development of detailed digital terrain and clutter data bases;

f) that information on ground conductivity is often available in digital form;

g) that seasonal variation of ground-wave propagation has been observed,

decides that the following Question should be studied

1 What is the influence of terrain irregularities, vegetation and buildings, the existence of conducting structures and seasonal variability, both for locations within the service area around a transmitter and for the evaluation of interference at much greater distances, on the transmission loss, polarization, group delay and angle of arrival?

2 What is the additional transmission loss in urban areas?

3 What is the screening provided by obstacles near a terminal, taking into account the propagation mechanisms over the path?

4 What are the conditions under which obstacle gain occurs and the short-term and long-term variations of transmission loss under these conditions?

5 What are suitable methods and formats for describing the detailed roughness of the surface of the Earth including topographic features and man-made structures?

6 How can terrain data bases, together with other detailed information on terrain features, vegetation and buildings be applied in the prediction of attenuation, time delay, scatter and diffraction?

7 How can quantitative relationships and statistically-based prediction methods be developed which treat reflection, diffraction and scatter from terrain features and buildings, as well as the influence of vegetation?

8 How can information on ground conductivity be made available digitally as matrix or vector information?

further decides

1 that the above studies should be completed by 2010.

Category: S2

Annex 3

QUESTION ITU-R 218-3/3

Ionospheric influences on space systems

(1990-1992-1995-1997-2007)

The ITU Radiocommunication Assembly,

considering

a) that, in the case of some high-performance space systems involving satellites, ionospheric effects should be considered up to the highest frequencies in use;

b) that various satellite systems, including mobile- and navigational-satellite services, are employing non-geostationary-satellite networks,

decides that the following Question should be studied

1 How can trans-ionospheric propagation models be improved, especially to account for ionospheric changes in the short-term, and at high and low latitudes, in regard to:

– scintillation effects on phase, angle of arrival, amplitude and polarization;

– Doppler and dispersion effects;

– refraction affecting in particular the direction of arrival and also the phase and group delays;

– Faraday effect, particularly with regard to polarization discrimination;

– attenuation effects?

2 What propagation prediction methods can be derived to assist in coordination and sharing among concerned services?

3 What propagation prediction method can be derived to assist in the determination of performance characteristics of satellite services employing non-geostationary-satellite networks?

further decides

1 that Recommendation ITU-R P.531 will be revised before 2010.

NOTE 1 – Priority will be given to studies relating to § 1.

Category: S2

Annex 4

QUESTION ITU-R 226-3/3

Ionospheric and tropospheric characteristics along satellite-to-satellite paths

(1997-2000-2000-2007)

The ITU Radiocommunication Assembly,

considering

a) that techniques exist for monitoring tropospheric and ionospheric characteristics by means of low orbiting satellites observing GPS satellites near the Earth's limb;

b) that ionospheric effects along these paths may dominate over tropospheric effects in some situations and, for extrapolation to other scenarios, separation of these two components is necessary;

c) that intersatellite links and compatibility may be affected by the ionosphere and the troposphere,

decides that the following Question should be studied

1 How does the ionospheric content along satellite-to-satellite radio paths vary with slant path, location, height, time and solar activity?

2 How are intersatellite links affected by the ionosphere and troposphere?

3 How can the ionospheric and tropospheric effects be separated in the results of measurements on such paths?

further decides

1 that material in answer to *decides* 1 should be developed as a new Recommendation by 2010.

Category: S2

Annex 5

QUESTION ITU-R 201-3/3

Radiometeorological data required for the planning of terrestrial and space communication systems and space research application

(1966-1970-1974-1978-1982-1990-1995-2000-2007)

The ITU Radiocommunication Assembly,

considering

a) that the characteristics of the tropospheric radio channel depend on a variety of meteorological parameters;

b) that statistical predictions of radiopropagation effects are urgently required for planning and design of radiocommunication and remote sensing systems;

c) that, for the development of such predictions, knowledge of all atmospheric parameters affecting channel characteristics, their natural variability and their mutual dependence is needed;

d) that the quality of measured and suitably analysed radiometeorological data is one of the determinants of the ultimate reliability of propagation prediction methods that are based on meteorological parameters;

e) that an accurate knowledge of the clear-sky level on a satellite-to-ground link is important in developing the margin required to enable a telecommunications service to operate satisfactorily under adverse propagation conditions;

f) that the clear-sky level on a satellite-to-ground link can fluctuate significantly both diurnally and seasonally due to solar heating and atmospheric effects;

g) that interest exists in extending the range of frequencies used for telecommunication and remote sensing purposes;

h) that propagation conditions should be known as well as possible during the process of bringing into service (BIS) of radio-relay equipment,

decides that the following Question should be studied

1 What are the distributions of tropospheric refractivity, its gradients and their variability, both in space and time?

2 What are the distributions of atmospheric constituents and particles, such as water vapour and other gases, clouds, fog, rain, hail, aerosols, sand, etc., both in space and time?

3 What is the magnitude of the variations in clear-sky level on a satellite-to-ground link that can occur on a diurnal and seasonal basis?

4 What model best describes the diurnal and seasonal variations in the clear-sky level on a satellite-to-ground link?

5 How do the climatology and natural variability of the rain process affect attenuation and interference predictions, especially for tropical regions?

6 What models best describe the relationship between atmospheric parameters and radiowave characteristics (amplitude, polarization, phase, angle of arrival, etc.)?

7 What methods based on meteorological information can be used in the statistical prediction of signal behaviour, especially for percentages of time from 0.1 to 10%, taking into account the composite effect of various atmospheric parameters?

8 What procedures can be used to evaluate data quality, accuracy, statistical stability and confidence levels?

9 What method can be used to forecast propagation conditions during consecutive periods of 24 hours during any season anywhere in the world?

NOTE 1 – Priority will be given to studies relating to § 3, 4, 5, 7 and 9.

further decides

1 that the results of the above studies should be included in one or more Recommendations and/or Reports;

2 that the above studies should be completed by 2010.

Category: S2

Annex 6

QUESTION ITU-R 211-4/3

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

(1993-2000-2002-2005-2007)

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 may have impact on radiocommunication services;

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;

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

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

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

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 indoors, outdoors, and indoor-to-outdoors (operating range less than 1 km) including wireless communication and access systems and WLANs ?

2 What propagation models should be used for assessing impact of UWB devices on other recognized radiocommunication services?

3 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?

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

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

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

7 What are the effects of various diversity schemes?

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

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

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

11 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?

12 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?

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

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

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

16 How may propagation channels using multiple transmitters and multiple receivers be characterised for system design?

further decides

1 that the results of the above studies should be included in one ore more Recommendations and/or Reports;

2 that the above studies should be completed by 2009.

Category: S1