



Radiocommunication Bureau

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**Administrative Circular
CACE/551**

10 October 2011

**To Administrations of Member States of the ITU, Radiocommunication Sector Members,
ITU-R Associates participating in the work of the Radiocommunication Study Group 6
and ITU-R Academia**

Subject: Radiocommunication Study Group 6 (Broadcasting service)
– **Approval of 3 revised ITU-R Questions**

By Administrative Circular CAR/319 of 23 June 2011, 3 draft revised ITU-R Questions were submitted for approval by correspondence in accordance with Resolution ITU-R 1-5 (§ 3.4).

The conditions governing this procedure were met on 23 September 2011.

The texts of the approved Questions are attached for your reference (Annexes 1 to 3) and will be published in Revision 3 to [Document 6/1](#) which contains the ITU-R Questions approved by the 2007 Radiocommunication Assembly and assigned to Radiocommunication Study Group 6.

François Rancy
Director, Radiocommunication Bureau

Annexes: 3

Distribution:

- Administrations of Member States and Radiocommunication Sector Members participating in the work of Radiocommunication Study Group 6
- ITU-R Associates in the work of Radiocommunication Study Group 6
- ITU-R Academia
- 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
- Secretary-General of the ITU, Director of the Telecommunication Standardization Bureau, Director of the Telecommunication Development Bureau

ANNEX 1

QUESTION ITU-R 132-2/6*

Digital terrestrial television broadcasting technology and planning

(2010-2011-2011)

The ITU Radiocommunication Assembly,

considering

- a) that many administrations have already introduced, and others are introducing, Digital Terrestrial Television Broadcasting (DTTB) services in VHF (Band III) and/or UHF (Bands IV/V) bands;
- b) that experience gained through the implementation of DTTB services will be useful in refining the assumptions and techniques to be applied in the planning and implementation of DTTB services,

decides that the following Questions should be studied

- 1** What are the frequency planning parameters for such services, including but not limited to:
 - minimum field strengths;
 - implications of modulation and emission methods;
 - receiving and transmitting antenna characteristics;
 - implications of using diversity transmission and reception methods;
 - location correction values;
 - time variability values;
 - single frequency networks;
 - speed ranges;
 - environmental noise and its impact on digital terrestrial TV reception;
 - effect of wet foliage on digital terrestrial TV reception;
 - effect of wind turbine farms and airplane flutter on digital terrestrial TV reception;
 - building penetration loss;
 - indoor location variations?

- 2** What is the likely impact on matters related to the planning of broadcasting networks for terrestrial television broadcasting in the migration from existing¹ digital television modulation parameters to new and more spectrally efficient² modulation parameters?
- 3** What protection ratios are required when two or more digital transmitters of the same system, digital television and multimedia transmitters of different systems, or analogue and digital television transmitters are operating:
 - in the same channel;
 - in adjacent channels;
 - with overlapping channels;
 - in other potential interference relationships (e.g. image channel)?
- 4** What receiver characteristics should be used for frequency planning with respect to more efficient use of the frequency spectrum (e.g. selectivity, noise figure, etc.)?
- 5** What are the protection ratios needed to protect television broadcasting services from other services sharing the bands or operating in adjacent bands?
- 6** What techniques can be used to mitigate interference?
- 7** What are acceptable durations of outages due to local short-term interference to DTTB services?
- 8** What are the technical bases required for planning which lead to efficient utilization of the VHF and UHF bands for terrestrial television services?
- 9** What are the characteristic multipath conditions that need to be taken into account in the planning of such services?
- 10** What time availability percentages can be practically achieved in DTTB service implementation and what margins in planning parameters are required to achieve these time availability percentages?
- 11** What technical or planning criteria can be optimized to facilitate the implementation of terrestrial digital broadcasting, taking into account existing services?
- 12** What are the characteristics of the mobile multipath channel that need to be taken into account in the use of mobile reception, at different speeds?
- 13** What are the characteristics of the multipath channel that need to be taken into account in the use of hand-held reception, at different speeds?
- 14** What are the appropriate methods to multiplex the required signals (including vision, sound, data, etc.) into the channel?
- 15** What are the appropriate methods for error protection?

¹ For example DVB-T (ITU-R DTTB System B).

² For example DVB-T2.

- 16** What are the appropriate modulation and emission methods and their relevant parameters, for the broadcasting of digitally encoded TV signals in terrestrial channels?
- 17** What are the appropriate strategies to introduce and implement digital terrestrial TV broadcast services, taking account of existing terrestrial broadcast services?
- 18** What are radiocommunication technologies or applications that could be provided by digital terrestrial TV systems and what sets of system parameters could be used for different applications?
- 19** What strategies should be employed by administrations, particularly those sharing common borders, for migration from an established digital terrestrial television broadcasting service to a more advanced digital terrestrial television broadcasting service?

further decides

- 1** that the results of the above studies should be included in (a) Report(s) and/or Recommendation(s);
- 2** that the above studies should be completed by 2015.

Category: S3

ANNEX 2

QUESTION ITU-R 44-4/6

Objective picture quality parameters and associated measurement and monitoring methods for digital television images

(1990-1993-1996-1997-2002-2003-2005-2006-2011)

The ITU Radiocommunication Assembly,

considering

- a) that considerable progress in digital television standards has been achieved;
- b) that the Radiocommunication Study Group is responsible for setting the overall quality performance of broadcasting chains;
- c) that for television systems, ranging from low-definition systems¹ through SDTV to EHRI and including specific applications such as multiprogramming and digital multimedia video information systems (VIS) for collective, indoor and outdoor viewing, it is essential to identify objective picture quality parameters as well as associated performance measurement and monitoring methods, for the studio environment and in broadcasting;
- d) that display technology, including fixed pixel displays, have digital pre-processing which may introduce unexpected artifacts, such as pixel rescaling, contrast ratio compensation, colorimetry correction, etc.;
- e) that it would be an advantage if measurement methods used for such tasks were unified for HDTV, SDTV and low-definition systems;
- f) that impairments to television pictures can be shown to correlate with measurable features of the signals;
- g) that overall picture quality is related to the combination of all impairments;
- h) that developments in the statistical characterization of television images and modelling of the human visual system may lead to the replacement of subjective assessment by objective measurement in certain applications;
- j) that in the case of digital TV it is necessary in particular to assess the performance of bit rate reduction methods both in terms of subjective and objective parameters;
- k) that the measurement of performance requires agreed standard test materials and methods based on moving and static images;

¹ These are those systems having a lower resolution than SDTV, such as those now used for mobile or handheld reception of broadcast programmes.

- l) that the scrambling process used in conditional access broadcasting may require special steps to be taken where bit-rate reduction is to be employed;
- m) that continuous evaluation and monitoring of quality (including dynamic resolution) is needed;
- n) that viewing conditions are different for outdoor and indoor applications,

decides that the following Questions should be studied

- 1** What are the objective performance parameters for each application identified, and for each digital TV format?
- 2** What are the necessary test materials and test signals required for the objective quality measurement of different applications?
- 3** What methods should be used for measuring and monitoring the parameters defined in §§ 1 and 2 to cover all motion artifacts and impairments including those introduced by the display pre-processor?
- 4** What characteristics should be recommended for a cost-effective quality meter which gives a direct displayed indication of picture quality?
- 5** What steps are necessary to coordinate the scrambling and bit-rate reduction processes so as to maintain the desired subjective and objective quality?
- 6** What characteristics should be recommended for a high quality electronic evaluation method for testing the quality of digital television pictures?

further decides

- 1** that the results of the above studies should be included in (a) Report(s) and/or (a) Recommendation(s);
- 2** that the above studies should be completed by 2015.

Category: S3

ANNEX 3

QUESTION ITU-R 102-1/6

Methodologies for subjective assessment of audio and video quality

(1999-2011)

The ITU Radiocommunication Assembly,

considering

- a) that Recommendations ITU-R BS.1116, ITU-R BS.1283, ITU-R BS.1284, ITU-R BS.1285 and ITU-R BT.500, and Report ITU-R BT.1082, have established primary methods for the subjective quality assessment of audio (including multichannel presentation) or visual (including stereoscopic presentation) systems respectively;
- b) that Recommendation ITU-R BS.1286 has established primary methods for the subjective quality assessment of audio in the presence of high quality television image;
- c) that the perceptual interaction between the audio and visual modalities can affect their mutual qualities and the overall perceived quality;
- d) that existing methods for the subjective assessment of audio quality are sometimes inadequate for audio systems with accompanying visual presentation;
- e) that there are no generally applicable methods for the subjective assessment of visual quality with accompanying audio presentation;
- f) that there are no known methods for the subjective assessment of both audio and visual presentation simultaneously;
- g) that a wide range of multimedia systems, including digital multimedia video information systems (VIS) for collective, indoor and outdoor viewing, comprise audio-visual presentations. Such systems have a wide range of applicability in terms of:
 - terminal types (standard and high definition television, computer terminals, (mobile-) multimedia terminals);
 - applications (entertainment, education, information services);
 - presentation quality (low, intermediate, high);
 - presentation environments (domestic, office, outdoor, professional);
 - delivery systems (internet, mobile networks, satellite, broadcast),

decides that the following Questions should be studied

- 1 What are the quality attributes for audio-visual perception?
- 2 How the context dependent quality balance between audio and visual presentation* should be considered?
- 3 What are the subjective test methodologies** required for different applications and quality levels for:
 - audio-visual presentation?
 - visual presentation in the presence of audio (audio presentation at a constant quality level)?
 - audio presentation in the presence of visual (visual presentation at a constant quality level)?
- 4 How could such methodologies be used as criteria to identify quality attributes that are important for different application areas of audio-visual presentation, including VIS?
- 5 How could they be used to express quality requirements for audio and visual modalities for different application areas and to assess their optimization?

further decides

- 1 that the results of the above studies should be included in (a) Recommendation(s);
- 2 that the above studies should be completed by 2015.

* Examples might include the importance of synchronisation between audio and visual presentation for talking head applications, changing focus in sports transmissions (from fast moving objects, where video is most important, to the cheering crowd after certain event, where the audio catches the attraction).

** This should include, for example, the harmonisation of grading scales employed in audio and visual testing at present (refer to present ITU-R BS and BT and ITU-T Recommendations), test environments, viewing and listening distances, training procedures, etc.