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| **Radiocommunication Assembly (RA-15)Geneva, 26-30 October 2015** |  |
| **INTERNATIONAL TELECOMMUNICATION UNION** |  |
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|  | **Annex 1 to Document 6/1001-E** |
| **1 October 2015** |
|  |
| Chairman, Radiocommunication Study Group 6 |
| report of the working parties and joint task groupof study group 6 |
|  |

# 1 Working Party 6A – Terrestrial broadcasting delivery

## 1.1 Introduction

The activities of Working Party 6A cover the areas of terrestrial system characteristics, channel coding/decoding, modulation/demodulation, frequency planning and sharing for sound, video, multimedia and interactivity, characteristics of transmitting and receiving antennas and evaluation methods of service area, transmitter and receiver reference performance requirements, requirements for source coding and for metadata as far as the terrestrial emission of broadcasting is concerned.

During the past study period, the Working Party considered the transition from analogue to digital terrestrial broadcasting, assisted in relevant studies and development of text for incorporation in the Report of the CPM (to WRC-15), studied issues related to the protection of the broadcasting service from interference (particularly from unlicensed users of the broadcasting spectrum and carried out studies related to sharing of the UHF terrestrial television frequency band with the mobile service.

The Working Party, chaired by Mr Larry Olson (USA), held eight meetings during the study period 2012-2015. The list of Vice-Chairmen of the Working Party is given in the Attachment 1 to Document 6/1001.

## 1.2 Results

### 1.2.1 Review of ITU-R texts

Over the study period, Working Party 6A reviewed all the ITU-R texts that were under its responsibility and suppressed a number of them which had become outdated and irrelevant. These included Questions, Recommendations, Reports, Handbooks and Opinions. The result of this activity is summarized below.

#### 1.2.1.1 Questions

The Working Party:

• proposed four revisions to existing Questions (Q.133/6, 136/6, 136-1/6 and 132-2/6); and

• proposed to suppress 10 Questions (Q.4-2/6, Q.14/6, Q.15-2/6, Q.27/6, Q.29/6, Q.51.6, Q.53/6, Q.60/6, Q.64-1/6 and Q.108/6). The proposed suppressions are currently under approval (CACE/746).

As a result, there are now 19 Questions relating to the subjects mentioned above (see § 1.1) that remain under the responsibility of the Working Party.

#### 1.2.1.2 Recommendations

Four new Recommendations have been produced, twenty Recommendations have been revised, one Recommendation has been editorially updated, and no Recommendations have been suppressed.

#### 1.2.1.3 Reports

Twenty-one Reports have been produced and twenty-seven Reports have been revised.

#### 1.2.1.4 Handbooks

A Handbook on digital terrestrial television was revised.

**1.2.1.5 Liaison statements**

The Working Party prepared many liaison statements covering subjects such as: terrestrial television broadcasting coverage and planning criteria, interference assessment, compatibility studies, coexistence of wired telecommunications with radiocommunication systems; the adoption of a Report on broadcasting for public warning, disaster mitigation and relief; human exposure to RF fields from broadcast transmitters; the transition from analogue to digital broadcasting, requirements for the introduction of and transition to ultra-high definition television; WRC-15 preparation (sharing parameters, technical and operational characteristics, adjacent band compatibility, spectrum requirements, and propagation); Recommendations and Reports for consideration by ITU-R JTG 4-5-6-7; and draft revision of a report on sharing and compatibility studies between digital terrestrial television broadcasting and terrestrial mobile broadband applications.

### 1.2.2 Transition from analogue to digital terrestrial broadcasting

Working Party 6A continued to revise Report ITU-R BT.2140 on the transition from analogue to digital terrestrial broadcasting. This comprehensive Report provides detailed information on the various digital systems for television and sound broadcasting that are in use worldwide and has many country case studies which describe the paths taken by those countries during their digital switchover. This Report is of interest to the Development Sector (ITU-D) which has a study Question on the topic and it continues to be updated with additional country-related information.

### 1.2.3 Working Party 6A Workshop/Seminar on the use of the TV spectrum

Recognizing a substantial amount of activity throughout the world with respect to actions involving the current and future use of broadcasting spectrum, four administrations (USA, Australia, UK and South Africa) delivered presentations during a half-day session during the October 2012 meeting. The presentations provided insight into various methods and policies that are in various stages of consideration and implementation in their countries. As this was mostly an informal session and was not widely publicized, several attendees expressed an interest to promote a similar and/or an expanded session in the future.

### 1.2.4 Preparation for WRC-15

The Working Party was involved in the development and studies related to preparation of draft text for the CPM Report, that would be submitted to WRC-15. In particular, the Working Party worked on the following WRC-15 Agenda items: 1.1 1.2, 1.3, 1.14, 1.15, 1.16, 1.17 and 9.1.8.

## 1.3 Liaison with other Working Parties, Study Groups, and international organizations

The Working Party interacts closely with other ITU-R Working Parties particularly on issues related to sharing and protection. There is also collaboration with ITU-D Study Group 2 on the transition from analogue to digital terrestrial broadcasting.

## 1.4 Future work[[1]](#footnote-1)

The Working Party already has a large number of items to consider in the foreseeable future. Among them are planning criteria, including protection ratios, for 2nd generation digital terrestrial television services in the VHF/UHF bands; guidelines for assessment of interference into the broadcasting service from other services/applications; preparation of a Handbook on digital terrestrial television (DTTB) and multimedia implementation; guidelines on measurements for digital terrestrial television broadcasting systems; and possible continuation of work on ITU-R Report ITU-R BT.2337 dealing with sharing and compatibility studies between digital terrestrial television broadcasting and terrestrial mobile broadband applications, including IMT, in the frequency band 470-694/698 MHz.

# 2 Working Party 6B – Broadcast service assembly and access

## 2.1 Introduction

Working Party 6B, chaired by Mr Yukihiro Nishida (Japan), held eight meetings during the study period 2012-2015. WP 6B is responsible for “broadcast service assembly and access” including interfaces in the production chain and for contribution and distribution of broadcast signals, source coding for all broadcasting services, multiplexing/demultiplexing of content, metadata for broadcast services, multimedia/interactive services carried on radiocommunication broadcast systems, cross-platform middleware for multimedia/interactive broadcast programmes and converged services, protocols of return channels for interactive programmes, quality and service requirements for ENG/SNG and broadcasting satellite services, access control and management of programme delivery.

## 2.2 Results

### 2.2.1 Review of ITU-R texts

Working Party 6B has reviewed all the ITU-R texts within its purview, including Questions, Recommendations, Reports and Opinions. The result is summarized below.

#### 2.2.2.1 Questions

The Working Party:

• developed two new Questions (Q.137/6 and Q.138/6);

• revised two Questions (Q.130-1/6 and Q.45-4/6);

• editorially updated 14 Questions (12-3/6, 15-2/6, 16-2/6, 19-1/6, 34-2/6, 45-4/6, 49-1/6, 111-1/6, 113/6, 126-1/6, 130-2/6, 131/6, 137/6, 138/6); and

• suppressed two Questions (Q.15-2/6 and Q.16-2/6).

In addition, a new Question (Q.140/6) on global platform for broadcasting has been assigned to Working Party 6B.

There are now 12 Questions that remain in force representing the main subjects of broadcast service assembly and access within the purview of Working Party 6B.

#### 2.2.2.2 Recommendations

Fifteen Recommendations have been produced (BT.2026, BT.2027, BS.2032, BT.2037, BT.2038, BT.2053, BT.2054, BT.2055, BT.2056, BT.2073, BT.2074, BT.2075, BS.2076, BT.2077, BS.[BW64]), 12 Recommendations have been revised (BS.1196-4, BT.1203-1, BR.1352-3, BT.1364-3, BT.1365-1, BT.1367-1, BS.1548-3, BT.1674, BT.1699-1, BT.1833-2, BT.1870, BT.2077-0), and six Recommendations have been editorially updated (BT.1120-8, BT.2026, BT.2037, BT.2053, BT.2054, BT.2073).

#### 2.2.2.3 Reports

Four Reports have been produced (BT.2267, BT.2268, BT.2342, BS.[ADM-USAGE]), and three Reports have been revised (BT.2049-5, BT.2249-3, BT.2267-4).

#### 2.2.2.4 Opinions

One Opinion has been suppressed (Opinion 90).

### 2.2.3 Integrated broadcast-broadband (IBB) systems

Working Party 6B has advanced studies on Integrated broadcast-broadband (IBB) systems which combines delivery through a radiocommunication broadcasting channel and that through telecommunication channels in collaboration with ITU-T SG 9 by establishing Inter Sector Rapporteur Group. Three new Recommendations have been produced (BT.2037, BT.2053, and BT.2075) and one new Report has been produced (BT.2267).

### 2.2.4 Digital interfaces for UHDTV studio signals

Following the establishment of Recommendation ITU-R BT.2020 on UHDTV image formats for programme production and international exchange, Working Party 6B studied digital interfaces for UHDTV studio signals. Since payload data rates of UHDTV are significantly higher than those of HDTV, e.g., a maximum payload data rate is 144 Gbit/s, new approaches were required to transport UHDTV signals. The effort resulted in the development of Recommendation ITU-R BT.2077.

### 2.2.5 Audio related metadata and file formats

Working Party 6B has been studying metadata and file formats for advanced sound systems specified in Recommendation ITU-R BS.2051. An advanced sound system uses audio data in combination with an appropriate set of metadata to specify a sound scene to be delivered/broadcasted. The studies resulted in Recommendation ITU-R BS.2076 that describes the structure of a metadata model that allows the format and content of audio files to be reliably described, Recommendation ITU-R BS.[BW64] that specifies the BW64 (Broadcast Wave 64Bit) audio file format to enable the file to carry large multichannel files and metadata, and Report BS.[ADM-USAGE] on usage guidelines for the Audio Definition Model and multichannel audio files.

### 2.2.6 Multimedia broadcasting for reception by handheld receivers

Working Party 6B restructured Recommendation ITU-R BT.1833 on multimedia broadcasting systems for reception by handheld receivers, by dividing the text into three key technological categories, and produced Recommendation ITU-R BT.2054 on multiplexing and transport and Recommendation ITU-R BT.2055 on multimedia applications and presentation. The revised BT.1833 describes the user requirements of multimedia broadcasting systems for mobile reception and overviews of each system.

#### 2.2.7 Satellite delivery

WP 6B has been communicating with Working Party 4B on satellite delivery systems including broadcasting-satellite service (BSS) and satellite news gathering (SNG). Study Group 6 appointed a Rapporteur on the joint activities for the study of BSS.

## 2.3 Liaison and collaboration with other Working Parties, Study Groups, and international organizations

WP 6B has communicated with other Working Parties, Study Groups, and international organizations as summarized below. WP 6B has been involved in Inter Sector Rapporteur Groups on Integrated Broadcast-Broadband (IBB) systems and on audiovisual media accessibility.

| Destination | Subject |
| --- | --- |
| ITU-T SG 9 | Integrated broadcast-broadband (IBB) systemsApplication formats for interactive TVScalable video transmission systemClosed captions |
| ITU-T SG 13 | Information control networks |
| ITU-T SG 16 | Integrated broadcast-broadband (IBB) systemsHigh Efficiency Video Coding (HEVC)IPTV basic terminal modelClosed captionsBroadcasting of multimedia and data applications |
| ITU-T FG-AVA | Audiovisual media accessibility |
| ITU-T FG-SmartCable | Smart Cable |
| IRG-AVA | Captioning |
| CCV | Terms, acronyms and definitions |
| ITU-R WP 4B | UHDTV satellite broadcastingDVB-S2X satellite broadcasting system |
| ITU-R WP 5D | Audio-visual capabilities and applications provided over terrestrial IMT systems |
| ITU-R WP 6A | Consumer receivers for worldwide broadcasting roamingNew technology platform for delivery of broadcasting contentWorldwide broadcasting roaming |
| ITU-R WP 6C | Methods for signalling loudness complianceMetadata descriptors for sound contentDefinition of intermediate audio qualityColour-gamut tailoringRenderers for object-based audioAdvanced sound systems |
| ITU-R SG 6 RG on spectrum requirements | Spectrum requirements for broadcasting |
| ITU-R WP 7A | WRC-15 Agenda item 1.14 - Future of the Coordinated Universal Time time-scale |
| IEC TC 100 | Receivers for worldwide roaming |
| ISO/IEC JTC1/SC29/WG11 (MPEG) | HEVCMPEG Media Transport (MMT)Interactive application formatsPotential bit rates for UHDTVMetadata model for audio formatsMetadata descriptors for sound contentAudio coding for digital broadcastingMetadata and audio delivery formats  |
| SMPTE TC-35PM | Audio definition model (ADM) |
| Audio Engineering Society | Synchronization of digital audio sample clock to video referencesMetadata model for audio formats |
| World Wide Web Consortium (W3C) | Subtitles and captions |
| Advanced Television Systems Committee (ATSC) | HEVC for broadcasting |
| Digital Video Broadcasting (DVB) Project | HEVC for broadcasting |

## 2.4 Future work

WP 6B will continue to study technologies for new broadcasting systems and applications such as high-speed signal interfaces in studio including IP-based, high-efficiency compression coding, file formats, metadata, transport methods, and global platform for broadcasting.

# 3 Working Party 6C – Programme Production and Quality Assessment

## 3.1 Introduction

Working Party 6C studies issues associated with what is termed the “presentation layer” for radio and television broadcasting, including signal formats for the making and exchange of television and radio programmes plus ways to evaluate picture and sound quality, which is a critical element in the choice of the parameters for the “presentation layer”.

Amongst the areas studied are vision and sound formats for quality of television and radio signals, high-definition television, and the television and radio of tomorrow, which includes Next Generation Audio (aka Advanced Sound Systems), ultra high definition (UHDTV) and 3DTV. Other areas under its remit are Colorimetry, audio issues such as “loudness”, and video and audio quality evaluation.

Further areas of study are television and sound programme recording for international programme exchange and archives, including the specification of the technical parameter values and the operating practices to which such television and sound-programme recordings should comply.

Working Party 6C, chaired by Dr David Wood (EBU), held eight meetings during the study period 2011-2015. The Vice-Chairmen of the Working Party include Craig Todd from the USA, who has special responsibility for audio issues and Mr Baroncini from Italy. Paul Gardiner from the UK has been particularly responsible for video issues in the current study period. Prof Chulhee Lee from Korea has led the discussions on video quality evaluation, and Dr P. Crum from the USA has led the discussions on audio quality evaluation.

## 3.2 Results

#### 3.2.1 Review of ITU-R texts

Over the study period Working Party 6C reviewed all the ITU-R texts that were under its responsibility and suppressed a number of them which had become outdated and irrelevant. These included Questions, Recommendations, Reports, Handbooks and Opinions. The result of this activity is summarized below.

#### 3.2.1.1 Questions

The Working Party:

• developed one new Question (Q.139/6) and two draft new Questions currently under approval (CACE/746);

• proposed five revisions to the existing Questions (Q.40-2/6, Q.102-1/6, Q.102-2/6, Q.128-1/6, Q.135/6); and

• proposed to suppress 17 Questions (Q.15-2/6, Q.46-1/6, Q.48/6, Q.55/6, Q.59-1/6, Q.88/6, Q.89-1/6, Q.93/6, Q.95/6 Q. 96-1/6, Q.99/6, Q.100/6, Q.112-1/6, Q.113/6, Q.121/6, Q.122/6 and Q.123/6). The proposed suppressions are currently under approval (CACE/746).

As a result, there are now 12 Questions (if all proposals are approved) relating to the subjects mentioned above (see 3.1) that remain under the responsibility of the Working Party.

A critical new Question 139/6 concerns Methods for Rendering Advanced Audio Formats. This question addresses the issue of how “audio objects”, which may be the new currency of sound broadcasting, are transformed into specific signals needed for the home loudspeaker arrangements.

#### 3.2.1.2 Recommendations

The following Recommendations were completed in the study period.

Recommendation ITU-R BT.2020-1 – Parameter values for ultra-high definition television systems for production and international programme exchange.

*This recommendation provides for a new generation of television production and broadcasting that will be used for decades to come. Rec. 2020-1 image quality offers the most realistic and immersive television that the world has seen.*

Recommendation ITU-R BS.1116-2 – Methods for the subjective assessment of small impairments in audio systems.

*This recommendation makes a major contribution to the tools for evaluating high quality audio systems.*

Recommendation ITU-R BT.2021 – Subjective methods for the assessment of stereoscopic 3DTV systems.

*This recommendation makes a major contribution to the tools available for evaluating plano-stereoscopic television systems.*

Recommendation ITU-R BS.1534-1 – Methods for the Subjective assessment of Intermediate Quality Levels of Audio Systems.

*This recommendation makes a major contribution to the tools for evaluating medium quality audio systems.*

Recommendation ITU-R BS.2051 – Advanced Sound System for Programme Production.

*This recommendation introduces the main elements of what will become the audio systems of the future, and provides a comprehensive technology base for the future of sound broadcasting and sound accompanying television.*

Recommendation ITU-R BT.2050 – Use of UHDTV image systems for capturing, editing, finishing, and archiving high quality HDTV programmes.

*Making programmes in UHDTV will provide the opportunity for creating HDTV programmes by down-conversion that can be of higher quality than programmes originated in HDTV. This Recommendation offers guidance on this.*

Recommendation ITU-R BT.2035 – A reference viewing environment for evaluation of HDTV program material or completed programs.

*Programme technical quality needs to be evaluated in a number of different environments, including testing and monitoring. This recommendation offers guidance on this.*

Recommendation ITU-R BT.2022 – General Viewing Conditions for Subjective Assessment of Quality of SDTV and HDTV Television Pictures on Flat Panel Displays.

*It will be necessary to perform subjective evaluations using flat panel displays, which have different characteristics to CRT. This recommendation gives guidance on this.*

Recommendation ITU-R BT.1438 – Subjective Methods for the Assessment of Stereoscopic 3DTV systems.

*Stereoscopic 3D television brings new challenges for subjective evaluations, because of issues such as the degree of depth perception. This recommendation offers guidance.*

Recommendation ITU-R BS.775-2 – Multichannel Stereophonic Sound Systems With and Without Accompanying Picture.

Recommendation ITU-R BS.1770-2 – Algorithms to Measure Audio Programme Loudness and True Peak Level.

*The Study Group 6 work on loudness is considered of great value to the audio visual industry, and this recommendation provides the basis for the concept of “loudness”.*

Recommendation ITU-R BS.2019 – Audio Systems for the Production and International Exchange of 3DTV Programmes for Broadcasting.

*The audio component of a 3DTV television programme can be an important part of the viewing experience for which this recommendation offers guidance*.

Recommendation ITU-R BT.2023 – Performance Requirements for the Production, International Exchange and Broadcasting of 3DTV Programmes.

*This recommendation offers general guidance on requirements for 3DTV production.*

Recommendation ITU-R BT.2024 – HDTV Digital Image Systems for the Production and International Exchange of 3DTV Programs for Broadcasting.

*3DTV content can be specifically prepared using the Rec. 709 formats, and this Recommendation offers guidelines for doing so.*

Recommendation ITU-R BT. 2025 – 1280 x 720 Digital Image Systems for the Production and International Exchange of 3DTV Programs for Broadcasting of 3DTV Programmes.

*3DTV content can be specifically prepared using the 720p format, and this Recommendation offers guidelines for doing so.*

#### 3.2.1.3 Reports

The following Reports were completed in the current study period.

ITU-R BS.2159-6 – Multichannel sound technology in home and broadcasting applications

*This report offered an introduction to next generation audio.*

Report ITU-R BT.2246-3 – The present state of ultra-high definition television

*This report provides one of the most complete publications on the factors affecting ultra high definition television. It is widely read and cited.*

Report ITU-R BS.2054 – Audio levels and loudness.

*One of the major achievements of the ITU-R Study Group 6 has been the widespread use of “loudness” technology which solves a major problem broadcasters and viewers have experienced – differential levels of sound across different content.*

Report ITU-R BT.2293 – Principles for the comfortable viewing of stereoscopic three-dimensional television (3DTV) images.

*Viewers can find stereoscopic viewing tiring unless care is taken in production. This report, also send to the WHO, provided guidance to make viewing as comfortable as possible.*

Report ITU-R BT.2245 – HDTV and UHDTV test materials for assessment of picture quality.

*Study Group 6 continues to provide test material for the subjective evaluation of image quality. This report provides material for the new image systems.*

Report ITU-R BS. 2300 – Methods for Assessor Screening.

*The Assessors of quality evaluations are screened for consistency and visual acuity. This Report offers guidance.*

Report ITU-R BS.2266 – Framework for Future Audio Broadcasting Systems.

Report ITU-R BT.2160-3 – Features of three dimensional television systems for broadcasting.

Report ITU-R BT.2249-1 – Digital broadcasting and multimedia video information systems.

Report ITU-R BT.2207-1 – Accessibility to broadcasting services for persons with disabilities.

Report ITU-R BS.2217 – Compliance Material for Recommendation ITU-R BS.1770.

Report ITU-R BT.2250 – Delivery of Wide Colour Gamut Image Content through SDTV and HDTV image systems.

Report ITU-R BT.2160-2 – Features of Three Dimensional Television Video Systems for Broadcasting – Visual Fatigue in Viewing Stereoscopic Images.

A new Report on colorimetry BT.[TV\_COLORIMETRY\_ELEMENTS] – TV colorimetry elements has been finalized in 2015. *This report has been under development since the beginning of the study period and its completion is a major success.*

### 3.2.2 Three-dimensional television (3DTV)

Working Party 6C started the last study period with a new study Question (Q.128/6) on three-dimensional television broadcasting and produced a Report on the subject (Report ITU-R BT.2160). Though the Report produced has been used throughout the world as a reference for 3DTV standards, we did not succeed in developing a draft Recommendation for a 3DTV broadcasting specification. Interest in 3DTV has however diminished in recent years as the limitations of the stereoscopic image process in the domestic environment have become apparent. Interest may revive in future if new approaches that allow glasses-free viewing become available. For the moment the broadcasting community regards 3DTV as “in abeyance”.

#### 3.2.3 Ultra-high definition television (UHDTV)

#### A major achievement of Working Party 6C was the agreement on ITU-R BT 2020 which is now the worldwide reference for Ultra High Definition Television.

The Recommendation left open the development of a further Recommendation for a new transfer function to take into account the future higher brightness television displays. The task of agreeing such a recommendation is now the most pressing task of Working Party 6C, and extensive experimental work and a large number of meetings have taken place. We hope for agreement early in the next study period.

#### 3.2.4 Accessibility to multimedia and broadcasting

Noting the approval of the [UN Convention on the Rights of Persons with Disabilities](http://www.un.org/disabilities/default.asp?navid=13&pid=150) and Resolution 179 (PP-10, Guadalajara), Working Party 6C has studied how Study Group 6 could facilitate the consumption of audio-visual media by persons with ageing, sight and hearing disabilities. A joint ITU-EBU workshop on the topic was held in 2010, which recommended the creation of an ITU-T Focus Group (FGAVA) with a specific mandate to facilitate the participation of experts from ITU-R, ITU-T and all other stakeholders from user associations and manufacturers. FGAVA provided its report at the end of 2012.

Work in this area has continued with the establishment of a new “Inter Sector Rapporteurs Group” in Audio Visual Accessibility, the IRG-AVA. The establishment of the group is a new departure for ITU-R. IRG-AVA reports to ITU-R Study Group 6, ITU-R SG 16 and ITU-R SG 12, and has three co-chairs, nominated by each of the SGs.

### 3.2.5 Establishment of a new Inter Sector Rapporteur Group on common methods of Quality Evaluation

A new Inter Sector Rapporteur Group, the IRG AVQA, was established to propose common methodologies for quality evaluation for broadcast, cable, and Internet. The group has three co-chairs from ITU-R Study Group 6, ITU-R Study Groups 9 and 12.

### 3.3 Liaison with other Working Parties, Study Groups, and international organizations

Working Party 6C maintains close liaison with other groups such as ISO/IEC JTC 1/SC 29/WG 11(MPEG), ISO TC 100, SMPTE, Audio Engineering Society Standards Committee (AESSC), ITU-T Study Groups 9, 12 and 16, ITU-T FG AVA, ITU-T VQEG, IRG-AVA, IRG-AVQA, and exchanges liaison statements on various issues of common interest.

### 3.4 Future work

The main areas of critical activity in the scope of Working Party 6C include the following:

– The system used to enable a High Dynamic Range (HDR) to be used for Programme Production and Exchange. This needs to do justice to the television displays available in the coming years that will have much higher peak screen brightness than today

– The optimum methods for converting images between Dynamic Range systems

– The optimum methods for mapping television images between different colour spaces.

The scientifically challenging task of developing reliable objective methods for measuring the quality of multichannel sound systems:

– Methods for adapting the parameter values of the display to its viewing environment

– The major ITU Recommendation on quality evaluation, used universally, is in urgent need of restructuring and updating

– There are potential methods that build on the successful loudness meter and would provide further tools to help broadcasters.

# 4 Joint Task Group 4-5-6-7 – Studies related to WRC-15 agenda items 1.1 and 1.2

In this study period, Joint Task Group 4-5-6-7 (JTG 4-5-6-7) was established by the first session of the CPM-15 as the responsible group to deal with the studies for the following WRC-15 agenda items 1.1 and 1.2:

– to consider additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for IMT and related regulatory provisions, to facilitate the development of terrestrial mobile broadband applications, in accordance with Resolution **233 (WRC‑12)**;

– to examine the results of ITU‑R studies, in accordance with Resolution **232 (WRC‑12)**, on the use of the frequency band 694-790 MHz by the mobile, except aeronautical mobile, service in Region 1 and take the appropriate measures.

The JTG has held six meetings. The first two meetings were chaired by Mr Thomas Ewers (Germany), and the later four meetings were chaired by Mr Martin Fenton (United Kingdom).

Through the six meetings, the JTG received more than 700 inputs from membership as well as the contributing groups in the ITU-R. Based on these contributions, the JTG completed the draft CPM texts for agenda items 1.1 and 1.2 and developed a number of ITU-R Reports on the sharing/compatibility studies.

WRC‑related outputs produced by Joint Task Group 4-5-6-7

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| Agenda item  | WRC Resolutions | Related Reports |
| 1.1 | Resolution **233 (WRC‑12)** | Report ITU-R BS.2340-0, Report ITU-R BT.2337-0Report ITU-R F.2326-0, Report ITU-R F.2327-0Report ITU-R F.2328-0, Report ITU-R F.2331-0Report ITU-R F.2333-0, Report ITU-R M.2324-0Report ITU-R RA.2332-0, Report ITU-R RS.2336-0Report ITU-R S.2367-0, Report ITU-R S.2368-0Report ITU-R SA.2325-0, Report ITU-R SA.2329-0 |
| 1.2 | Resolution **232 (WRC‑12)** | Report ITU-R BT.2338-0, Report ITU-R BT.2339-0 |

It was agreed between the four study groups that any future revision of the Reports developed by the JTG should be undertaken jointly by the relevant study groups, except for those in F-series and M-series which are sole responsibility of Study Group 5.

Detailed information on the work of JTG 4-5-6-7 is provided in Annex 4 to Document 4/1001 (Report of Chairman of Study Group 4 to RA-15) and Study Group 6 Document 6/260 (Report from Chairman of JTG 4-5-6-7 to Study Groups 5 and 6).

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1. Considerations provided by the Chairman by Working Party 6A. [↑](#footnote-ref-1)