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| ITU-T Study Group 9 |
| Television and sound transmission and integrated broadband cable networks |
| REPORT of ITU-T SG9 TO THE WORLD TELECOMMUNICATION STANDARDIZATION ASSEMBLY (WTSA-16), PART I: GENERAL |

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| --- | --- |
| **Abstract:** | This contribution contains the report of ITU-T Study Group 9 to WTSA-16 concerning its activities during the 2013-2016 study period. |

Note by the TSB:

The report of Study Group 9 to the WTSA-16 is presented in the following documents:

Part I: **Document 7** – General

Part II: **Document 8** – Questions proposed for study during the study period 2017-2020

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# 1 Introduction

## 1.1 Responsibilities of Study Group 9

Study Group 9 was entrusted by the World Telecommunications Standardization Assembly (Dubai, 2012) with the study of 13 Questions in the area of :

− use of telecommunication systems for contribution, primary distribution and secondary distribution of television, sound programmes and related data services including interactive services and applications, extendable to advanced capabilities such as ultra-high definition television, 3D television, etc.;

− use of cable and hybrid networks, primarily designed for television and sound programme delivery to the home, as integrated broadband networks to also carry voice or other time-critical services, video-on-demand, interactive services, etc. to customer premises equipment (CPE) in the home or enterprise.

## 1.2 Management team and meetings held by Study Group 9

Study Group 9 met 6 times in Plenary and 6 times in Working Partiesin the course of the study period (see Table 1) under the chairmanship of Mr Arthur Webster assisted by Vice-Chairmen Mr Antoine Boustani, Mr Ayanzhan Shulembaevich Buldybayev, Mr Satoshi Miyaji, Mr Habib Tall, and Mr Dong Wang.

In addition many Rapporteurs’ meetings (including e-meetings) took place during the study period in different locations, see Table 1-bis.

TABLE 1
Meetings of Study Group 9 and its Working Parties

| Meetings | Place, date | Reports |
| --- | --- | --- |
| Study Group 9 | [Geneva, 14 - 18 January 2013](http://www.itu.int/md/meeting.asp?lang=en&parent=T13-SG09-130114) | COM 9 – R 1 |
| Study Group 9 | [Geneva, 3-11 December 2013](http://www.itu.int/md/meeting.asp?lang=en&parent=T13-SG09-131203) | COM 9 – R 2 |
| Study Group 9 | [Geneva, 8-12 September 2014](http://www.itu.int/md/meeting.asp?lang=en&parent=T13-SG09-140908) | COM 9 – R 3 |
| Study Group 9 | [Beijing, 10-17 June 2015](http://www.itu.int/md/meeting.asp?lang=en&parent=T13-SG09-150610) | COM 9 – R 4 |
| Study Group 9 | [Geneva, 21-28 January 2016](http://www.itu.int/md/meeting.asp?lang=en&parent=T13-SG09-160121) | COM 9 – R 5 to R 7 |
| Study Group 9 | [Geneva, 29 August – 2 September 2016](http://www.itu.int/md/meeting.asp?lang=en&parent=T13-SG09-160121) | COM 9 – R 8 |

TABLE 1-bis
Rapporteur meetings organized under Study Group 9 during the study period

| Dates | Place/Host | Question(s) | Event name |
| --- | --- | --- | --- |
| 24-26 April 2013 | Switzerland [Geneva] | Q3, 6/9 | Multiple SG9 Rapporteur meetings |
| 24-26 April 2013 | Switzerland [Geneva] | Q1, 7/9 | Joint Q1/9 and Q7/9 meeting |
| 10-12 June 2013 | United States [Atlanta, Georgia] | Q1, 7/9 | Joint Q1/9 and Q7/9 meeting |
| 10-12 June 2013 | United States [Atlanta, Georgia] | Q1, 3, 6, 7, 8, 9, 10/9 | Multiple SG9 Rapporteur meetings |
| 8-12 July 2013 | Belgium [Gent] | Q2, 12/9 | Joint Q2/9, Q12/9 meeting |
| 30 Sep - 2 Oct 2013 | Japan [Tokyo] | Q1, 7/9 | Joint Q1/9, Q7/9 meeting |
| 30 Sep - 2 Oct 2013 | Japan [Tokyo] | Q1, 3, 4, 5, 7, 8, 9, 10/9 | Study Group 9 Rapporteurs meetings [Q1/9, 3/9, 4/9, 5/9, 6/9, 7/9, 8/9, 9/9, 10/9, joint 1/9 & 7/9, and joint 5/9, 8/9 & 9/9] |
| 23 January 2014 | United States [Boulder, Colorado] | Q2, 12/9 | IRG-AVQA |
| 17-18 March 2014 | E-Meeting | Q4/9 | Question 4/9 meeting |
| 26-28 May 2014 | Switzerland [Geneva] | Q1, 3, 4, 6, 7, 8, 9, 10, 13/9 | Multiple SG9 Rapporteur Group meetings |
| 26-28 May 2014 | Switzerland [Geneva] | Q1, 7/9 | Joint Q1/9 and 7/9 meeting |
| 2 July 2014 | Japan [Sapporo] | Q2, 12/9 | IRG-AVQA meeting |
| 23 July 2014 | China [Beijing]/SARFT | Q1, 7/9 | Joint Q1/9 and 7/9 meeting |
| 18-20 August 2014 | E-Meeting | Q4/9 | Question 4/9 meeting |
| 9-13 February 2015 | Switzerland [Geneva] | Q3, 5, 7, 8, 9, 10, 13/9 | Multiple SG9 Rapporteur meetings |
| 23-27 February 2015 | United States | Q2, 12/9 | Joint Q2/9 and Q12/9 Rapporteur group meeting |
| 1 April 2015 | E-Meeting | Q4/9 | Q4/9 Rapporteur group meeting |
| 8-10 April 2015 | Korea (Rep. of)/TTA | Q7/9 | Q7/9 Rapporteur group meeting |
| 8-10 April 2015 | Korea (Rep. of)/TTA | Q3/9 | Q3/9 Rapporteur group meeting |
| 14-18 September 2015 | United Kingdom | Q2, 12/9 | Joint Q2/9 and Q12/9 Rapporteur group meeting |
| 15-20 October 2015 | Switzerland [Geneva] | Q3, 7/9 | Multiple SG9 Rapporteur Group meetings |
| 15-20 October 2015 | Switzerland [Geneva] | Q1, 7/9 | Joint Q1/9 and Q7/9 Rapporteur group meeting |
| 29 Feb - 4 March 2016 | United States [San Diego, California] | Q2, 12/9 | Joint 2/9 and 12/9 meeting |
| 20-25 April 2016 | Switzerland [Geneva] | Q7/9 | Q7/9 Rapporteur group meeting |
| 20-25 April 2016 | Switzerland [Geneva] | Q1, 7/9 | Joint Q1/9 and 7/9 meeting |
| 16-18 May 2016 | Switzerland [Geneva] | Q3/9 | Q3/9 Rapporteur group meeting |
| 16 May 2016 | E-Meeting | Q4/9 | Q4/9 Rapporteur group meeting |
| 17 May 2016 | E-Meeting | Q5/9 | Q5/9 Rapporteur group meeting |
| 15 - 20 June 2016 | Switzerland [Geneva] | Q7/9 | Q7/9 Rapporteur group meeting |
| 15 - 20 June 2016 | Switzerland [Geneva] | Q1/9Q7/9 | Joint 1/9 and 7/9 meeting |
| 15 - 20 June 2016 | Switzerland [Geneva] | Q3/9 | Q3/9 Rapporteur group meeting |
| 17 June 2016 | E-Meeting | Q10/9 | Q10/9 Rapporteur group meeting |
| 14 - 19 July 2016 | Switzerland [Geneva] | Q3/9 | Q3/9 Rapporteur group meeting |
| 19 July 2016 | E-Meeting | Q10/9 | Q10/9 Rappporteur group meeting |

# 2 Organization of work

## 2.1 Organization of studies and allocation of work

**2.1.1** At its first meeting of the study period, Study Group 9 decided to establish 2 Working Parties. During the study period, a Focus Group on Smart Cable Television (FG SmartCable) has been created to assist development of globally unique future ITU-T Recommendations on “Smart Cable Television”, taking advantage of the combination of aforementioned technologies with some possible improvements to existing deployed technologies.

FG SmartCable was established under the auspices and charter of the ITU Telecommunication Standardization Sector Study Group 9 (ITU-T SG9) in April 2012, and concluded its business in December of 2013 and produced all its activities into a technical report namely ‘Technical Report of the Focus Group on Smart Cable Television’.

Six standing working groups (WGs) were responsible for the deliverables in this FG Technical Report, and their deliverables are contained in the chapters below. The purpose of the FG SmartCable was to collect and familiarize ITU-T and interested parties with the emerging technologies that make up “Smart Cable Television”; namely, advanced services and technologies for cable broadband networks, and the potential impact on future standards development projects under ITU-T SG9.

The FG SmartCable completed their work after having held eight physical and two virtual meetings. The following represents a list of Output documents which was agreed to be developed.

− Out.1a – High level service requirements related to Smart Cable TV

− Out.1b – Collection of use cases of services provided under the context of Smart Cable TV

− Out.1c – A living list of relevant SDOs, forums, consortia, academic institutions, research institutes and other companies that could contribute to the work of the FG SmartCable

− Out.2 – Advanced transport technology, including IoT/M2M, for Smart Cable TV

− Out.3 – Content and application delivery including security for Smart Cable TV

− Out.4 – User interface and accessibility for Smart Cable TV

− Out.5 – Multi-screen and mobile devices for Smart Cable TV

− Out.6 – Terminology for Smart Cable TV

The charter of the FG SmartCable was to solicit and collect input from individuals and entities working on the forefront of these innovative technologies, and it received contributions from experts throughout the world.

**2.1.2** Table 2 shows the number and title of each Working Party, together with the number of Questions assigned to it and the name of its Chairman.

TABLE 2
Organization of Study Group 9

| Designation | Questions to be studied | Title of the Working Party | Chairmanand Vice-Chairmen |
| --- | --- | --- | --- |
| WP 1/9 | Q1, 2, 3 6, 11, 12/9 | Video transport and quality  | Chairman: Satoshi MIYAJI (KDDI Corporation, Japan)Vice-chairman: Jingfei CUI (Academy of Broadcasting Science, SAPPRFT) |
| WP 2/9 | Q4, 5, 7, 8, 9, 10/9 | Terminals and applications  | Chairman: Dong WANG (ZTE Corporation, China)Vice-chairman: Gale LIGHTFOOT (CISCO, USA) and Tae Kyoon Kim (ETRI, Korea) |
| PLEN | Q13/9 | Work programme, coordination and planning | Chairman: Satoshi MIYAJI (KDDI Corporation, Japan) |

**2.1.3** Table 3 lists three Intersector Rapporteur Groups (IRGs) created by Study Group 9 during the study period.

TABLE 3 - Other Groups

| Title of the Group | Co-Chairman |
| --- | --- |
| IRG-AVQA(Audiovisual Quality Assessment ) | Chulhee LEE (Korea, Rep of)Quan Huynh-Thu (Australia)Jens Berge(Germany) |
| IRG-AVA (Audiovisual Media Accessibility) | David Wood (Switzerland)Masahito Kawamori (Japan) |
| IRG-IBB (Integrated Broadcast-Broadband systems) | Masaru Takechi (Japan)Ana Eliza Faria Silva (Brazil)Marcelo Moreno (Brazil) |

1. **Intersector Rapporteur Group Audiovisual Quality Assessment** (IRG-AVQA, <https://itu.int/en/irg/avqa>) was decided to establish an ITU Intersector Rapporteur Group between ITU-T SG 9, SG 12, and ITU-R WP 6 on Audiovisual Quality Assessment (IRG-AVQA) in accordance with Annex C of WTSA-12 Resolution 18, and the corresponding ITU-R Resolution (when it is approved), aims to;
* coordinate the progress of specific topics of mutual interest restricted to the area of video and audiovisual quality assessment, both subjective and objective;
* identify potential work items that may be progressed as joint text Recommendations;
* benefit from colocation with the meetings of the Video Quality Experts Group (VQEG) where video/audiovisual quality experts meet and execute technical work;
* encourage collaboration between ITU-T SG 9, SG 12, and ITU-R WP 6 on work items unique to each study group;

This is the first IRG to be established under the newly revised WTSA-12 Resolution 18 (Dubai, 2012). The terms of reference of the group can found in [TD 115 Rev.2 (GEN/9)](http://www.itu.int/md/T13-SG09-130114-TD-GEN-0115/en).

1. Preamble : WTSA Resolution 18 was revised in WTSA-12 to allow for ITU-R experts to jointly develop work with ITU-T experts in a group officially recognized by both ITU-R and ITU-T.

The **Intersector Rapporteur Group on Audiovisual Media Accessibility (IRG-AVA)** is established in accordance with Annex C of WTSA-12 Resolution 18 and the corresponding provisions in Resolution ITU-R 6 (in line with the Conclusions of the Radiocommunication Advisory Group (RAG) taken on May 2013, ref. Agenda Item 5 in

<http://www.itu.int/en/ITU-R/conferences/rag/Documents/SUMOFCONCLFINAL.docx>).

Intersector Rapporteur Group Audiovisual Media Accessibility (IRG-AVA, <https://itu.int/en/irg/ava>) bacame second IRG. The terms of reference of the group are to be found in [TD 291 (GEN/9)](http://www.itu.int/md/T13-SG09-131203-TD-GEN-0291/en).

1. Preamble: WTSA Resolution 18 was revised in WTSA-12 to allow for ITU-R experts to jointly develop work with ITU-T experts in a group officially recognized by both ITU-R and ITU-T.

The **Intersector Rapporteur Group on Integrated Broadcast-Broadband systems (IRG-IBB)** is established in accordance with Annex C of WTSA-12 Resolution 18 and the corresponding provisions in Resolution ITU-R 6 (in line with the Conclusions of the Radiocommunication Advisory Group (RAG) on May 2013, ref. Agenda Item 5 in
<http://www.itu.int/en/ITU-R/conferences/rag/Documents/SUMOFCONCLFINAL.docx> ).

**Intersector Rapporteur Group Integrated Broadcast-Broadband systems (IRG-IBB)**, <https://itu.int/en/irg/ibb> became third IRG of SG9 to establish a framework for collaboration on this topic with ITU-R SG6. The proposed terms of reference of the group are to be found in [TD 359 (GEN/9)](http://www.itu.int/md/T13-SG09-131203-TD-GEN-0359/en).

* + 1. In line with **WTSA-12 Resolution 80 (Geneva, January 2016)**
1. SG9 had a special session for the pilot implementation of WTSA-12 Resolution 80 “Acknowledging active involvement of the Membership in the development of ITU-T deliverables” on Friday 22 January 2016. The purpose of this session was to discuss the method to make ITU-T deliverables recognized by academic databases such as Google Scholar, Web of Science, etc. TSB presented [TD816r1](http://www.itu.int/md/T13-SG09-160121-TD-GEN-0816/en) on their findings concerning this matter. After discussion SG9 updated its guidelines – “Implementation details of WTSA-12 Resolution 80 pilot in SG9”, which can be found in [TD 899](http://www.itu.int/md/T13-SG09-160121-TD-GEN-0899/en). The group also agreed to send a liaison statement to TSAG to provide the updated SG9 guidelines. The draft liaison statement is contained in [TD 898](http://www.itu.int/md/T13-SG09-160121-TD-GEN-0898/en).
2. **WTSA-12 Resolution 80 (Beijing, June 2015)**
TSAG requested SG9 to implement, on a trial basis, their findings on WTSA-12 Resolution 80 “Acknowledging active involvement of the Membership in the development of ITU-T deliverables”. Study Group 9 revised the SG9 guidelines “Implementation details of WTSA-12 Resolution 80 pilot in SG9” to address inputs from the ITU Legal Advisor, who informed SG9 that on item 3 of the guidelines some privacy issues do not allow listing persons that are present at meetings on public web pages. Therefore, it was advised to list all persons that have an official role. The Guidelines were accordingly revised and were approved by SG9 meeting:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Status | Title | Final TD (GEN) | Contact |
| 1 | Revised | SG9 guideline- - Implementation details of WTSA-12 Resolution 80 pilot in SG9 | TD 748 (GEN/9)  | Satoshi Miyaji |

1. **WTSA-12 Resolution 80 (Geneva, September 2014)**
TSAG requested SG9 to implement, on a trial basis, their findings on WTSA-12 Resolution 80 “Acknowledging active involvement of the Membership in the development of ITU-T deliverables”. To follow up on this request SG9 developed and agreed on the following guidelines:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Status | Title | Final TD (GEN) | Contact |
| 1 | New | Implementation details of WTSA-12 Resolution 80 pilot in SG9 | TD 583 (GEN/9) | Satoshi Miyaji |

1. **WTSA-12 Resolution 80 (Geneva, December 2013)**
SG9 has also progressed the discussion to propose a way forward to TSAG on WTSA-12 Resolution 80 (Dubai, 2012) “Acknowledging active involvement of the Membership in the development of ITU-T deliverables”. An initial output on this topic is available as [TD 391 (GEN/9)](http://www.itu.int/md/T13-SG09-131203-TD-GEN-0391/en).

## 2.2 Questions and Rapporteurs

**2.2.1** WTSA-12 assigned to Study Group 9 the 13 Questions listed in Table 4.

**2.2.2** The Questions listed in Table 5 have been adopted during this period.

**2.2.3** The Questions listed in Table 6 have been deleted during this period.

TABLE 4
Study Group 9 – Questions assigned by WTSA-12 and Rapporteurs

| Q. | Title of the Questions | WP | Rapporteur |
| --- | --- | --- | --- |
| 1/9 | Transmission of television and sound programme signal for contribution, primary distribution and secondary distribution | 1/9 | Shigeyuki Sakazawa (KDDI Corporation, Japan)Associate rapporteur: Yangsu Kim (ETRI, Korea) |
| 2/9 | Measurement and control of the end-to-end quality of service (QoS) for advanced television technologies, from image acquisition to rendering, in contribution, primary distribution and secondary distribution networks | 1/9 | Quan Huynh-Thu (Australia)Associate rapporteur:Margaret Pinson (NTIA, United States) |
| 3/9 | Methods and practices for conditional access, protection against unauthorized copying and against unauthorized redistribution ("redistribution control" for digital cable television distribution to the home) | 1/9 | Han-Seung Koo (ETRI, Korea)Associate rapporteur: Kenji Obata (Japan Cable Laboratories, Japan)Phisit Pungvora-asn (Office of the national broadcasting and telecommunication commission (NBTC), Thailand) |
| 4/9 | Software components application programming interfaces (APIs), frameworks and overall software architecture for advanced content distribution services within the scope of Study Group 9 | 2/9 | Masaru Takechi (NHK, Japan) Associate rapporteur: Aguinaldo Boquimpani (Brazil) |
| 5/9 | Functional requirements for residential gateway and set-top box for the reception of advanced content distribution services | 2/9 | Associate rapporteur: Dong Wang (China) |
| 6/9 | Digital programme delivery controls for multiplexing, switching and insertion in compressed bit streams and/or packet streams | 1/9 | Satoshi Miyaji (KDDI Corporation, Japan) |
| 7/9 | Cable television delivery of digital services and applications that use Internet protocol (IP) and/or packet-based data over cable networks | 2/9 | Tae Kyoon Kim (ETRI, Korea)Associate rapporteur:Ouyang Feng (Academy of Broadcasting Science, China) |
| 8/9  | The IP enabled multimedia applications and services for cable television networks enabled by converged platforms | 2/9 | Sung-kwon Park (Ministry of Information and Communication, Korea) |
| 9/9 | Requirements for advanced service capabilities over broadband cable home networks | 2/9 | Jiansheng Zhang (China Cable Network corporation, China) |
| 10/9 | Requirements, methods, and interfaces of the advanced service platforms to enhance the delivery of sound, television, and other multimedia interactive services over cable television network | 2/9 | Tomohiko Takahashi (KDDI Corporation, Japan) |
| 11/9 | Guidelines for implementations and deployment of transmission of multichannel digital television signals over optical access networks | 1/9 | Shigeyuki Sakazawa (KDDI Corporation, Japan) |
| 12/9 | Objective and subjective methods for evaluating perceptual audiovisual quality in multimedia services within the terms of Study Group 9 | 1/9 | Chulhee Lee (Ministry of Information and Communication, Korea)Associate rapporteur:Quan Huynh-Thu (Australia),Margaret Pinson (NTIAUnited States) |
| 13/9 | Work programme, coordination and planning | Plen | Satoshi Miyaji (KDDI Corporation, Japan)Associate rapporteur:Tae Kyoon Kim (ETRI, Korea) |

TABLE 5
Study Group 9 – New Questions adopted and Rapporteurs

| Questions | Title of the Questions | WP | Rapporteur |
| --- | --- | --- | --- |
| Revised Q9/9 | Requirements for advanced service capabilities over broadband cable home networks | 2/9 | **Jiansheng ZHANG (**China Cable Network corporation, China) |

TABLE 6
Study Group 9 – Questions deleted

| Questions | Title of Questions | Rapporteurs | Results |
| --- | --- | --- | --- |
| None |   |   |   |

# 3 Results of the work accomplished during the 2013-2016 study period

## 3.1 General

During the study period, (As of today 04 July 2016) Study Group 9 examined 137 contributions and generated a large number of TDs and liaison statements. It also:

− drew up 33 new Recommendations;

− amended/revised 12 existing Recommendations;

− no Supplements etc;

− no technical papers and 1 technical report of the [Focus Group on Smart Cable Television](http://www.itu.int/dms_pub/itu-t/opb/fg/T-FG-SMART-2013-PDF-E.pdf).

## 3.2 Highlights of achievements

The main results achieved on the various Questions assigned to Study Group 9 are briefly summarized below. Formal replies to the Questions are given in a synoptic table in Annex 1 of this report.

1. **ITU-T Resolution 80 (**Acknowledging active involvement of the Membership in the development of ITU-T deliverables)
* TSAG requested SG9 to implement on a trial basis, their findings on WTSA-12 Resolution 80. 🡺 SG9 developed SG9 Guidelines and forward to TSAG (Sept, 2014).
* TSAG requested SG9 to implement on a trial basis, their findings on WTSA-12 Resolution 80. 🡺 SG9 revised the SG9 guidelines to address inputs from the ITU Legal advisor who informed SG9 that on Annex item 3 of the Guidelines some privacy issues do not allow listing persons that are present at the meetings on public web pages. Therefore it was advised to list all persons that have an official role. 🡺 The Guidelines were revised accordingly and it were approved by SG9 meeting and sent to TSAG for review and comment. (June 2015)
* SG9 had a special session for the pilot implementation of WTSA-12 Resolution 80 “Acknowledging active involvement of the Membership in the development of ITU-T deliverables” on Friday 22 January 2016. The purpose of this session was to discuss the method to make ITU-T deliverables recognized by academic databases such as Google Scholar, Web of Science, etc. TSB presented [TD 816r1](http://www.itu.int/md/T13-SG09-160121-TD-GEN-0816/en) on their findings concerning this matter. After discussion SG9 updated its guidelines – “Implementation details of WTSA-12 Resolution 80 pilot in SG9”, which can be found in [TD899](http://www.itu.int/md/T13-SG09-160121-TD-GEN-0899/en). The group also agreed to send a liaison statement to TSAG to provide the updated SG9 guidelines. The draft liaison statement is contained in TD 898.
1. **FG on Smart Cable TV**; The Focus Group was established under the auspices and charter of the ITU Telecommunication Standardization Sector Study Group 9 (ITU-T SG9) in April 2012, and concluded its business in December of 2013. Six standing working groups (WGs) were responsible for the deliverables in this FG Technical Report, and their deliverables are contained in the chapters below. The purpose of the FG SmartCable was to collect and familiarize ITU-T and interested parties with the emerging technologies that make up “Smart Cable Television”; namely, advanced services and technologies for cable broadband netw
2. **3 IRGs**
* Intersector Rapporteur Group Audiovisual Quality Assessment (IRG-AVQA); was decided to establish an ITU Intersector Rapporteur Group between ITU-T SG 9, SG 12, and ITU-R WP 6 on Audiovisual Quality Assessment (IRGAVQA). This is the first IRG to be established under the newly revised WTSA-12 Resolution 18 (Dubai, 2012).
* Intersector Rapporteur Group Audiovisual Media Accessibility (IRG-AVA); A second IRG on audiovisual accessibility (IRG-AVA) was also established on 11 December 2013 at the closing Plenary of SG9 after accepting the invitation of SG16 and ITU-R SG6 to join with them on this topic.
* Intersector Rapporteur Group Integrated Broadcast-Broadband systems (IRG-IBB); A third IRG on integrated broadcast-broadband systems (IRG-IBB) was also proposed by SG9, to establish a framework for collaboration on this topic with ITU-R SG6.

## 3.3 Report of lead study group activities, GSIs, JCAs and regional groups

None.

### 3.3.1 Lead study group activities on

None.

### 3.3.2 GSI/JCA

None.

### 3.3.3 Regional Group

None.

# 4 Observations concerning future work

Study Group 9 has revised its mandate, which is included in ITU-T Resolution 2 “ITU-T study group responsibility and mandates” (approved at World Telecommunication Standardization Assembly Dubai, 20-29 November, 2012). In ANNEX 2 to this report, a revision marked version, as compared with the current Resolution 2 text is provided. Briefly, the changes update the mandate to reflect advances in the cable industry. For example, adding “multiview and high-dynamic range” television and “multiscreen services” to the work topics.

# 5 Updates to the WTSA Resolution 2 for the 2017-2020 study period

Annex 2 contains the updates to WTSA Resolution 2 proposed by Study Group 9 concerning the general areas of study, title, mandate, lead roles and points of guidance in the next study period.

ANNEX 1

List of Recommendations, Supplements and
other materials produced or deleted during the study period

The list of new and revised Recommendations approved during the study period is found in Table 7.

The list of Recommendations determined/consented at the last meeting of Study Group 9 is found in Table 8.

The list of Recommendations deleted by Study Group 9 during the study period is found in Table 9.

The List of Recommendations submitted by Study Group 9 to WTSA-16 for approval is found in Table 10.

Tables 11 onwards list other publications approved and/or deleted by Study Group 9 during the study period.

TABLE 7
Study Group 9 – Recommendations approved during the study period

| **Recommendation** | **Approval** | **Status** | **TAP/AAP** | **Title** |
| --- | --- | --- | --- | --- |
| [J.94 (1998) Amd. 3](http://handle.itu.int/11.1002/1000/12763) | 2016-03-15 | In force | AAP | Revised Annex C – Service information for digital multi-programme System C |
| [J.181](http://handle.itu.int/11.1002/1000/12102) | 2014-01-13 | In force | AAP | Digital program insertion cueing message for cable television systems |
| [J.181 (2014) Amd. 1](http://handle.itu.int/11.1002/1000/12351) | 2014-09-12 | In force | Agreement | New Appendix II: Recommended practices for the implementation of ITU-T J.181 |
| [J.183](http://handle.itu.int/11.1002/1000/12766) | 2016-03-15 | In force | AAP | Time-division multiplexing of multiple MPEG-2 transport streams and generic formats of transport streams over cable television systems |
| [J.195.1](http://handle.itu.int/11.1002/1000/11879) | 2013-03-01 | Superseded | AAP | Functional requirements for high speed transmission over coaxial networks connected with fibre to the building |
| [J.195.1](http://handle.itu.int/11.1002/1000/12765) | 2016-03-15 | In force | AAP | Functional requirements for high speed transmission over coaxial networks connected with fibre to the building |
| [J.195.2](http://handle.itu.int/11.1002/1000/12311) | 2014-10-29 | In force | AAP | Physical layer specification for high speed transmission over coaxial networks |
| [J.195.3](http://handle.itu.int/11.1002/1000/12312) | 2014-10-29 | In force | AAP | Medium Access Control layer specification for high speed transmission over coaxial networks |
| [J.196.1](http://handle.itu.int/11.1002/1000/12767) | 2016-03-15 | In force | AAP | Functional requirements for second-generation HiNoC |
| [J.201](http://handle.itu.int/11.1002/1000/12313) | 2014-10-29 | In force | AAP | Harmonization of declarative content format for interactive television applications |
| [J.205 (2012) Cor. 1](http://handle.itu.int/11.1002/1000/11858) | 2013-01-18 | In force | Agreement | Corrigendum to J.205 - Requirements for an application control framework using integrated broadcast and broadband digital television |
| [J.205 (2012) Cor. 2](http://handle.itu.int/11.1002/1000/12329) | 2014-10-29 | In force | AAP | Requirements for an application control framework using integrated broadcast and broadband digital television |
| [J.206](http://handle.itu.int/11.1002/1000/11880) | 2013-03-01 | In force | AAP | Architecture for an application control framework using integrated broadcast and broadband digital television |
| [J.207](http://handle.itu.int/11.1002/1000/12768) | 2016-03-15 | In force | AAP | Specification for Integrated Broadcast and Broadband DTV application control framework |
| [J.223.1](http://handle.itu.int/11.1002/1000/12769) | 2016-03-15 | In force | AAP | Functional Requirements for Cabinet DOCSIS (C-DOCSIS) |
| [J.230](http://handle.itu.int/11.1002/1000/12568) | 2015-08-13 | In force | AAP | Requirements for platform functionalities on the integration of cable STB and mobile second screen devices |
| [J.280](http://handle.itu.int/11.1002/1000/11829) | 2013-03-01 | In force | AAP | Digital program insertion: Splicing application program interface |
| [J.287](http://handle.itu.int/11.1002/1000/12103) | 2014-01-13 | In force | AAP | Automation system to compression system communications application program interface |
| [J.288](http://handle.itu.int/11.1002/1000/12770) | 2016-03-15 | In force | AAP | Encapsulation of type-length-value (TLV) packet for cable transmission systems |
| [J.301](http://handle.itu.int/11.1002/1000/12314) | 2014-10-29 | In force | AAP | Requirements for augmented reality smart television systems |
| [J.341](http://handle.itu.int/11.1002/1000/12771) | 2016-03-15 | In force | AAP | Objective perceptual multimedia video quality measurement of HDTV for digital cable television in the presence of a full reference |
| [J.343](http://handle.itu.int/11.1002/1000/12315) | 2014-11-29 | In force | AAP | Hybrid perceptual bitstream models for objective video quality measurements |
| [J.343.1](http://handle.itu.int/11.1002/1000/12316) | 2014-11-29 | In force | AAP | Hybrid-NRe objective perceptual video quality measurement for HDTV and multimedia IP-based video services in the presence of encrypted bitstream data |
| [J.343.2](http://handle.itu.int/11.1002/1000/12317) | 2014-11-29 | In force | AAP | Hybrid-NR objective perceptual video quality measurement for HDTV and multimedia IP-based video services in the presence of non-encrypted bitstream data |
| [J.343.3](http://handle.itu.int/11.1002/1000/12318) | 2014-11-29 | In force | AAP | Hybrid-RRe objective perceptual video quality measurement for HDTV and multimedia IP-based video services in the presence of a reduced reference signal and encrypted bitstream data |
| [J.343.4](http://handle.itu.int/11.1002/1000/12319) | 2014-11-29 | In force | AAP | Hybrid-RR objective perceptual video quality measurement for HDTV and multimedia IP-based video services in the presence of a reduced reference signal and non-encrypted bitstream data |
| [J.343.5](http://handle.itu.int/11.1002/1000/12320) | 2014-11-29 | In force | AAP | Hybrid-FRe objective perceptual video quality measurement for HDTV and multimedia IP-based video services in the presence of a full reference signal and encrypted bitstream data |
| [J.343.6](http://handle.itu.int/11.1002/1000/12321) | 2014-11-29 | In force | AAP | Hybrid-FR objective perceptual video quality measurement for HDTV and multimedia IP-based video services in the presence of a full reference signal and non-encrypted bitstream data |
| [J.382](http://handle.itu.int/11.1002/1000/12104) | 2014-01-13 | In force | AAP | Advanced digital downstream transmission systems for television, sound and data services for cable distribution |
| [J.604](http://handle.itu.int/11.1002/1000/12105) | 2014-01-13 | In force | AAP | Requirements for a scalable video transmission system over cable networks |
| [J.900](http://handle.itu.int/11.1002/1000/12322) | 2014-10-29 | In force | AAP | Requirements for stereoscopic three-dimensional television service over hybrid fibre and coaxial based networks |
| [J.1002](http://handle.itu.int/11.1002/1000/11881) | 2013-03-01 | In force | AAP | Pairing protocol specification for renewable conditional access system |
| [J.1003](http://handle.itu.int/11.1002/1000/12323) | 2014-10-29 | In force | AAP | Specifications of network protocol for renewable conditional access system |
| [J.1004](http://handle.itu.int/11.1002/1000/12569) | 2015-08-13 | In force | AAP | Specifications of authorization centre interfaces for renewable conditional access system |
| [J.1005](http://handle.itu.int/11.1002/1000/12570) | 2015-08-13 | In force | AAP | Architecture and requirements of digital rights management (DRM) for cable television multiscreen |
| [J.1102](http://handle.itu.int/11.1002/1000/12571) | 2015-08-13 | In force | AAP | Interface specifications for IP-based switched digital video using DOCSIS |
| [J.1103](http://handle.itu.int/11.1002/1000/12572) | 2015-08-13 | In force | AAP | Transmission specification for IP-based switched digital video using data over cable service interface specifications |
| [P.912](http://handle.itu.int/11.1002/1000/12774) | 2016-03-15 | In force | AAP | Subjective video quality assessment methods for recognition tasks |
| [P.913](http://handle.itu.int/11.1002/1000/12106) | 2014-01-13 | Superseded | AAP | Methods for the subjective assessment of video quality, audio quality and audiovisual quality of Internet video and distribution quality television in any environment |
| [P.913](http://handle.itu.int/11.1002/1000/12775) | 2016-03-15 | In force | AAP | Methods for the subjective assessment of video quality, audio quality and audiovisual quality of Internet video and distribution quality television in any environment |
| [P.914](http://handle.itu.int/11.1002/1000/12776) | 2016-03-15 | In force | AAP | Display requirements for 3D video quality assessment |
| [P.915](http://handle.itu.int/11.1002/1000/12777) | 2016-03-15 | In force | AAP | Subjective assessment methods for 3D video quality |
| [P.916](http://handle.itu.int/11.1002/1000/12778) | 2016-03-15 | In force | AAP | Information and guidelines for assessing and minimizing visual discomfort and visual fatigue from 3D video |

TABLE 8
Study Group 9 – Recommendations consented/determined at the last meeting

|  |  |  |  |
| --- | --- | --- | --- |
| **Recommendation** | **Consent/Determination** | **TAP/AAP** | **Title** |
| [J.1010](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10617) | 2016-01-28 | TAP | Embedded Common Interface (ECI) for exchangeable CA/DRM solutions; Use cases and requirements |
| [J.1011](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10807) | 2016-01-28 | TAP | Embedded Common Interface (ECI) for exchangeable CA/DRM solutions; Architecture, Definitions and Overview |

TABLE 9
Study Group 9 – Recommendations deleted during study period

None.

**Discontinued work item during study period**

| Work item | Last version | Withdrawal date | Title |
| --- | --- | --- | --- |
| J.rcas-saf.req | TD 538 (GEN/9) |  | Requirements for Smart Agricultural Framework over RCAS in CATV network |
| J.mm-noref(J.mm-noref [planned J.344-J.349]) | TD 517 (GEN/9) |  | Perceptual audiovisual quality measurement techniques for multimedia services over digital cable television networks in the absence of a reference |
| J.hadi([planned J.231]) | TD714 (GEN/9) |  | Harmonization of APIs for device integration |
| J.iptvappclient | TD 867 (GEN/9) |  | Description of the Application Client Interface |
| J.iptvcontentclient([planned J.709]) | TD 791 (GEN/9) |  | Description of the IPTV Content Client Interface |

TABLE 10
Study Group 9 – Recommendations submitted to WTSA-16

| Recommendation | Proposal | Title | Reference |
| --- | --- | --- | --- |
| None |  |  |  |

TABLE 11
Study Group 9 – Supplements

| Recommendation | Date | Status | Title |
| --- | --- | --- | --- |
| None |  | New/ Revised/ Deleted |  |

TABLE 12
Study Group 9 – Technical Papers

| Recommendation | Date | Status | Title |
| --- | --- | --- | --- |
| None |  | New/ Revised/ Deleted |  |

TABLE 13
Study Group 9 – Technical Reports

| Recommendation | Date | Status | Title |
| --- | --- | --- | --- |
|  | 12/2013 | New | ITU-T [Focus Group on Smart Cable Television](http://www.itu.int/dms_pub/itu-t/opb/fg/T-FG-SMART-2013-PDF-E.pdf) |

TABLE 14
Study Group 9 – Other publications

| Recommendation | Date | Status | Title |
| --- | --- | --- | --- |
| None |  | New/ Revised/ Deleted |  |

ANNEX 2

Proposed updates to the Study Group 9 mandate and Lead Study Group roles

**(WTSA Resolution 2)**

The following are the proposed changes to the Study Group 9 mandate and Lead Study Group roles agreed at the last Study Group 9 meeting in this study period, based on the relevant portions of [Resolution 2 (2016)](http://www.itu.int/en/ITU-T/wtsa16/Documents/CPI/ITU-T_Res2_2016-E.docx).

PART 1 ‑ General areas of study

ITU-T Study Group 9

Television and sound transmission and integrated broadband cable networks

ITU-T Study Group 9 is responsible for studies relating to:

• use of telecommunication systems for contribution, primary distribution and secondary distribution of television, sound programmes and related data services including interactive services and applications, extendable to advanced capabilities such as ultra-high definition, 3D, multiview and high-dynamic range television, etc.;

• use of cable and hybrid networks, primarily designed for television and sound programme delivery to the home, as integrated broadband networks to also carry voice or other time-critical services, video-on-demand (e.g., over-the-top), interactive services, multiscreen services, etc. to customer premises equipment (CPE) in the home or enterprise.

…

PART 2 ‑ Lead Study Groups in specific areas of study

 Lead study group on integrated broadband cable and television networks

Annex B
(to WTSA Resolution 2)

Points of guidance to study groups for the development
of the post-2016 work programme

Within its general area of responsibility, ITU-T Study Group 9 will develop and maintain Recommendations on:

• the use of IP or other appropriate protocols and middleware to provide time‑critical services, services on demand or interactive services over cable or hybrid networks, in cooperation with other study groups where necessary;

• procedures for the operation of television and sound-programme networks;

• television and sound-programme systems for contribution and distribution networks;

• transmission systems for television, sound programmes and interactive services, including Internet applications on networks intended primarily for television;

• the delivery of broadband audio/visual and data services over home networks.

Study Group 9 is responsible for coordination with ITU‑R on broadcasting matters.

Inter-sector rapporteur group activities of different sectors and/or joint rapporteur group activities of different study groups (under a global standards initiative (GSI) or other arrangements) shall be seen as complying with the WTSA expectations for collaboration and coordination.

Annex C
(to WTSA Resolution 2)

List of Recommendations under the responsibility of the respective
study groups and TSAG in the 2017-2020 study period

**ITU-T Study Group 9**

ITU-T J-series

ITU-T N-series

ITU-T P.900-series

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