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| ITU‑T Study Group 9 Audiovisual content transmission and integrated broadband cable networks | | | | |
| Report of ITU-T SG9 to the World Telecommunication Standardization Assembly (WTSA-24), Part I: GENERAL | | | | |
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| **Abstract:** | This contribution contains the report of ITU-T Study Group 9 to WTSA-24 concerning its activities during the 2022-2024 study period. | |
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Note by the TSB:

The report of Study Group 9 to the WTSA-24 is presented in the following documents:

Part I: **Document** [**07**](https://www.itu.int/md/T22-WTSA.24-C-0007/en) – General

Part II: **Document** [**08**](https://www.itu.int/md/T22-WTSA.24-C-0008/en) – Questions proposed for study during the study period 2025-2028

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# 1 Introduction

## 1.1 Responsibilities of Study Group 9

Study Group 9 was entrusted by the World Telecommunications Standardization Assembly (Geneva, 2022) with the study of 11 Questions in the area of:

• use of telecommunication systems for contribution, primary distribution and secondary distribution of audiovisual content, e.g. television programmes and related data services, including interactive services and applications, providing advanced capabilities, e.g. ultra-high definition and high-dynamic range, 3D, virtual reality, augmented reality and multiview;

• use of cable networks, e.g. coaxial cable, optical fibre, hybrid fibre coaxial (HFC), etc., to also provide integrated broadband services. The cable network, primarily designed for audiovisual content delivery to the home, also carries time‑critical services like voice, gaming, video-on-demand, interactive and multiscreen services, etc. to customer premises equipment (CPE) in the home or enterprise;

• use of cloud computing, artificial intelligence (AI) and other advanced technologies to enhance audiovisual content contribution and distribution as well as integrated broadband services over the cable networks;

• use of accessibility services (like captioning, audio caption) and new interaction technologies (like haptic, gesture, eye tracking and so on) to enhance accessibility of audiovisual content and related data services for people with different ranges of abilities.

Annex A to WTSA-20 Resolution 2 states the following lead study group responsibilities for Study Group 9:

• *Lead study group on integrated broadband cable networks*

• *Lead study group on audiovisual content delivery over cable networks*

Annex B to WTSA-20 Resolution 2 defines the following responsibilities of SG9:

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

• audiovisual content systems for contribution and distribution, including broadcasting, over cable networks, e.g. coaxial cable, optical fibre or hybrid fibre coaxial (HFC), etc.;

• procedures for the operation of audiovisual content delivery over cable networks;

• the use of IP or other appropriate protocols, middleware and operating systems to provide time-critical services, services on demand or interactive services over cable networks;

• artificial intelligence (AI)-assisted delivery and transmission systems for audiovisual content and other data services over cable networks;

• cable network terminals and related interfaces (e.g. interfaces to home network devices, such as IoT devices, interfaces to the cloud);

• end-to-end integrated platforms for cable networks;

• advanced, interactive, time-critical and other services and applications over cable networks;

• cloud-based systems for audiovisual content services and control over cable networks;

• secured audiovisual content contribution and distribution, for example conditional access (CA) systems and digital rights management (DRM), over cable networks;

• accessibility applications to access audiovisual content over cable networks;

• common user profile and participation taxonomy for broadband cable-TV accessibility.

Study Group 9 will develop and maintain implementation guidelines to support the deployment of audiovisual content contribution and distribution in developing countries.

Study Group 9 is responsible for coordination with the ITU Radiocommunication Sector (ITU‑R) on broadcasting matters.

Inter-Sector rapporteur group activities of different Sectors and/or joint rapporteur group activities of different study groups shall be seen as complying with the WTSA expectations for collaboration and coordination.

Annex C to WTSA-20 Resolution 2 defines the list of Recommendations under the responsibility of Study Group 9 in the 2022-2024 study period:

*• ITU‑T J-series, except those under the responsibility of Study Groups 12 and 15*

*• ITU‑T N-series*

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

Study Group 9 met five times in Plenary in the course of the study period (see Table 1) chaired by Mr Satoshi Miyaji assisted by Vice-Chairs Mr Pradipta Biswas, Mr TaeKyoon Kim, Mr Blaise Mamadou and Mr Zhifan Sheng.

*NOTE*: the fifth meeting in Tokyo, 2-10 September 2024, was planned and not yet held when this report was prepared. A revision of this report is planned and will provide the final status of meetings as well as the final status of deliverables in annex to this report.

In addition, many Rapporteurs’ meetings (including e-meetings) took place during the study period in different locations, see Table 2.

TABLE 1  
Meetings of Study Group 9 and its Working Parties

| ***Meetings*** | ***Place, date*** | ***Reports*** |
| --- | --- | --- |
| Study Group 9 | E-Meeting, 6-14 September 2022 | SG9 –R1 to R3 |
| Study Group 9 | Bangalore, 9-18 May 2023 | SG9 –R4 to R6 |
| Study Group 9 | Bogota, 14-23 November 2023 | SG9 –R7 to R9 |
| Study Group 9 | E-Meeting, 9-17 May 2024 | SG9 –R10 to R12 |
| Study Group 9 | Tokyo, 2-10 September 2024 (planned) | SG9 –R13 to R15 (planned) |

TABLE 2  
Rapporteur meetings organized under Study Group 9 during the study period

*NOTE*: the Rapporteur meetings marked as planned were not yet held when this report was prepared. A revision of this report is planned and will provide the final status of Rapporteur meetings.

| Dates | Place/Host | Question(s) | Event name |
| --- | --- | --- | --- |
| 2024-07-24 (planned) | E-meeting | [Q9/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=15852&Group=9) | Q9/9 Rapporteur meeting |
| 2024-07-22 (planned) | E-meeting | [Q2/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=15849&Group=9) | Q2/9 Rapporteur meeting |
| 2024-07-09 to 2024-07-10 | E-meeting | [Q11/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=15847&Group=9) | Q11/9 Rapporteur meeting |
| 2024-07-08 | E-meeting | [Q1/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=15848&Group=9) | Q1/9 Rapporteur meeting |
| 2024-07-05 | E-meeting | [Q7/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=15851&Group=9) | Q7/9 Rapporteur meeting |
| 2024-07-04 | E-meeting | [Q6/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=15850&Group=9) | Q6/9 Rapporteur meeting |
| 2024-06-18 to 2024-06-19 | E-meeting | [Q11/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=15847&Group=9) | Q11/9 Rapporteur meeting |
| 2024-04-18 and 2024-04-24 | E-meeting | [Q1/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=15666&Group=9); [Q2/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=15667&Group=9); [Q3/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=15668&Group=9); [Q4/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=15669&Group=9); [Q5/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=15670&Group=9); [Q6/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=15671&Group=9); [Q7/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=15672&Group=9); [Q8/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=15673&Group=9); [Q9/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=15674&Group=9); [Q10/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=15675&Group=9); [Q11/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=15676&Group=9) | 2nd Special Session on SG9 Restructuring in view of WTSA-24 |
| 2024-04-17 | E-meeting | [Q2/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=14507&Group=9) | Q2/9 Rapporteur meeting |
| 2024-04-11 | E-meeting | [Q3/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=14508&Group=9) | Q3/9 Rapporteur meeting |
| 2024-03-14 to 2024-03-15 | E-meeting | [Q9/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=14512&Group=9) | Q9/9 Rapporeur meeting |
| 2024-03-12 | E-meeting / Under auspice of ITU-R SG6. | [Q11/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=15633&Group=9) | 29th IRG-AVA meeting |
| 2024-03-01 | E-meeting | [Q6/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=14509&Group=9) | Q6/9 Rappoteur meeting |
| 2024-02-27 | E-meeting | [Q2/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=14506&Group=9) | Q2/9 Rapporteur meeting |
| 2024-02-27 to 2024-02-28 | E-meeting | [Q1/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=14514&Group=9); [Q2/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=14515&Group=9); [Q3/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=14516&Group=9); [Q4/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=14517&Group=9); [Q5/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=14518&Group=9); [Q6/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=14519&Group=9); [Q7/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=14520&Group=9); [Q8/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=14521&Group=9); [Q9/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=14522&Group=9); [Q10/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=14523&Group=9); [Q11/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=14524&Group=9) | Special Session on SG9 Restructuring in view of WTSA-24 |
| 2024-02-21 | E-meeting | [Q1/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=14505&Group=9) | Q1/9 Rapporteur meeting |
| 2024-01-17 | E-meeting | [Q11/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=14503&Group=9) | 28th IRG-AVA meeting |
| 2023-11-10 | E-meeting / Under the auspice of ITU-T SG9 which will meet from 14 to 23 November 2023 in Bogotá, Colombia | [Q11/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=14222&Group=9) | 27th IRG-AVA meeting |
| 2023-09-26 | E-meeting | [Q6/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13918&Group=9) | Q6/9 Rapporteur meeting |
| 2023-09-20 | E-meeting | [Q11/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13924&Group=9) | Q11/9 Rapporteur meeting |
| 2023-09-18 | E-meeting | [Q7/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13919&Group=9) | Q7/9 Rapporteur meeting |
| 2023-09-08 | E-meeting | [Q10/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13923&Group=9) | Q10/9 Rapporteur meeting |
| 2023-09-04 | E-meeting | [Q1/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13906&Group=9); [Q7/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13907&Group=9) | Joint Q1/9 and Q7/9 Rapporteur meeting |
| 2023-08-24 to 2023-08-25 | E-meeting | [Q9/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13922&Group=9) | Q9/9 Rapporteur meeting |
| 2023-08-17 | E-meeting | [Q3/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13909&Group=9) | Q3/9 Rapporteur meeting |
| 2023-07-27 | E-meeting | [Q8/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13921&Group=9) | Q8/9 Rapporteur meeting |
| 2023-07-03 | E-meeting | [Q1/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13904&Group=9); [Q7/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13905&Group=9) | Joint Q1/9 and Q7/9 Rapporteur meeting |
| 2023-06-22 | E-meeting | [Q7/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13902&Group=9) | Q7/9 Rapporteur meeting |
| 2023-05-10 | E-meeting / ITU, under the auspices of ITU-T SG9 meeting in Bangalore, India | [Q11/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13816&Group=9) | 25th IRG-AVA meeting |
| 2023-03-15 | E-meeting | [Q7/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13395&Group=9) | Q7/9 Rapporteur meeting |
| 2023-03-02 | E-meeting | [Q3/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13391&Group=9) | Q3/9 Rapporteur meeting |
| 2023-02-10 | E-meeting | [Q2/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13530&Group=9) | Q2/9 Rapporteur meeting |
| 2023-01-13 | E-meeting | [Q9/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13396&Group=9) | Q9/9 Rapporteur meeting |
| 2022-12-13 | E-meeting | [Q1/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13388&Group=9); [Q4/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13389&Group=9) | Joint Q1/9 and Q4/9 Rapporteur meeting |
| 2022-12-13 | E-meeting | [Q1/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13390&Group=9) | Q1/9 Rapporteur meeting |
| 2022-12-05 to 2022-12-06 | E-meeting | [Q1/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13386&Group=9); [Q7/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13387&Group=9) | Joint Q1/9 and Q7/9 Rapporteur meeting |
| 2022-12-01 | E-meeting | [Q11/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13397&Group=9) | Q11/9 Rapporteur meeting |
| 2022-11-23 | E-meeting | [Q8/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13394&Group=9) | Q8/9 Rapporteur meeting |
| 2022-11-22 | E-meeting | [Q6/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13392&Group=9) | Q6/9 Rapporteur meeting |
| 2022-10-25 | E-meeting / ITU, under the auspices of ITU-T SG16 | [Q11/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13398&Group=9) | 24th IRG-AVA meeting |
| 2022-10-24 | E-meeting / ITU | [Q7/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13393&Group=9) | Q7/9 Rapporteur meeting |
| 2022-09-07 | E-meeting / ITU, under the auspices of ITU-T SG9 | [Q11/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13259&Group=9) | 23rd IRG-AVA meeting |
| 2022-08-03 | E-meeting | [Q8/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13076&Group=9) | Q8/9 Rapporteur meeting |
| 2022-08-01 | E-meeting | [Q7/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=12857&Group=9) | Q7/9 Rapporteur meeting |
| 2022-07-13 | E-meeting | [Q9/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13070&Group=9) | Q9/9 Rapporteur meeting |
| 2022-06-15 | E-meeting | [Q8/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=13075&Group=9) | Q8/9 Rapporteur meeting |
| 2022-06-06 | E-meeting | [Q7/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=12856&Group=9) | Q7/9 Rapporteur meeting |
| 2022-05-12 | E-meeting | [Q10/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=12859&Group=9) | Q10/9 Rapporteur meeting |
| 2022-04-28 | E-meeting | [Q3/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=12855&Group=9); [Q6/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=12851&Group=9); [Q7/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=12852&Group=9); [Q8/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=12853&Group=9); [Q9/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=12854&Group=9) | Joint Q6, Q7, Q8, Q9 and Q12/9 Rapporteur meeting |
| 2022-04-26 to 2022-04-27 | E-meeting | [Q9/9](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=12858&Group=9) | Q9/9 Rapporteur 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 two Working Parties, WP1 on *“Cable transport and terminals, including video and data”* and WP2 on *“Cable-related platforms and applications”*.

**2.1.2** Table 3 shows the number and title of each Working Party, together with the number of Questions assigned to it and the name of WP Chair and vice-Chairs. Mr Yanbin (Evan) Sun (Huawei, China) was appointed as WP2/9 Vice-chair in May 2023 to replace his colleague Mr Xiang (Eric) Wang, who served as WP2/9 Vice-chair from September 2022 till May 2023.

**2.1.3** Table 4 lists other groups and their current management team, which were created by (or associated as parent group to) Study Group 9 during the study period, namely one Intersector Rapporteur Group (IRG).

TABLE 3  
Organization of Study Group 9

| Designation | Questions to be studied | Title of the Working Party | Chair and Vice-chairs |
| --- | --- | --- | --- |
| WP1/9 | Q1/9; Q2/9; Q4/9; Q6/9; Q7/9 | Cable transport and terminals, including video and data | Mr Zhifan Sheng (Chair) Mr Feng Ouyang (Vice-chair) Mr Tatsuo Shibata (Vice-chair) |
| WP2/9 | Q3/9; Q5/9; Q8/9; Q9/9; Q11/9 | Cable-related platforms and applications | Mr TaeKyoon Kim (Chair) Mr Pradipta Biswas (Vice-chair) Mr Yanbin (Evan) Sun (Vice-chair) |
| PLEN | Q10/9 | Plenary | Mr Satoshi Miyaji (Chair) |

TABLE 4  
Other groups

| Title of the Group | Co-Chair |
| --- | --- |
| IRG-AVA (Audiovisual Media Accessibility) | Mr Pradipta Biswas (Indian Institute of Science, India) |

PREAMBLE: WTSA Resolution 18 (Rev. Geneva, 2022) and Resolution ITU-R 75 (Dubai, 2023) 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, named Intersector Rapporteur Group (IRG).

**2.1.3.1** The **Intersector Rapporteur Group on Audiovisual Media Accessibility (**[**IRG-AVA**](https://www.itu.int/en/irg/ava/Pages/default.aspx)**)** was established to study topics related to audiovisual media accessibility and aims at developing draft Recommendations for "Access systems" that can be used for all media delivery systems, including broadcast, cable, Internet, and IPTV.

Media can be delivered by a number of delivery platforms, including over-the-air broadcasting, cable-casting, IPTV, and Internet. In each case there is an increasing need for access services, for reasons such as the aging population, and the growth of literacy. To ensure that unnecessary differences do not hold back the use of access services, common systems should be used whenever possible.

The IRG-AVA also addresses matters contributing to the coordination of the standardization work of the involved ITU-T and ITU-R groups and collaborates with other SDOs and other audiovisual media organizations (e.g., forums and consortia, research institutes and academia). The IRG will thus consider delivery systems currently in the purview of the ITU-R Study Group 6 and the ITU-T Study Groups 9 and 16).

The terms of reference of the IRG-AVA are available online on IRG-AVA webpage: <https://www.itu.int/en/irg/ava/Pages/default.aspx>.

## 2.2 Questions and Rapporteurs

**2.2.1** WTSA-20 assigned to Study Group 9 the eleven Questions listed in Table 5. These Questions are in force with no modification since September 2022 as SG9 has not revised further its Question texts. The Rapporteurs and associate Rapporteurs that served during the Study Period and currently in charge are listed.

**2.2.2** The Questions listed in Table 6 have been adopted during this period.

**2.2.3** The Questions listed in Table 7 have been deleted during this period.

TABLE 5  
Study Group 9 – Questions assigned by WTSA-20 and Rapporteurs

| Questions | Title of the Questions | WP | Rapporteur |
| --- | --- | --- | --- |
| 1/9 | Transmission and delivery control of television and sound programme signal for contribution, primary distribution and secondary distribution | WP1/9 | Mr Kei Kawamura (Rapporteur) |
| 2/9 | Methods and practices for conditional access and content protection | WP1/9 | Mr Han-Seung Koo (Rapporteur)  Mr Rajiv Khattar (Associate rapporteur)  Mr Zhijian Liang (Associate rapporteur) |
| 3/9 | AI-enabled enhanced functions over integrated broadband cable network | WP2/9 | Mr Yanbin (Evan) Sun (Rapporteur)  Mr Avinash Agarwal (Associate rapporteur) |
| 4/9 | Guidelines for implementations and deployment of transmission of multichannel digital television signals over optical access networks and Hybrid Fibre-Coaxial (HFC) | WP1/9 | Mr Tatsuo Shibata (Rapporteur)  Mr Blaise Mamadou (Associate rapporteur) |
| 5/9 | Software components, application programming interfaces (APIs), frameworks and overall software architecture for advanced content distribution services within the scope of Study Group 9 | WP2/9 | Mr Haifeng Yan (Rapporteur) |
| 6/9 | Functional requirements for terminal devices of the integrated broadband cable network | WP1/9 | Mr Xin Zhang (Rapporteur)  Ms Meenakshi Singhvi (Associate rapporteur)  Mr Shizhu Long (Rapporteur up to 14 September 2022) |
| 7/9 | Transmission control and interfaces (MAC layer) for IP and/or packet-based data over integrated broadband cable networks | WP1/9 | Mr TaeKyoon Kim (Rapporteur)  Mr Feng Ouyang (Associate rapporteur)  Mr Yanbin (Evan) Sun (Associate rapporteur) |
| 8/9 | The Internet protocol (IP) enabled multimedia applications and services for cable television networks enabled by converged platforms | WP2/9 | Mr Rakesh Desai (Rapporteur)  Ms Qiong Yao (Associate rapporteur) |
| 9/9 | Requirements, methods, and interfaces of the advanced service platforms to enhance the delivery of audiovisual content, and other multimedia interactive services over integrated broadband cable networks | WP2/9 | Ms Yanhua Niu (Rapporteur)  Mr Soonchoul Kim (Associate rapporteur)  Mr Xiang (Eric) Wang (Rapporteur up to 9 May 2023) |
| 10/9 | Work programme, coordination and planning | PLEN | Ms Jingyi Xue (Rapporteur)  Mr Satoshi Miyaji (Associate rapporteur) |
| 11/9 | Accessibility to cable systems and services | WP2/9 | Mr Avinash Agarwal (Rapporteur)  Mr Ming Zhao (Associate rapporteur) |

TABLE 6  
Study Group 9 – New Questions adopted and Rapporteurs

| Questions | Title of the Questions | WP | Rapporteur |
| --- | --- | --- | --- |
| None | – | – | – |

TABLE 7  
Study Group 9 – Questions deleted

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

# 3 Results of the work accomplished during the 2022-2024 study period

## 3.1 General

During the study period, Study Group 9 examined 130 contributions and generated a large number of TDs and liaison statements. It also:

– drew up 27 (new/revised) Recommendations. Among them, ten revised Recommendations, and four Corrigenda;

– developed four (new/revised) Supplements, of which two new and two revised;

– produced three technical reports;

## 3.2 Highlights of achievements

In this Study Period (2022-2024), SG9 continued its efforts to grow SG9 business, identifying and realizing strategic objectives. To this end, a series of Workshops on the “Future of TV” in various regions of the world were organized on SG9 initiative and in collaboration with the three Sectors of the ITU and the regional offices.

The aim of this series of workshops is to discuss the future of television taking into account regional needs with relevant stakeholders, covering regulatory and policy frameworks, emerging and convergent ICT Infrastructures and services, as well as user interfaces and human factors issues. This provides an opportunity to discuss TV-related regional and international standardization and to share best practices and case studies on TV implementations over various media as well as new TV services. With the organization of these workshops, SG9 activities were promoted to existing membership of the ITU, who are interested in television business from various perspectives (broadcasting, broadband and cable), as well as to new prospect members. This activity also enhanced the collaboration and cooperation of ITU-T SG9 with ITU-T SG16 and ITU-R SG6 on several topics including innovation in content delivery across multiple delivery platforms; merging of broadcasting, broadband, and web platforms; emerging smart terminals; audiovisual accessibility; advanced services; AI and extended reality technologies such as augmented and virtual reality as well as metaverse, etc.

Taking into account the flexibility and number of delegates that make SG9 meetings easy to be hosted outside Geneva, SG9 developed a strategy to meet in the regions in colocation with these Workshops. As results, SG9 meetings plus workshops were hosted in:

* Bangalore, India, 9-18 May 2023   
  ([ITU Workshop on "The Future of Television for South Asia, Arab and Africa Regions](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/2023/0511/Pages/default.aspx))
* Bogotá, Colombia, 14-23 November 2023   
  ([ITU Workshop on "The Future of Television for the Americas"](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/2023/1117/Pages/default.aspx))
* Tokyo, Japan, 2-10 September 2024 (planned).

Two additional fully virtual meetings of SG9 were held on:

* Fully virtual, 6-14 September 2022
* Fully virtual, 9-17 May 2024

Having SG9 meetings outside Geneva is in line with SG9's objectives to promote rollout of cable television in developing countries. In this regard, SG9 continued to address the requests from developing countries in its dedicated Question (Q4/9).

To be noted that SG9 continued the collaboration with CableLabs to develop cable television related technologies, particularly for cable modem systems standardization such as DOCSIS, which is now standardized in ITU-T up to its 5th generation. [J Supplement 10](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=15607) provides a correspondence between CableLabs DOCSIS specifications and ITU-T J-series Recommendations.

At the same time SG9 advanced the standardization on the High-Performance Network over Coax (HiNoC), which is now standardized in ITU-T up to its 3rd generation. [J Supplement 12](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=24) provides with a useful comparison between third-generation HiNoC and second-generation HiNoC.

SG9 has developed Recommendations (ITU-T J.152-J.153) on digital television distribution through local subscriber networks to utilize IMT-2020 radio system as local subscriber networks.

Also, SG9 has completed the standardization on the series of Recommendations on Smart TV Operating System (TVOS) over integrated broadcast and broadband cable networks by developing ITU-T J.1206. This Recommendation specifies the application programming interface of a smart TV operating system, including Java application programming interface and Web application programming interface. SG9 is currently studying the TVOS conformance testing, which is planned to be finalized in September 2024 as ITU-T J.1207.

SG9 has completed the standardization (ITU-T J.1036) on the new Recommendation on Factual subscriber-base reporting and protected content delivery in conditional access system. This Recommendation elaborates the various functional requirements of the CAS such as log requirements, reports requirements, database requirements, security requirements, service requirements and more.

SG9 also developed Recommendations ITU-T J.1630 related to "end to end network characteristics requirement for video services over cable integrated broadband networks". It focusses on the key performance indicators (KPIs) for network performance and key quality indicators (KQIs) for user experience with traditional and advanced video services. It also defines the measurement and monitoring methods and offers a comprehensive framework for assessing the performance and quality of experience for video services.

SG9 has updated the standardization on requirements and specifications for a smart home gateway (ITU-T J.1611, J.1612) for additional protocol support, and is currently studying new technologies to provide ultra-high-definition (UHD) video and virtual reality (VR) services (J.JTB-UHDVR) as well as new audio and video interfaces (AV) for compact and cost-effective terminal devices, such as set-top-boxes (J.STB-AV), for integrated cable network.

In addition, SG9 has completed the standardization (ITU-T J.1305, J.1306) on two new Recommendations on the requirements and the specifications for the microservice architecture for audio-visual media in the converged media cloud. These Recommendations define the media microservices architecture (MMA) of integrated media based on container, virtual machine, cloud and other infrastructures to support the audiovisual media business carried out by microservices on a variety of infrastructures leading to meet the needs of rapid iteration and diversified services of the audiovisual media business.

SG9 is also dedicated to the standardization of advanced service platforms to enhance the delivery of audiovisual content and other multimedia interactive services over integrated broadband cable networks. This includes the development of standards for multicast adaptive bitrate IP delivery (ITU-T J.484), end-to-end network platform for cloud-based holography transmissions (J.cloud-ow), and cloud gaming service platforms (ITU-T J.1311).

SG9 has continued to update ITU-T J.1, leading to the publication of versions 3 and 4. These revisions reflect the newly approved terms and definitions that have been introduced since May 2020. Recommendation ITU-T J.1 compiles all the definitions related to television and sound transmission, and integrated broadband cable networks, and which are in force in J-series and N‑series Recommendations developed under the responsibility of SG9.

Finally, SG9 worked closely with ITU-T SG16 and ITU-R SG6 through the Intersectoral Rapporteur Group on Audio-Visual Accessibility (IRG-AVA) to publish a new Technical Report (TR.CUP) on " Concept of a common user profile format used to personalize audiovisual media" and to progress the draft Recommendation (J.acc-us-prof) on the same topic. SG9 is also working on developing terminology, metrics and functional requirements for cognitive load estimation for augmented and virtual reality (AR/VR) services, as well as on a new technical report to provide technical advances, challenges, and best practices in live captioning. These are being progressed in consultation with the IRG-AVA.

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

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

### 3.3.1 Lead study group activities on integrated broadband cable networks, and audiovisual content delivery over cable networks

SG9 has been entrusted by WTSA-20 the Lead study group on:

* integrated broadband cable networks, and
* audiovisual content delivery over cable networks

Accordingly, SG9 has developed a number of lead Study Group activities reports which were timely submitted to TSAG for review. All SG9 Lead SG Activity reports are summarised below and can be accessed following the related URLs:

[TSAG-TD32-R1](https://www.itu.int/md/T22-TSAG-221212-TD-GEN-0032/en) (Geneva, 12-16 December 2022)

[TSAG-TD201](https://www.itu.int/md/T22-TSAG-230530-TD-GEN-0201/en) (Geneva, 30 May - 2 June 2023)

[TSAG-TD334](https://www.itu.int/md/T22-TSAG-240122-TD-GEN-0334/en) (Geneva, 22-26 January 2024)

[TSAG-TD535](https://www.itu.int/md/T22-TSAG-240729-TD-GEN-0535/en) (Geneva, 29 July - 2 August 2024)

### 3.3.2 JCA

None.

### 3.3.3 Regional Group

None.

### 3.3.4 Focus Group

None.

# 4 Observations concerning future work

Study Group 9 has revised its mandate, which is proposed to be included in the next version of ITU‑T Resolution 2 “ITU-T study group responsibility and mandates” for next Study Period.

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 television industry.

SG9 is aware and supportive that WTSA-24 may decide to consolidate SG9 and SG16 into one single Study Group (SGC). However, the revised mandate of SG9, as found in ANNEX 2, was prepared updating the current SG9 mandate in the unlikely event that SG9 is maintained as a single independent Study Group. In that case, SG9 proposes to WTSA-24 to move five Questions from SG16 to SG9 to reduce duplication and clearly differentiate the scopes of work of SG9 and SG16 as well as to achieve more balanced Study Groups.

* ***ACTION: SG9 proposes to WTSA-24 to move the current Q8/16, Q11/16, Q13/16, Q26/16 and Q27/16 from SG16 to SG9***

# 5 Updates to the WTSA Resolution 2 for the 2025-2028 study period

Annex 2 contains the updates to WTSA Resolution 2 proposed by Study Group 9 concerning updates to its current general areas of study, title, mandate, lead roles and points of guidance in the next study period, which were used as baseline to the proposal prepared by the joint management team of SG9 and SG16 submitted to TSAG for the WTSA Resolution 2 element related to a consolidated SG9 and SG16 ("SGC") being proposed to WTSA-24.

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 8.

The list of Recommendations determined/consented by Study Group 9 or its working parties that were not yet approved at the time this report was published is found in Table 9.

The list of Recommendations deleted by Study Group 9 during the study period is found in Table 10.

The List of Recommendations submitted by Study Group 9 to WTSA-24 for approval is found in Table 11.

Tables 12 onwards list other publications approved and/or deleted by Study Group 9 during the study period.

TABLE 8  
Study Group 9 – Recommendations approved during the study period

| Recommendation | Approval | Status | TAP/AAP | Title |
| --- | --- | --- | --- | --- |
| [J.1](http://handle.itu.int/11.1002/1000/15115) | 2022-10-29 | Superseded | AAP | Terms, definitions and acronyms for television and sound transmission and integrated broadband cable networks |
| [J.1](http://handle.itu.int/11.1002/1000/15806) | 2024-01-13 | In force | AAP | Terms, definitions and acronyms for television and sound transmission and integrated broadband cable networks |
| [J.152](http://handle.itu.int/11.1002/1000/15579) | 2023-07-14 | In force | AAP | Requirements for cable television services to use IMT-2020 radio systems |
| [J.198.2](http://handle.itu.int/11.1002/1000/15800) | 2024-01-13 | In force | AAP | Physical layer specification for third-generation HiNoC |
| [J.198.3](http://handle.itu.int/11.1002/1000/15801) | 2024-01-13 | In force | AAP | MAC layer specification for third-generation HiNoC |
| [J.224](http://handle.itu.int/11.1002/1000/15116) | 2022-10-29 | Superseded | AAP | Fifth-generation transmission systems for interactive cable television services - IP cable modems |
| [J.224](http://handle.itu.int/11.1002/1000/15589) | 2023-07-14 | In force | AAP | Fifth-generation transmission systems for interactive cable television services – IP cable modems |
| [J.225](http://handle.itu.int/11.1002/1000/15117) | 2022-10-29 | Superseded | AAP | Fourth-generation transmission systems for interactive cable television services - IP cable modems |
| [J.225](http://handle.itu.int/11.1002/1000/15590) | 2023-07-14 | In force | AAP | Fourth-generation transmission systems for interactive cable television services – IP cable modems |
| [J.299](http://handle.itu.int/11.1002/1000/15591) | 2023-07-14 | In force | AAP | Functional requirements for remote management of cable set-top boxes by auto configuration server |
| [J.484](http://handle.itu.int/11.1002/1000/15580) | 2023-11-15 | In force | AAP | Requirements of multicast adaptive bitrate (M-ABR) IP delivery |
| [J.1036](http://handle.itu.int/11.1002/1000/15581) | 2023-07-14 | In force | AAP | Factual subscriber-base reporting and protected content delivery in conditional access system – Requirements |
| [J.1112](http://handle.itu.int/11.1002/1000/15582) | 2023-07-14 | In force | AAP | Functional requirements for IP-based digital video convergence service |
| [J.1206](http://handle.itu.int/11.1002/1000/15802) | 2024-01-13 | In force | AAP | Smart television operating system – Application programming interface |
| [J.1305](http://handle.itu.int/11.1002/1000/15583) | 2023-07-14 | In force | AAP | Requirements for microservices architecture for audio-visual media in the converged media cloud |
| [J.1306](http://handle.itu.int/11.1002/1000/15584) | 2023-07-14 | In force | AAP | Specification of microservices architecture for audio-visual media in the converged media cloud |
| [J.1611](http://handle.itu.int/11.1002/1000/15118) | 2022-10-29 | In force | AAP | Functional requirements for a smart home gateway |
| [J.1612](http://handle.itu.int/11.1002/1000/15592) | 2023-07-14 | In force | AAP | Architecture for a smart home gateway |
| [J.153](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18894) | 2024-06-29 | In force | AAP | System architecture for cable television services to use IMT-2020 radio system |
| [J.198.2 (Cor.1)](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=19463) | 2024-06-29 | In force | AAP | Physical layer specification for third-generation HiNoC |
| [J.298](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18899) | 2024-06-29 | In force | AAP | Requirements and technical specifications of a cable TV hybrid set-top box compatible with terrestrial and satellite TV transport |
| [J.1036 (Cor.1)](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=19464) | 2024-06-29 | In force | AAP | Factual subscriber-base reporting and protected content delivery in conditional access system - Requirements |
| [J.1291](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=19222) | 2024-06-29 | In force | AAP | Requirements and functional specification of Audio and Video interface on cable set-top box |
| [J.1305 (Cor.1)](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=19465) | 2024-06-29 | In force | AAP | Requirements of microservice architecture for audio-visual media in the converged media cloud |
| [J.1306 (Cor.1)](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=19466) | 2024-06-29 | In force | AAP | Specification of microservice architecture for audio-visual media in the converged media cloud |
| [J.1311](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17758) | 2024-06-29 | In force | AAP | Technical Requirements for Cloud Gaming Service Platforms |
| [J.1630](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17753) | 2024-06-29 | In force | AAP | End to End network characteristics requirement for video services over integrated broadband cable network |

TABLE 9  
Study Group 9 – Recommendations under approval as of publication of this report

| Recommendation | Consent/ Determination | TAP/AAP | Title |
| --- | --- | --- | --- |
| None |  |  |  |

TABLE 10  
Study Group 9 – Recommendations deleted during study period

| Recommendation | Last version | Withdrawal date | Title |
| --- | --- | --- | --- |
| None |  |  |  |

TABLE 11  
Study Group 9 – Recommendations submitted to WTSA-24

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

TABLE 12  
Study Group 9 – Supplements

| Supplement | Date | Status | Title |
| --- | --- | --- | --- |
| [J Suppl. 10](http://handle.itu.int/11.1002/1000/15183) | 2022-09-14 | Superseded | Correspondence between CableLabs DOCSIS Specifications and ITU-T J-series Recommendations |
| [J Suppl. 10](http://handle.itu.int/11.1002/1000/15607) | 2023-05-18 | In force | Correspondence between CableLabs DOCSIS Specifications and ITU-T J-series Recommendations |
| [J Suppl. 12](http://handle.itu.int/11.1002/1000/24) | 2023-11-23 | In force | Comparison between third-generation HiNoC and second-generation HiNoC |
| [J Suppl. 13](http://handle.itu.int/11.1002/1000/15783) | 2023-11-23 | In force | ITU-T J.1036 – Factual subscriber-base reporting and protected content delivery in conditional access system – Test methods |

TABLE 13  
Study Group 9 – Technical Papers

| Technical Paper | Date | Status | Title |
| --- | --- | --- | --- |
| None |  |  |  |

TABLE 14  
Study Group 9 – Technical Reports

| Recommendation | Date | Status | Title |
| --- | --- | --- | --- |
| [J.TR.WiFiTV](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18510) | 2024-05-17 | New | Secondary distribution of digital television and audiovisual content to portable devices using the wireless local area network |
| [TR.CUP](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=19134) | 2023-11-23 | New | Concept of a Common User Profile format used to personalize audiovisual media |
| [TR.FSR](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18512) | 2023-05-18 | New | Factual subscriber-base reporting and protected content delivery in conditional access system (CAS) |

TABLE 15  
Study Group 9 – Other publications

| Recommendation | Date | Status | Title |
| --- | --- | --- | --- |
| None |  |  |  |

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 [WTSA-20 Resolution 2](https://www.itu.int/dms_pub/itu-t/opb/res/T-RES-T.2-2022-PDF-E.pdf). The relevant updates are recorded using the revision mark function of word.

SG9 is aware that WTSA may decide to consolidate SG9 and SG16 into one single Study Group (SGC). Therefore, this proposal is intended to provide a backup plan in case WTSA-24 decides to maintain SG9 as a standalone Study Group.

The updated mandate developed by SG9, found below, includes a proposal from SG9 to WTSA-24 to move five Questions from SG16 to SG9.

* ***ACTION: SG9 proposes to WTSA-24 to move Q8/16, Q11/16, Q13/16, Q26/16 and Q27/16 from SG16 to SG9***

The updated mandate includes some text between square brackets highlighted in yellow […]. There was consensus in SG9 that the inclusion or not of the yellow text depends on the move of the above Questions from SG16 to SG9, i.e., the square brackets are removed if these Questions are moved from SG16 to SG9, otherwise, the text in square bracket is removed, unless it is marked as strikethrough in which case it’s kept removing the strikethrough.

The updated mandate of SG9, according to Resolution 2 /Annex A, B and C (portions related to SG9), is provided from next page.

Annex A  
(to Resolution 2 (Rev. Geneva, 2022))

#### PART 1 ‑ General areas of study

**…**

**ITU‑T Study Group 9**

**Audiovisual content 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 audiovisual content, e.g. television programmes and related data services, including interactive services and applications, providing advanced capabilities, e.g. ultra-high definition, high-dynamic range and immersive, including 3D (stereoscopy and holographic type), virtual reality, augmented reality and multiview;

• use of [~~cable~~] distribution networks, e.g. coaxial cable, optical fibre, hybrid fibre coaxial (HFC), [IPTV,] etc., to also provide integrated broadband services, including interconnection with other types of networks such as fixed wireless access network, e.g., wireless local access network, private IMT-2020 network and beyond, etc. The cable network, primarily designed for audiovisual content delivery to the home, also carries time‑critical services like voice, gaming, video-on-demand, interactive and multiscreen services, etc. to customer premises equipment (CPE) in the home or enterprise;

• use of cloud computing, artificial intelligence (AI) and other advanced technologies to enhance audiovisual content contribution and distribution as well as integrated broadband services over the cable networks;

• use of accessibility services (like captioning, audio caption) and new interaction technologies (like haptic, gesture, eye tracking and so on) to enhance accessibility of audiovisual content and related data services for people with different ranges of abilities.

NOTE 1: Integrated broadband cable network can be referred to as a cable network, e.g., coaxial cable, optical fibre, hybrid fibre coaxial (HFC), etc., that also has capability to provide integrated broadband services coexisting with television services over the same network.

NOTE 2: private IMT-2020 network is intended to refer to the private wireless network specifically designed for supplementing cable TV access network.

**…**

#### PART 2 ‑ Lead Study Groups in specific areas of study

**…**

SG9 Lead study group on integrated broadband cable networks  
Lead study group on audiovisual content delivery over [~~cable~~] distribution systems [such as cable networks, IPTV, etc.], which could be applied also to satellite and/or terrestrial content distribution;  
[Lead study group on audiovisual content delivery over emerging technologies such as augmented reality (AR), virtual reality (VR), extended reality (XR), and metaverse  
Lead study group on IP-based television services and digital signage  
Lead study group on human factors and ICT accessibility for digital inclusion  
Lead study group on multimedia aspects of automotive-related intelligent services].

**…**

Annex B  
(to WTSA Resolution 2)  
  
Points of guidance to study groups for the development  
of the post-2022 work programme

**B.1** This annex provides points of guidance to study groups for the development of post‑2022 study Questions in accordance with their proposed structure and general areas of responsibility. The points of guidance are intended to clarify, where appropriate, interaction between study groups in certain areas of common responsibility, and are not intended to provide a comprehensive list of such responsibilities.

**B.2** This annex will be reviewed by the Telecommunication Standardization Advisory Group (TSAG) as necessary to facilitate interaction between study groups, to minimize duplication of effort and to harmonize the overall ITU‑T work programme.

**…**

**ITU‑T Study Group 9**

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

• audiovisual content systems for contribution and distribution, including broadcasting, over [~~cable~~] distribution networks, e.g. coaxial cable, optical fibre, hybrid fibre coaxial (HFC), [IPTV,] etc. which could be applied also to satellite and/or terrestrial content distribution;

• procedures for the operation of audiovisual content delivery over cable networks;

• interconnection between cable networks and other types of networks such as fixed wireless access network, e.g., wireless local access network, private IMT-2020 network and beyond, etc.;

• audiovisual content delivery ~~[through cable]~~ over emerging technologies such as augmented reality (AR), virtual reality (VR), extended reality (XR), and metaverse;

• the use of IP or other appropriate protocols, middleware and operating systems to provide time-critical services, services on demand, interactive services or service migrations from RF to IP over [~~Integrated broadband cable~~] distribution networks;

• artificial intelligence (AI)-assisted delivery and transmission systems for audiovisual content and other data services over cable networks;

• cable network terminals and related interfaces (e.g. interfaces to home network devices, such as IoT devices, interfaces to the cloud);

• end-to-end integrated platforms for cable networks;

• advanced, interactive, time-critical and other services and applications over integrated broadband cable networks;

• cloud-based systems for audiovisual content services and control over integrated broadband cable networks;

• secured audiovisual content contribution and distribution, for example conditional access (CA) systems and digital rights management (DRM), over cable networks;

• accessibility applications for delivery of audiovisual content for television viewing experiences, as well as emerging technologies such as augmented reality (AR), virtual reality (VR), extended reality (XR), and metaverse;

• common user profile and participation taxonomy for broadband cable-TV accessibility.

Study Group 9 will develop and maintain implementation guidelines to support the deployment of audiovisual content contribution and distribution in developing countries.

Study Group 9 is responsible for coordination with the ITU Radiocommunication Sector (ITU‑R) on broadcasting matters.

Inter-Sector rapporteur group activities of different Sectors and/or joint rapporteur group activities of different study groups 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 2025-2028 study period

**…**

**ITU‑T Study Group 9**

ITU‑T J-series, except those under the responsibility of Study Groups 12 and 15

ITU‑T N-series

[ITU-T H-series and F-series related to Q8/16, Q11/16, Q13/16, Q26/16 and Q27/16]

**…**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_