|  |  |  |
| --- | --- | --- |
| itu_logo | World Telecommunication Standardization Assembly (WTSA-16)Hammamet, 25 October - 3 November 2016 | CCITT/ITU-T 60th Anniversary logo |
|  |  |
|  |  |
| PLENARY MEETING | Document 17-E |
|  | July 2016 |
|  | Original: English |
|  |
| ITU‑T Study Group 16 |
| Multimedia coding, systems and applications |
| REPORT of ITU-T SG16 TO THE WORLD TELECOMMUNICATION STANDARDIZATION ASSEMBLY (WTSA-16), PART I: GENERAL |

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

Note by the TSB:

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

Part I: **Document 17** – General

Part II: **Document 18** – Questions proposed for study during the study period 2017-2020

**CONTENTS**

|  Page |
| --- |
| [1 Introduction 2](#_Toc456956950)[2 Organization of work 2](#_Toc456956951)[3 Results of the work accomplished during the 2013-2016 study period 1](#_Toc456956952)[4 Observations concerning future work 14](#_Toc456956953)[5 Updates to the WTSA Resolution 2 for the 2017-2020 study period 16](#_Toc456956954)[ANNEX 1 List of Recommendations, Supplements and other materials produced or deleted during the study period 17](#_Toc456956955)[ANNEX 2 Proposed updates to the Study Group 16 mandate and Lead Study Group roles 34](#_Toc456956956) |

# 1 Introduction

## 1.1 Responsibilities of Study Group 16

Study Group 16 was entrusted by the World Telecommunications Standardization Assembly (Dubai, 2012) with the study of 18 Questions for studies relating to ubiquitous applications, multimedia capabilities for services and applications for existing and future networks, including NGN and beyond. This included accessibility, multimedia architectures, terminals, protocols, signal processing, media coding and systems (e.g. network signal processing equipment, multipoint conference units, gateways and gatekeepers).

## 1.2 Management team and meetings held by Study Group 16

Study Group 16 met six times in Plenary and one time in Working Partiesin the course of the study period (see Table 1) under the chairmanship of Mr Yushi Naito (Japan), assisted by vice-chairmen Mohannad El-Megharbel (Egypt), Seong-Ho Jeong (Rep. of Korea), Paul Jones (USA), Harald Kullmann (Germany), Noah Luo (China), Ntsibane Ntlatlapa (South Africa) and Khusan Isaev (Uzbekistan), and by Mr Masahito Kawamori (Japan). Mr Simão Ferraz de Campos Neto was the Counsellor for ITU‑T SG16, assisted by Mrs Rosa Angeles Leon de Vivero. Vice-chairman Mr Gaby Daniel (Lebanon) was unable to attend any meetings during the study period.

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

# 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 16 decided to establish three Working Parties.

**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. Question 20/16 "Multimedia coordination" was allocated to the Plenary.

**2.1.3** Table 3 lists other groups created by Study Group 16 during the study period.

a) IRG-AVA (Intersector Rapporteur Group on Audiovisual Media Accessibility)

b) IRG-IBB (Intersector Rapporteur Group on Integrated Broadcast-Broadband)

**2.1.4** During the study period, no Focus Groups were created, even though the study group had already the Focus Group on Audiovisual Media Accessibility that had been created in November 2009 (see [WTSA-12 Doc. 17](http://www.itu.int/md/T09-WTSA.12-C-0017/en)).

**2.1.5** Study Group 16 established no Regional Groups (as per WTSA-12 Resolution 54) during the study period.

## 2.2 Questions and Rapporteurs

**2.2.1** WTSA-12 assigned to Study Group 16 the eighteen 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 1
Meetings of Study Group 16 and its Working Parties

| Meetings | Place, date | Reports |
| --- | --- | --- |
| SG/WP 16 | Geneva, 14-25 January 2013 | COM16-R 1 to 4 |
| SG/WP 16 | Geneva, 28 October - 8 November 2013 | COM16-R 5 to 8 |
| WP 2/16 | Geneva, 28 February 2014 | COM16-R 9 |
| SG/WP 16 | Sapporo, Japan, 30 June - 11 July 2014 | COM16-R 10 to 13 |
| SG/WP 16 | Geneva, 9-20 February 2015 | COM16-R 14 to 17 |
| SG/WP 16 | Geneva, 12-23 October 2015 | COM16-R 18 to 21 |
| SG/WP 16 | Geneva, 23 May - 3 June 2016 | COM16-R 22 to 25 |

TABLE 1-bis
Rapporteur meetings organized under Study Group 16 during the study period

| Dates | Place/Host | Question(s) | Event name |
| --- | --- | --- | --- |
| 2013-04-18~26 | Incheon, Korea (Rep. of) | [Q6/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=145&Group=16) [[report](http://www.itu.int/md/T13-SG16-131028-TD-WP3-0064/en)] | ITU‑T Q6/16, JCT-VC & JCT‑3V |
| 2013-05-06~10 | Johannesburg, South Africa | [Q13/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=140&Group=16) [[report](http://www.itu.int/md/T13-SG16-131028-TD-WP2-0080/en)][Q14/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=142&Group=16) [[report](http://www.itu.int/md/T13-SG16-131028-TD-WP2-0083/en)][Q28/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=141&Group=16) [[report](http://www.itu.int/md/T13-SG16-131028-TD-WP2-0088/en)] | IPTV-GSI |
| 2013-06-03~04 | Washington D.C., United States | [Q26/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=27&Group=16) [[report](http://www.itu.int/md/T13-SG16-131028-TD-WP2-0086/en)] | ITU‑T Q26/16 - Accessibility to multimedia systems and services |
| 2013-06-05~07 | Darmstadt, Germany | [Q15/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=146&Group=16) [[report](http://www.itu.int/md/T13-SG16-131028-TD-WP3-0067/en)][Q16/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=147&Group=16) [[report](http://www.itu.int/md/T13-SG16-131028-TD-WP3-0068/en)][Q18/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=148&Group=16) [[report](http://www.itu.int/md/T13-SG16-131028-TD-WP3-0069/en)] | ITU‑T Q15/16, Q16/16, Q18/16 Rapporteurs Group meeting |
| 2013-06-17~21 | Oslo, Norway | [Q1/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=19&Group=16) [[report](http://www.itu.int/md/T13-SG16-131028-TD-WP1-0077/en)][Q2/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=20&Group=16) [[report](http://www.itu.int/md/T13-SG16-131028-TD-WP1-0077/en)][Q3/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=21&Group=16) [[report](http://www.itu.int/md/T13-SG16-131028-TD-WP1-0077/en)][Q5/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=22&Group=16) [[report](http://www.itu.int/md/T13-SG16-131028-TD-WP1-0077/en)] | WP1/16 Questions Rapporteur Group meeting |
| 2013-06-19~25 | Geneva | [Q25/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=143&Group=16) [[report](https://www.itu.int/ifa/t/2013/iot-gsi/docs/1306/TDs/iotgsi-td-198_Q25%20report.doc)] | ITU‑T Q25/16 - IoT applications and services |
| 2013-06-24~25 | Geneva | [Q27/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=61&Group=16) [[report](http://www.itu.int/md/T13-SG16-131028-TD-WP2-0087/en)] | ITU‑T Q27/16 - Vehicle gateway platform for telecommunication/ITS services/applications |
| 2013-07-08~12 | Geneva | [Q13/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=41&Group=16) [[report](http://www.itu.int/md/T13-IPTV.GSI-130708-TD-GEN-0049/en)][Q14/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=43&Group=16) [[report](http://www.itu.int/md/T13-IPTV.GSI-130708-TD-GEN-0045/en)][Q28/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=42&Group=16) [[report](http://www.itu.int/md/T13-IPTV.GSI-130708-TD-GEN-0048/en)] | IPTV-GSI |
| 2013-07-25~08-02 | Vienna, Austria | [Q6/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=149&Group=16) [[report](http://www.itu.int/md/T13-SG16-131028-TD-WP3-0065/en)] | ITU‑T Q6/16 & JCT-VC & JCT-3V |
| 2013-08-29 | E-Meeting | [Q28/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=87&Group=16) [[report](http://www.itu.int/md/T13-IPTV.GSI-130708-TD-GEN-0048/en)] | ITU‑T Q28/16 H.MEDX discussions |
| 2013-09-26 | E-Meeting | [Q28/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=88&Group=16) [[report](http://www.itu.int/md/T13-IPTV.GSI-130708-TD-GEN-0048/en)] | ITU‑T Q28/16 H.MEDX discussions |
| 2013-10-23~11-01 | Geneva | [Q6/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=150&Group=16) [[report](http://www.itu.int/md/T13-SG16-140630-TD-WP3-0113/en)] | ITU‑T Q6/16 & JCT-VC & JCT-3V |
| 2013-12-05 | E-Meeting | [Q28/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=254&Group=16) [[report](http://www.itu.int/md/T13-IPTV.GSI-140224-TD-GEN-0075/en)] | ITU‑T Q28/16 H.MEDX discussions |
| 2013-12-19 | E-Meeting | [Q28/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=255&Group=16) [[report](http://www.itu.int/md/T13-IPTV.GSI-140224-TD-GEN-0075/en)] | ITU‑T Q28/16 H.MEDX discussions |
| 2014-01-09~17 | San Jose, California, United States | [Q6/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=243&Group=16) [[report](http://www.itu.int/md/T13-SG16-140630-TD-WP3-0114/en)] | ITU‑T Q6/16 & JCT-VC & JCT-3V |
| 2014-01-09 | E-Meeting | [Q28/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=256&Group=16) [[report](http://www.itu.int/md/T13-IPTV.GSI-140224-TD-GEN-0075/en)] | ITU‑T Q28/16 H.MEDX discussions |
| 2014-01-22 | E-Meeting | [Q28/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=257&Group=16) [[report](http://www.itu.int/md/T13-IPTV.GSI-140224-TD-GEN-0075/en)] | ITU‑T Q28/16 H.MEDX discussions |
| 2014-02-06 | E-Meeting | [Q28/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=258&Group=16) [[report](http://www.itu.int/md/T13-IPTV.GSI-140224-TD-GEN-0075/en)] | ITU‑T Q28/16 H.MEDX discussions |
| 2014-02-19~25 | Geneva | [Q25/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=246&Group=16) [[report](http://www.itu.int/md/T13-SG16-140228-TD-WP2-0175/en)] | ITU‑T Q25/16 Rapporteurs Group Meeting |
| 2014-02-24~28 | Geneva | [Q13/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=247&Group=16) [[report](http://www.itu.int/md/T13-SG16-140228-TD-WP2-0173/en)][Q14/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=249&Group=16) [[report](http://www.itu.int/md/T13-SG16-140228-TD-WP2-0173/en)][Q26/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=250&Group=16) [[report](http://www.itu.int/md/T13-SG16-140228-TD-WP2-0176/en)][Q28/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=248&Group=16) [[report](http://www.itu.int/md/T13-SG16-140228-TD-WP2-0175/en)] | IPTV-GSI |
| 2014-02-27~28 | Rennes, France | [Q27/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=245&Group=16) [[report](http://www.itu.int/md/T13-SG16-140630-TD-WP2-0196/en)] | ITU‑T Q27/16 Rapporteurs Group Meeting |
| 2014-03-10~14 | Geneva | [Q3/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=262&Group=16) [[report](http://www.itu.int/md/T13-SG16-140630-TD-WP1-0146)][Q5/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=263&Group=16) [[report](http://www.itu.int/md/T13-SG16-140630-TD-WP1-0146)] | WP1/16 Questions Rapporteur Group meeting |
| 2014-03-27~04-04 | Valencia, Spain | [Q6/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=251&Group=16) [[report](http://www.itu.int/md/T13-SG16-140630-TD-WP3-0115/en)] | ITU‑T Q6/16 & JCT-VC & JCT-3V |
| 2014-10-06~10 | Tashkent, Uzbekistan | [Q13/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=644&Group=16) [[report](http://www.itu.int/md/T13-IPTV.GSI-141006-TD-GEN-0152/en)][Q14/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=662&Group=16) [[report](http://www.itu.int/md/T13-IPTV.GSI-141006-TD-GEN-0154/en)][Q26/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=663&Group=16) [[report](http://www.itu.int/md/T13-IPTV.GSI-141006-TD-GEN-0156/en)][Q28/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=664&Group=16) [[report](http://www.itu.int/md/T13-IPTV.GSI-141006-TD-GEN-0158/en)] | IPTV-GSI |
| 2014-10-17~24 | Strasbourg, France | [Q6/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=650&Group=16) [[report](http://www.itu.int/md/T13-SG16-150209-TD-WP3-0156/en)] | ITU‑T Q6/16 & JCT-VC & JCT-3V |
| 2014-11-03~07 | Seoul, Korea (Rep. of) | [Q3/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=656&Group=16) [[report](http://ftp3.itu.int/av-arch/avc-site/2013-2016/1411_Seo/AVD-4661.zip)][Q5/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=658&Group=16) [[report](http://wftp3.itu.int/av-arch/avc-site/2013-2016/1411_Seo/TD-06a.zip)] | WP1/16 Questions Rapporteur Group Meeting |
| 2014-11-05~07 | E-Meeting | [Q14/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=792&Group=16) [[report](http://ifa-int.itu.int/t/2013/sg16/exchange/wp2/q14/InterimByFeb2015/Nov2014/MR/TD-001-MR-Nov2014.doc)] | ITU‑T Q14/16 e-meeting |
| 2014-11-12~18 | Geneva | [Q25/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=648&Group=16) [[report](https://www.itu.int/ifa/t/2013/iot-gsi/docs/1411/TDs/iotgsi-td-261_Q25%20report-final.doc)] | ITU‑T Q25/16 - IoT applications and services |
| 2014-11-26 | E-Meeting | [Q13/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=789&Group=16) [[report](http://www.itu.int/md/T13-SG16-150209-TD-WP2-0308/en)] | ITU‑T Q13/16 e-meeting |
| 2014-12-17~19 | E-Meeting | [Q14/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=839&Group=16) [[report](http://www.itu.int/md/T13-SG16-150209-TD-WP2-0312/en)] | ITU‑T Q14/16 e-meeting |
| 2014-12-17 | E-Meeting | [Q13/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=838&Group=16) [[report](http://www.itu.int/md/T13-SG16-150209-TD-WP2-0308/en)] | ITU‑T Q13/16 e-meeting |
| 2015-02-10~18 | Geneva | [Q6/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=651&Group=16) [[report](http://www.itu.int/md/T13-SG16-151012-TD-WP3-0190)] | ITU‑T Q6/16 & JCT-VC & JCT-3V |
| 2015-04-21~27 | Geneva | [Q25/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=970&Group=16) [[report](http://www.itu.int/md/T13-SG16-151012-TD-WP2-0381/en)] | ITU‑T Q25/16 - IoT applications and services |
| 2015-06-08~12 | Chengdu, China | [Q2/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=966&Group=16) [[report](http://www.itu.int/md/T13-SG16-151012-TD-WP1-0275)][Q3/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=967&Group=16) [[report](http://www.itu.int/md/T13-SG16-151012-TD-WP1-0275)][Q5/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=968&Group=16) [[report](http://www.itu.int/md/T13-SG16-151012-TD-WP1-0275)][Q21/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=969&Group=16) [[report](http://www.itu.int/md/T13-SG16-151012-TD-WP1-0275)] | WP1/16 Questions Rapporteur Group meeting |
| 2015-06-15~19 | Geneva | [Q13/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=971&Group=16) [[report](http://www.itu.int/md/T13-SG16-151012-TD-WP2-0377)][Q14/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=974&Group=16) [[report](http://www.itu.int/md/T13-SG16-151012-TD-WP2-0378)][Q26/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=972&Group=16) [[report](http://www.itu.int/md/T13-SG16-151012-TD-WP2-0379)][Q28/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=973&Group=16) [[report](http://www.itu.int/md/T13-SG16-151012-TD-WP2-0380)] | IPTV-GSI |
| 2015-06-19~26 | Warsaw, Poland | [Q6/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=976&Group=16) [[report](http://www.itu.int/md/T13-SG16-151012-TD-WP3-0191)] | ITU‑T Q6/16 & JCT-VC & JCT-3V |
| 2015-07-14~20 | Geneva | [Q25/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=1059&Group=16) [[report](http://www.itu.int/md/T13-SG16-151012-TD-WP2-0394)] | ITU‑T Q25/16 - IoT applications and services |
| 2015-07-30~31 | Beijing, China | [Q27/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=975&Group=16) [[report](http://www.itu.int/md/T13-SG16-151012-TD-WP2-0382)] | ITU‑T Q27/16 Rapporteurs Group Meeting |
| 2015-08-19 | E-Meeting | [Q13/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=1211&Group=16) [[report](http://www.itu.int/md/T13-SG16-151012-TD-WP2-0386)] | ITU‑T Q13/16 - Multimedia application platform and end systems for IPTV |
| 2015-09-07 | E-Meeting | [Q26/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=1213&Group=16) [[report](http://www.itu.int/md/T13-SG16-151012-TD-WP2-0384)] | ITU‑T Q26/16 - Accessibility to multimedia systems and services |
| 2015-09-16 | E-Meeting | [Q13/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=1212&Group=16) [[report](http://www.itu.int/md/T13-SG16-151012-TD-WP2-0386)] | ITU‑T Q13/16 - Multimedia application platform and end systems for IPTV |
| 2015-12-17 | E-Meeting | [Q26/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=2388&Group=16) [[report](http://ifa.itu.int/t/2013/sg16/exchange/wp2/q26/1601-emtg/Q26-16-Emtg-20151217-Discussion_results.docx)] | ITU‑T Q26/16 - Accessibility to multimedia systems and services |
| 2016-01-13 | E-Meeting | [Q26/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=2389&Group=16) [[report](https://www.itu.int/ifa/t/2013/sg16/exchange/wp2/q26/1601-emtg/)] | ITU‑T Q26/16 - Accessibility to multimedia systems and services |
| 2016-02-08 | E-Meeting | [Q6/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=2454&Group=16) [[report](http://www.itu.int/md/T13-SG16-160523-TD-WP3-0226)] | AHG on non-normative "best practices" information for HDR video coding |
| 2016-02-19~26 | San Diego, USA | [Q6/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=2390&Group=16) [[report](http://www.itu.int/md/T13-SG16-160523-TD-WP3-0225/en)] | ITU‑T Q6/16 & JCT-VC & JCT-3V |
| 2016-02-29~03-01 | Rennes, France | [Q27/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=2438&Group=16) [[report](http://www.itu.int/md/T13-SG16-160523-TD-WP2-0474)] | ITU‑T Q27/16 Rapporteurs Group Meeting |
| 2016-03-02~09 | Tokyo, Japan | [Q13/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=2391&Group=16) [[report](http://www.itu.int/md/T13-IPTV.GSI-160302-TD-GEN-0225)][Q14/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=2394&Group=16) [[report](http://www.itu.int/md/T13-IPTV.GSI-160302-TD-GEN-0227)][Q26/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=2392&Group=16) [[report](http://www.itu.int/md/T13-IPTV.GSI-160302-TD-GEN-0229)][Q28/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=2393&Group=16) [[report](http://www.itu.int/md/T13-IPTV.GSI-160302-TD-GEN-0231)] | IPTV-GSI |
| 2016-05-04 | E-Meeting | [Q13/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=3553&Group=16) [[report](http://www.itu.int/md/T13-SG16-160523-TD-WP2-0480)] | Q13/16 e-meeting |
| 2nd-half 2016\* | E-meeting | Q3/16 | Q3/16 e-meeting |
| June to Sep. 2016\* | E-meeting | Q27/16 | E-meeting via mailing list |
| 2016-09-01~02\* | Geneva  | [Q27/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=4624&Group=16) | Q27/16 and Joint Q6/17 and Q27/16 |
| 2016-09-12~16\* | ITU/Geneva | Q13/16, Q14/16, Q26/16, Q28/16, QILE/16 | IPTV-GSI |
| 2016-09-26~29\* | Changzhou, China | [Q21/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=4644&Group=16) | Q21/16 meeting |
| 2016-10-14~21\* | ISO/IEC JTC 1/‌SC 29/‌WG 11 /Chengdu, CN | [Q6/16](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=4625&Group=16) | 6/16 & JCT-VC & JVET meetings |
| \* NOTE – Planned meetings at the time of preparation of this report. |

TABLE 2
Organization of Study Group 16

| Designation | Questions to be studied | Title of the Working Party | Chairmanand Vice-chairmen |
| --- | --- | --- | --- |
| WP 1/16 | 1, 2, 3, 5, 21/16 | Multimedia systems | Mr Paul Jones (USA; Chairman)Mr Noah Luo (China; Vice-chairman) |
| WP 2/16 | 13, 14, 25\*, 26, 27, 28/16 | Multimedia services and accessibility | Mr Seong-Ho Jeong (Rep. of Korea; Chairman)Mr Masahito Kawamori (Japan; Vice-chairman) |
| WP 3/16 | 6, 7, 10, 15, 16\*, 18/16 | Media coding and signal processing | Mr Harald Kullmann (Germany; Chairman) |
| \* NOTE – Question 16/16 completed its work and was merged with Question 18/16 during the study period. Question 25/16 was closed during the study period, as the IoT related work was transferred to new ITU‑T Study Group 20 in October 2015. |

TABLE 3
Other Groups (if any)

| Title of the Group | Co-Chairmen | Vice-chairmen |
| --- | --- | --- |
| IRG-AVA (Intersector Rapporteur Group on Audiovisual Media Accessibility) | Ms Margaret Pinson (USA), Mr Masahito Kawamori (Keio University, Japan) and Mr David Wood (EBU, Switzerland) | – |
| IRG-IBB (Intersector Rapporteur Group on Integrated Broadcast-Broadband) | Mr Masaru Takechi (Japan), Mr Marcelo Moreno (Brazil) and Ms Ana Eliza Faria e Silva (Brazil) | – |

TABLE 4
Study Group 16 – Questions assigned by WTSA-12 and Rapporteurs

| Questions | Title of the Questions  | WP | Rapporteur |
| --- | --- | --- | --- |
| 1/16 | Multimedia systems, terminals and data conferencing | 1/16 | Mr Patrick Luthi (Cisco Systems Norway; Switzerland; Rapporteur) |
| 2/16 | Packet-based conversational multimedia systems and functions | 1/16 | Mr Paul E. Jones (Cisco Systems, USA; Rapporteur) |
| 3/16 | Multimedia gateway control architectures and protocols | 1/16 | Mr Christian Groves (Australia; Rapporteur) |
| 5/16 | Telepresence systems | 1/16 | Mr Stephen Botzko (Polycom, USA; Rapporteur) |
| 6/16 | Visual coding | 3/16 | Mr Gary Sullivan (Microsoft, USA; Rapporteur)Ms Jill Boyce (Vidyo; Intel, USA; Associate Rapporteur, 2014-2016)Mr Thomas Wiegand (HHI, Germany; Associate Rapporteur) |
| 7/16 | System and coordination aspects of media coding | 3/16 | Mr Yusuke Hiwasaki (NTT, Japan; Rapp. a.i., 2013); Mr Harald Kullmann (Rapporteur a.i. 2013-2016) |
| 10/16 | Speech and audio coding and related software tools | 3/16 | Mr Yusuke Hiwasaki (NTT, Japan; Rapporteur, 2013);Mr Harald Kullmann (Rapporteur a.i. 2013-2016) |
| 13/16 | Multimedia application platforms and end systems for IPTV | 2/16 | Mr Marcelo Moreno (Brazil; Rapporteur)Mr Fernando Masami Matsubara (Mitsubishi Electric, Japan; Associate Rapporteur) |
| 14/16 | Digital signage systems and services | 2/16 | Mr Kazunori Tanikawa (NEC, Japan; Rapporteur)Mr Kang Shin-Gak (ETRI, Rep. of Korea; Associate Rapporteur) |
| 15/16 | Voiceband signal discrimination and modem/facsimile terminal protocols | 3/16 | Mr Paul Coverdale (Huawei Technologies, China; Rapporteur) |
| 16/16 | Speech enhancement functions in signal processing network equipment | 3/16 | Mr Bob Reeves (BT, UK; Rapporteur, 2013); Mr Dominique Ho (Ericsson Canada; Associate Rapporteur, 2013) |
| 18/16 | Signal processing network functions and equipment | 3/16 | Mr Harald Kullmann (Germany; Rapporteur) |
| 20/16 | Multimedia coordination | – | Mr Noah Luo (Huawei Technologies, China; Rapporteur) |
| 21/16 | Multimedia framework, applications and services | 1/16 | Mr Noah Luo (Huawei Technologies; Rapporteur)Mr Wei Kai (China; Associate Rapporteur) |
| 25/16 | IoT applications and services | 2/16 | Mr Hyoung Jun Kim (ETRI, Ref. of Korea; Rapporteur) |
| 26/16 | Accessibility to multimedia systems and services | 2/16 | Mr John Lee (Blackberry – Rapporteur 2013); Mr Masahito Kawamori (Keio University, Japan; Rapporteur, 2014-2016)Mr Mohannad El-Megharbel (Associate Rapporteur, 2015-2016) |
| 27/16 | Vehicle gateway platform for telecommunication/‌ITS services/‌applications | 2/16 | Mr Scott Pennock (Blackberry, Canada; Rapporteur 2013-2014); Mr Seong-Ho Jeong (Rep. of Korea, Rapporteur a.i; 2014-2016); Mr Fernando Matsubara (Mitsubishi Electric, Japan; Rapporteur, 2016) |
| 28/16 | Multimedia framework for e‑health applications | 2/16 | Mr Masahito Kawamori (Keio University, Japan; Rapporteur, 2013-2016) |

TABLE 5
Study Group 16 – New Questions adopted and Rapporteurs

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

TABLE 6
Study Group 16 – Questions deleted

| Questions | Title of Questions | Rapporteurs | Results |
| --- | --- | --- | --- |
| 16/16 | Speech enhancement functions in signal processing network equipment | Mr Bob Reeves (BT, UK) | New Rec. ITU‑T G.161.1. |
| 25/16 | IoT applications and services | Mr Hyoung Jun Kim (ETRI, Rep. of Korea) | New and revised Recommendations (ITU‑T F.747.3, F.747.4, F.747.5, F.747.6, F.747.8, F.748.0, F.748.1, F.748.2, F.748.3, F.748.5, F.771 Amd.1, H.621 Amd.1, H.623).NOTE – Question transferred to ITU‑T Study Group 20 in October 2015, and continued under Question 4/20. |

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

## 3.1 General

During the study period, Study Group 16 examined 1210 contributions (up from 951 contributions in the previous study period).

On the basis of these documents and of an extremely large number of temporary documents, Study Group 16:

– drew up 108 new Recommendations;

– amended/revised 152 existing Recommendations;

– developed four new and four revised Supplements;

– produced ten new and two revised technical papers;

– approved one new technical report.

## 3.2 Highlights of achievements

### 3.2.1 General

The main results achieved on the various Questions assigned to Study Group 16 are briefly summarized below. Formal replies to the Questions are given in the synoptic tables in Annex 1 of this report.

During the four years of the study period, the telecommunication scene continued its fast pace of evolution and that had specific impact on Study Group 16 work. Some highlights of the responses from Study Group 16 are:

− **IPTV:** Question 13/16 continued as an important pillar of IPTV standardization in ITU‑T. Key Recommendations in the H.700-Series were revised and new Recommendations and Technical Papers were approved covering IPTV systems and terminal standards, advanced IPTV aspects as well as conformance testing specifications. The first edition of the "ITU‑T IPTV Green Book" was approved and it contains an overview of the ITU‑T family of standards for IPTV. Study Group 16 has joined the IRG-IBB, which discusses the coordinated development of Recommendations between ITU‑T and ITU-R for integrated broadcast and broadband systems. Study Group 16 also organized several IPTV interoperability events that have clearly promoted enhancements to IPTV product implementations. Moreover, ITU's IPTV IPv6 Global Testbed was launched, connecting sites worldwide to test and showcase ITU‑T's IPTV Recommendations as well as related technologies. On top of this effort, the third IPTV Application Challenge with a special focus on a "world accessible for all" was jointly organized with the International Paralympic Committee (IPC).

− **Digital signage:**Study Group 16 has made good progress in the work on digital signage systems and services during this study period. Question 14/16 developed two new Recommendations on general architecture (H.781), requirements for services in the case of disaster (H.785.0), and a Technical Paper on use-cases focusing on the interactivity between systems and audiences. Study Group 16 also started cooperation with W3C in order to enhance the work on Web-technology based digital signage systems.

− **IoT**: Internet of Things (IoT) can be viewed as a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on, existing and evolving, interoperable information and communication technologies. Through the exploitation of identification, data capture, processing and communication capabilities, the IoT makes full use of things to offer services to all kinds of applications, whilst maintaining the required privacy. Study Group 16 has developed under Question 25/16 standards on service description, service architecture, middleware, interfaces to support IoT applications and services. Close to the end of the study period, the work of this Question was transferred to the new Study Group 20, which passed to be ITU's focal point on IoT and its applications, including smart sustainable cities and communities.

− **ITS:** Study Group 16 is the lead Study Group on ITS Communications. It has made good progress in the work on vehicle gateway platforms (VGPs) including functional requirements, service requirements, architecture and functional entities, and communication interface between external applications and VGP. It is also working on the definition of the taxonomy for ICT-enabled vehicles. Question 27/16 also actively participated in Collaboration on ITS Communication Standards (CITS) organized across various SDOs.

− **Accessibility:** Study Group 16 made significant progress on terms and definitions for accessibility, on guidelines for accessible meetings including support for remote participation of persons with disabilities (PwDs). These documents were shared with the United Nations and other organizations of the UN system, as ITU is the leader organization amongst the UN family for modern and accessible working methods. On the technical level, SG16 also produced profiles to identify accessible IPTV terminal devices with ITU‑T H.702, which has been developed with strong involvement of PwDs. The Question also progressed specifications for telecommunication relay services, which aim at allowing persons with hearing impairments to fully and conveniently communicate with other people. Question 26/16 also followed up on various deliverables from the Focus Group on Audio Visual Media Accessibility (FG AVA), which closed in October 2013. SG16 also initiated joint the work with ITU-R within the framework of the Intersector Rapporteur Group on audiovisual media accessibility (IRG-AVA).

− **E-health**: As the lead group of e-health in ITU, Question 28/16 has been working on various areas of e-health and telemedicine. Personal connected health is one of the most salient topics that Question 28/16 has produced significant volume of work and attracted significant user interest. It has so far published 45 Recommendations in the H.810-series "*Interoperability design guidelines for personal health systems*" and H.820-H.850-series "*Conformance of ITU‑T H.810 personal health devices*" that transpose the Continua Design Guidelines as international standards. The number is expected to grow, as new devices, transport and back-end systems are added. In the area of e-health data exchange, Q28/16 approved and published [H.860 "*Multimedia e-health data exchange services*".](http://www.itu.int/ITU-T/recommendations/rec.aspx?rec=12163) Furthermore, Question 28/16 initiated the work on multimedia brain information, which enables neuro-medical information to be used in various services. Continuous health monitoring for in-flight disease and health lifelog are recent additions to the items under study. To safeguard the young generations from losing hearing, Question 28/16 is working with the World Health Organization (WHO) on the implementation guidelines for safe listening devices.

− **Media coding:** The work saw a strong emphasis and progress for video coding; the following developments are detailed under the text of Q6/16:

• A new generation video coding standard called HEVC (ITU‑T H.265 | ISO/IEC 23008‑2) was developed jointly with ISO/IEC MPEG and approved in 2013. HEVC can achieve approximately 50% bit-rate reduction versus its predecessor, ITU‑T H.264, while achieving the same level of video quality.

• Various important extensions of HEVC were also developed for variety of applications, and some further work on HEVC usage for high-dynamic range (HDR) video content remains under development.

• Exploration has also begun toward identifying the potential for a next-generation of video coding beyond the capabilities of HEVC and its current extensions, which could result in additional extensions of HEVC or a new video coding standard.

 Substantial reduction was observed in the voice and audio compression work, which has been shifted to maintenance mode.

− **Multimedia systems** – During this study period, a number of existing Recommendations related to multimedia systems were revised, as well as several new Recommendations produced. Of particular note, work was completed on two new Recommendations related to telepresence systems, namely Recommendations ITU‑T F.734 "*Definitions, requirements and use cases for telepresence systems*" and ITU‑T H.420 "*Telepresence system architecture*." In addition to those foundational documents, the technical work on two additional Recommendations was essentially completed, [H.TPS-AV](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=9237) "*Audio/Video Parameters for Telepresence systems*" and [H.TPS-SIG](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=9941) "*Signalling for telepresence-enabled conferencing*", with Consent expected by the Question that continues this work during the first meeting of the next study period, after IETF completes work on related RFCs. In addition, changes to support telepresence systems and provide for WebRTC interoperability were made to the core H.323-series specifications and one new Recommendation, all of which is expected to be completed during the early part of the next study period.

### 3.2.2 Multimedia systems

**Question 1/16** continued its work on maintenance of multimedia systems, terminals and data conferencing, in particular for ITU‑T H.239 and for the common text with ISO/IEC in ITU‑T H.222.0 | ISO/IEC 13818-1 ("MPEG2 system"). Question 1/16 also produced new work on motorized conferencing, H.265 video signalling support for the H.300-series Recommendations and web collaboration procedures for ITU‑T H.239.

**Question 2/16** progressed work on several new and revised Recommendations as part of its continued development of the Recommendations for H.323 systems, including amendments to improve call transfer functionality, improvements to related security Recommendations (H.235-series), improvements to the NAT and firewall traversal functionality, enhancements to several H.450-series supplementary service Recommendations and H.450-series H.323 feature extensions, management information base specification, and end-to-end session identification. ITU‑T H.323 is widely used around the world for videoconferencing as well as for more modern telepresence systems. Having its origins in enterprise videoconferencing, use of H.323 quickly expanded to service providers that used H.323 to carry voice over IP networks to take advantage of the efficiencies of packet-switched networks. While H.323 remains widely used in enterprise networks, services are now being offered via cloud-based conferencing providers to better enable enterprise users to host videoconferencing meetings that span enterprise boundaries. The work on telepresence systems was a major focus for both Q5/16 ("Telepresence Systems") and Q2/16, with Q2/16 progressing revisions to the core ITU‑T H.323 family of Recommendations (specifically, ITU‑T H.323, H.225.0, and H.245) to accommodate the functions and capabilities required for telepresence systems. Additionally, changes were made to the core specifications and one new Recommendation progressed (H.460.DTLS) to provide interoperability with WebRTC applications. The core specifications and the new H.460.DTLS Recommendation are expected to be finalized during the early part of the next study period.

**Question 3/16** continued its development of Recommendations and Supplements related to gateway control:

– added support of RTCWEB and SCTP for gateways (Recommendations ITU‑T H.248.94 "*Gateway control protocol: Web-based real-time communication services - H.248 protocol support and profile guidelines*", ITU‑T H.248.96 "*Gateway Control Protocol: H.248 Stream grouping and aggregation*" and ITU‑T H.248.97 "*Gateway control protocol: H.248 support for control of SCTP bearer connections*";

– added support of new transport and security mechanisms (ITU‑T H.248.89 "*Gateway control protocol: TCP support packages*", ITU‑T H.248.90 "*Gateway control protocol: H.248 packages for control of transport security using TLS*", ITU‑T H.248.91 "*Guidelines on the use of H.248 capabilities for transport security in TLS networks in H.248 Profiles*", ITU‑T H.248.92 "*Gateway control protocol: Stream endpoint interlinkage package*", ITU‑T H.248.93 "*Gateway control protocol: H.248 support for control of transport security using DTLS*");

– added greater support of transport and media multiplexing (new ITU‑T H.248.57 "*Gateway control protocol: RTP control protocol package*" (Rev.), new ITU‑T H.248.95 "*Gateway Control Protocol: H.248 support for RTP multiplexing*", revised ITU‑T H.248.78 "*Gateway control protocol: Bearer-level message backhauling and application level gateway*" and revised H.248.41 "*Gateway control protocol: IP domain connection package*");

– provided media handling enhancements (ITU‑T H.248.66 "*Packages for RTSP and H.248 interworking*", ITU‑T H.248.74 "*Media resource control enhancement packages*", ITU‑T H.248.86 "*Gateway control protocol: ITU‑T H.248 support for deep packet inspection*" and ITU‑T H.248.98 "*Gateway control protocol: Support of remote media pause and resume*");

– continued to maintain and enhance existing Recommendations (revised ITU‑T H.248.39 "*H.248 SDP parameter identification and wildcarding*", rev. ITU‑T H.248.80 "*Gateway control protocol: Usage of the revised SDP offer/answer model with ITU‑T H.248*") and implementors guides; and

– revised ITU‑T H-Series Supplement 2 "*Gateway control protocol: H.248.x sub-series packages guide*" and produced two new ones (ITU‑T H-series Supplement 13 "*Gateway control protocol: Common ITU‑T H.248 terminology*" and Supplement 14 "*Gateway control protocol: SDP codepoints for gateway control.*").

Ongoing areas of study include enhanced NAT traversal support (draft revised ITU‑T H.248.50), cloudification of gateways (draft ITU‑T H.248.CLOUD), support of traffic shaping (draft ITU‑T H.248.SHAPER), SIP-based media recording (draft ITU‑T H.248.SIPREC), alternate IP connectivity support (draft H.Sup.ALTC), Openflow versus H.248 evaluation (draft H.Sup.Openflow), and profiling codec configurations in SDP (draft H.Sup.CodecSDPProfile).

**Question 5/16** continued work to address an important evolution of the videoconferencing market and the Question progressed several topics. Question 5/16 completed its work on telepresence requirements and architecture, with the consent of ITU‑T F.734 "*Definitions, requirements, and use cases for Telepresence Systems*" and ITU‑T H.420 "*Telepresence System Architecture*" during this study period. The question progressed the work on Audio/Video Parameters for Telepresence Systems (H.TPS-AV) and Signalling for telepresence-enabled Conferencing (H.TPS-SIG).

**Question 21/16** played throughout this study period a role of incubator for technical innovations in the multimedia domain by identifying and nurturing many promising technologies. It continued its work on multimedia framework, applications and services, in particular for F.700-series and H.600-series Recommendations. In the visual surveillance area, the long-term vision is to develop a set of Recommendations to enable wide deployment of ubiquitous and intelligent visual surveillance systems. As a first step, some Recommendations like ITU‑T F.743 "Requirements and service description for visual surveillance" and ITU‑T H.626 *"Architectural requirements for visual surveillance"* have been published and several new work items on visual surveillance systems are being progressed. In meeting the demands of the industry for generic content formats, such as comics and animations applications, work has been launched and is progressing. Future work in this direction will cover formats and transport mechanisms for gaming and interactive advertisement. Machine translation of natural languages using artificial intelligence is an important domain where the Question has done substantial work, including Recommendations ITU‑T F.745 *"Functional requirements for network-based speech-to-speech translation services"* and H.625 *"Architecture for network-based speech-to-speech translation services"*. In addition to the aforementioned areas of study, Question 21/16 also progressed work on virtual home networks, content delivery networks, identification of the requirements for service-agnostic multimedia service functions, and service-agnostic architecture specifications, such as inspection technology, inspection policy, delivery functions, network topologies, and robustness.

### 3.2.3 Multimedia services and accessibility

**Question 13/16** led the ITU‑T standardization activity on IPTV, harmonizing its work with that of other ITU‑T and ITU-R Study Groups as well as with other SDOs, such as ATIS-IIF, APT/ASTAP, W3C and IEC. During the study period, it progressed the work on IPTV by approving 14 new and revised Recommendations in the ITU‑T H.700 sub-series, which currently includes various types of IPTV terminal device (rev. H.721 with the basic model; H.722 with the full-fledged model; and H.723 with the mobile model), *Audience Measurement* (H.741.1 Amd.1/Corr.1, H.741.2 Amd.1/Corr.1, H.741.3 Amd.1, H.741.4 Amd.1); metadata (H.751 on "*Metadata for rights information*", a joint text with IEC TC 100; and H.752 "*Content provisioning interface*"); Multimedia Application Frameworks (rev. H.761 "*NCL and Ginga-NCL*", H.765 "*Widget service*"); and service discovery (rev. H.770 "*Service discovery and selection*" and H.772 "*Terminal device discovery*"). In this way, this suite of Recommendations have evolved over the period to enable a wide range of IPTV services such as linear TV, video-on-demand, interactivity, multi-sourced content and multi-device integration. Question 13/16 also developed and approved Technical Papers for conformance testing (rev. HSTP.CONF-H721 and new HSTP.CONF-H762), audience measurement (HSTP.IPTV-AM.101 "*Introduction to H.741-series - A new video engagement audience measurement standard*") and IPTV terminology (HSTP.IPTV-Gloss "*Glossary and terminology of IP-based TV-related multimedia services*"). The first edition of the *"ITU‑T IPTV Green Book"* was approved and contains an overview of the ITU‑T family of standards for IPTV. Question 13/16 conducted interoperability events, which have been proved essential in assuring interoperability among implementations. Question 13/16 has also initiated and progressed work on enhanced user-interface, multi-device services, virtual terminal devices and scene-based metadata to address the new developments of the IPTV industry.

**Question 14/16** has been working on digital signage systems and services which are methods to notify wide variety of messages including alerts and are recently installing both at public and at private places. The Question completed two Recommendations (ITU‑T H.781 "*Digital signage: Functional architecture*" that defines a detailed functions and describes how the functions interact with each other, and ITU‑T H.785.0 "*Digital signage: Requirements for disaster information services*" that addresses the high-level requirements of disaster information services such as early warning and announcements of social infrastructure) and one Technical Paper, HSTP.DS-UCIS "*Use-cases of interactive services*" that introduces interactive services between systems and audiences in the current and the near future market. Question 14/16 continued or initiated work on H.DS-AM "*Digital signage: Audience measurement services*", which describes *inter alia* requirements, configuration, operations, and data structures for digital signage services; H.DS-META "*Digital signage: Metadata*" which is a foundational document for both generic services and H.781-based services; H.DS-CASF "*Digital signage: Common alerting service framework*" which handles alert and notification services through digital signage; and H.DS-PISR "*Requirements of interoperable information services in public places*" which focuses on the characteristics of public services. In addition, to cope with a kind of the current market trend requesting lightweight implementation and swift deployment of digital signage services, HSTP.DS-WDS "Web-based digital signage" was created.

**Question 25/16** successfully studied ubiquitous sensor networks and IoT applications and services, and was a key Question in the IoT-GSI. Important work was done in the area of audience-selectable media service framework in the IoT environment, of machine socialization, of requirements and reference architecture for the M2M service layer, and of a service architecture for the web of things (WoT). Question 25/16 was moved to ITU‑T SG20, after having existed in SG16 for eight years and having worked on ubiquitous sensor networks and IoT. Before the transfer, it completed work on five IoT Recommendations, ITU‑T F.747.8 "*Requirements and reference architecture for audience-selectable media service framework in the IoT environment*", ITU‑T F.748.2 "*Overview and reference model of machine socialization*", ITU‑T F.748.3 "*Relation management models and descriptions for machine socializations*", ITU‑T F.748.5 "*Requirements and reference architecture of M2M service layer*", and ITU‑T H.623 "*Web of things service architecture*". Three remaining work items (F.IoT-ASF, F.IoT-DE-RA, and F.IoT-SPSN) were transferred to Question 4/20.

**Question 26/16** studied accessibility issues and made significant progress on several work items during this study period. In this period, it approved two Recommendations ITU‑T F.791 "*Accessibility terms and definitions*" and ITU‑T H.702 "*Accessibility Profiles for IPTV systems*" as well as two Technical papers, FSTP.ACC-RemPart "*Technical Paper: Guidelines for supporting remote participation in meetings for all*" and FSTP-AM "*Guidelines for accessible meetings*". It also made progress on specifications for telecommunication relay services. It continued cooperation with ITU-R in particular ITU-T SG6 on audiovisual media accessibility and ITU-R SG5 on spectrum protection for assistive devices.

**Question 27/16** studied vehicle gateway platform for telecommunication/ITS services/applications, which are a part of the intelligent transportation system ecosystem. During the study period, it continued to take part in the inter-SDO Collaboration on ITS Communication standards and approved Technical Paper ITU‑T HSTP-CITS-Reqs "*Global ITS communication requirements*", which was provided by the CITS. The Question also completed Recommendation ITU‑T F.749.1 "*Functional requirements for vehicle gateway*s," and continued to work on four draft new Recommendations (F.VGP-REQ "*Service requirements for and use cases of Vehicle Gateway Platform*", H.VGP-ARCH "*Architecture and functional entities of Vehicle Gateway Platform*", G.V2A "*Communications interface between external applications and a Vehicle Gateway Platform*", and F.AUTO-TAX "*Taxonomy for ICT-enabled motor vehicle automated driving systems*").

**Question 28/16** has been the lead experts group on e-health standardization in ITU. In the area of personal connected health, the Question was responsible for the transposition of the Continua Design Guidelines and related conformance testing specification developed by the Personal Connected Health Alliance (formerly, Continua Health Alliance) in the form of 45 ITU-T Recommendations in the H.810-H.850-series. In the area of e-health data exchange, Q28/16 approved and published H.860 "*Multimedia e-health data exchange services*". Question 28/16 also initiated work on multimedia brain information, which enables neuro-medical information to be used in various services: H.MBI-PF and HSTP.MBI-Usecases. On a different area leveraging discussions initiated in the ITU-T Focus Group on Aviation Cloud, Q28/16 started developing F.MCDC with a framework for in-flight and post-flight precautionary continuous monitoring for communicable disease control, which could provide tools to help monitor and prevent the spread of global epidemics (such as H1N1 and avian flu outbreaks in the past). To safeguard the young generations from losing hearing, Question 28/16 is working with the World Health Organization and other standards development organizations on draft F.SLD with guidelines for safe listening devices. Question 28/16 is closely working with various external bodies, including WHO, Personal Connected Health Alliance, IEEE, ISO, IEC, to coordinate its work.

### 3.2.4 Media coding and signal processing

In the area of visual coding, **Question 6/16** had many major accomplishments during the 2003–2016 Study Period, and this area of work has a very high degree of impact in the industry since most of the data traffic on world-wide networks is video. The Question work was done in close collaboration with the video coding experts from ISO/IEC JTC1 SC29/WG11, known as MPEG, within two joint groups of experts: the Joint Collaborative Team on video coding (JCT-VC), and the Joint Collaborative Team on 3D Video(JCT-3V).

The biggest news in visual coding is the development of a new generation of video coding standard, ITU‑T H.265 | ISO/IEC 23008-2 "*High Efficiency video coding*" (HEVC). HEVC can achieve approximately 50% bit-rate reduction versus its predecessor, ITU-T H.264, without reducing video quality. While further work continues on HEVC usage for high-dynamic range (HDR) video content, a large number of important extensions of capabilities for HEVC were also developed for a variety of applications:

− Format range extensions (RExt), which expand the range of video formats for use with the coding design, such as adding support for higher bit depths and full-resolution colour representations (developed in the JCT-VC)

− Scalability extensions (SHVC), which enable the representation of video as distinct *layers* of video quality, improving robustness to data losses and enhancing flexibility for such applications as real-time multipoint video communication (developed in the JCT-VC)

− Multi-view extensions (MV-HEVC), which enable the coding of video content from multiple camera perspectives, such as for stereoscopic 3D content (developed in the JCT-3V)

− 3D extensions (3D-HEVC), which provide a more efficient way of coding multi-view video content that is accompanied by depth maps (also developed in the JCT-3V)

− Screen content coding extensions (SCC), which substantially improve the ability to encode video containing a significant proportion of rendered (moving or static) graphics, text, or animation rather than, or in addition to, camera-captured video scenes; its example applications include wireless displays, news and other television content with text and graphics overlays, remote computer desktop access, and real-time screen sharing for video chat and video conferencing (developed in the JCT-VC)

HEVC has also been complemented by a conformance testing specification (ITU‑T H.265.1) and reference software implementation (ITU‑T H.265.2).

The "Joint Video Exploration Team" (JVET) was launched at the meeting of Study Group 16 in October 2015 as a new informal collaboration between SG16 and MPEG that has made substantial progress towards identifying the potential for a next-generation of video coding standard beyond the capabilities of HEVC and its current extensions, which could result in additional extensions of HEVC or the development of a new video coding standard.

Historically, Question 6/16 is best known for its development of Rec. ITU-T H.264 "*Advanced video coding for generic audiovisual services*", which is amongst the most widely supported and celebrated of standards worldwide. Regardless of the particular application domain, most video used in the world today is encoded according to ITU‑T H.264. It is widely supported in DVB broadcast, videoconferencing, satellite TV, IPTV, Blu-ray Disc, HTML5, YouTube, Silverlight, Flash, AVCHD camcorders, CCTVs, DSLRs, 3GPP mobile devices, iPhones, Windows PCs, Mac OS, etc. ITU‑T H.264 is complemented by a conformance testing specification (ITU‑T H.264.1) and reference software implementation (ITU‑T H.264.2). Originally approved in 2003 as the fruit of a collaborative work with MPEG, ITU-T H.264 is published as twin text with ISO/IEC 14496-10 and received some further updates during the study period. Three new editions of H.264 were approved in the 2013–2016 Study Period, and two revisions each were completed for H.264.1 and H.264.2. The added features were primarily focused on new capabilities for 3D video coding that were developed together within the JCT-3V. Additional supplemental information for carriage within H.264 bitstreams was also standardized.

Also in the domain of Q6/16 are various Recommendations on image coding, including those known as JPEG, JPEG 2000, and JPEG XR, which were developed as common text or twin text in collaboration with ISO/IEC JTC 1/SC 29/WG 1 (a.k.a. JPEG). New work completed during the 2013–2016 Study Period in this area included a new edition and several amendments and corrigenda for the T.800 core coding system of JPEG 2000, an amendment for the associated T.801 file format, two amendments to the associated T.804 reference software, an amendment of the associated T.808 interactivity protocols, and a new edition of the T.834 JPEG XR conformance testing specification for JPEG XR.

**Question 7/16**, which addressed mainly coordination aspects of media coding and maintaining the Media Coding Summary Database, has had a very low activity during the study period. The future of Q7/16 was discussedand it has been confirmed that Q7/16 need not exist as a stand-alone Question in the next Study Period, but could be combined as part of other audio-related Questions.

**Question 10/16** provided in the last study period updates and extensions of existing voice and audio coding standards:

− ITU‑T G.711.1 (2009) Amd.1 (ex G.711.1-SWBS-Float) "*Wideband embedded extension for G.711 PCM: New Annex G with an alternative implementation of stereo superwideband extension using floating-point*";

− ITU‑T G.718 Amd.3 (ex G.718-SWB-Float) "*Variable bit rate embedded coding of speech signals: New Annex C with an alternative floating-point implementation of the superwideband monaural extension*";

− ITU‑T G.722 (2012) Amd.1 (ex G.722-SWBS-Float) "*7 kHz audio-coding within 64 kbit/s: New Annex E with an alternative implementation of stereo superwideband extension using floating-point*"; and

− ITU‑T G.729.1 Amd.8 (ex G.729.1-SWB-Float) "*G.729-based embedded variable bit-rate coder: An 8-32 kbit/s scalable wideband coder bitstream interoperable with G.729: New Annex G with an alternative floating-point implementation of the superwideband monaural extension*".

With the completion of the work items above, the speech and audio coding work in ITU enters mainly into maintenance phase, due to the lack of technical experts to pursue future work. This is reflected by the folding of this Question with the other speech- and voiceband-related Questions into a single Question for the next study period.

Updates to the ITU‑T software tools library (STL) in ITU‑T G.191 were identified but could not be progressed due to the lack of volunteers. In view of the reduction of the number of audio and speech coding experts in SG16, it was agreed to take two steps to ensure upkeep of this important library, which is actively used by ITU experts as well as by other standards development organizations dealing with audio coding, such as 3GPP and 3GPP2. The first step was, taking advantage of the fact that the STL already has a GPLv2 open source license, to make it a true open source project to facilitate the collection of inputs from speech and audio coding experts participating or not in ITU work; and the second step was to transfer its maintenance to ITU‑T Study Group 12, where resides the core set of existing users of the STL in ITU.

**Question 15/16** revised and developed work items dealing with all aspects of voiceband modem, facsimile terminal and voiceband signal discrimination standardization. This includes functionality and performance across different network types:

− ITU‑T G.799.4 "*Procedures for control of de-jitter buffers used in PSTN-IP gateways carrying voice-band data*";

− ITU‑T T.24 (1998) Cor.1 "*Standardized digitized image set: Clarifications in Table 1*";

− ITU‑T T.38 (2010) Amd.1 (2014) "*Procedures for real-time Group 3 facsimile communication over IP networks: New Appendix VI, clarifications and corrections*", ITU‑T T.38 Implementors' Guide (2015) and rev. ITU‑T T.38 (2015).

The work items above reflect maintenance of technologies supporting voiceband data transmission and their transport over IP networks. For more efficient handling in the next study period, it was decided to fold this Question into the combined Question involving various speech-related aspects.

Considering the close links between Question 16/16 with Question 18/16 and the reduced volume of work, it was agreed to merge both Questions in the middle of the study period. Q16/16 produced, as a stand-alone Question, new Recommendation ITU‑T G.161.1 "*Do no harm testing*" (DNH), which defines DNH tests for network-based and terminal-based voice quality enhancement (VQE) functions and non-VQE functions.

**Question Q18/16** dealt with signal processing network equipment (SPNE) including network-based speech enhancement devices such as electrical network echo control, acoustic network echo control, automatic level control devices, and voice enhancement devices. It also dealt with the implementation and interaction aspects of signal processing network equipment/‌terminals for transporting voice and voiceband traffic in networks. Question 18/16 has also continued the revision of ITU‑T G.799.1 "*Functionality and interface specifications for GSTN transport network equipment for interconnecting GSTN and IP networks*".

It revised and developed the following documents:

− ITU‑T G.161.1 "*Do no harm testing*"

− ITU‑T G.168 "*Digital network echo cancellers*"

− ITU‑T G.776.4 "*Signal processing network equipment*"

− ITU‑T G.799.1 "*Functionality and interface specifications for GSTN transport network equipment for interconnecting GSTN and IP networks*"

As it was felt that Question 18/16 arrived to a mature state, it was agreed to merge it with Q7/16, Q10/16 and Q15/16 for the next study period.

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

### 3.3.1 Lead study group activities

ITU‑T Study Group 16 has performed on its lead SG roles assigned by WTSA-12:

− multimedia coding, systems and applications

− telecommunication/ICT accessibility for persons with disabilities

− intelligent transport system (ITS) communications

− IPTV

− ubiquitous applications

− Internet of Things (until October 2015, with the creation of new ITU‑T SG20)

In addition to being the parent of the JCA on IPTV, ITU‑T Study Group 16 also had active participation in various joint coordination activities:

− JCA-IoT: [Joint Coordination Activity on Network Aspects of Identification Systems (including RFID)](http://www.itu.int/ITU-T/jca/nid/index.html)

− JCA-AHF: [Joint Coordination Activity on Accessibility and Human factors](http://www.itu.int/ITU-T/jca/ahf/index.html)

The Study Group also coordinated its activities with a number of external players, there including:

− ISO/IEC JTC1 SC29 WGs 1 and 11 on still image and video coding, and on digital transport

− WHO, ISO, IEC and CENELEC on e-health standardization

− IEC TC100 on IPTV and accessibility standardization

− Various IETF working groups on matters relating to the transport of multimedia over IP networks

− Various disability organizations within the scope of Study Group 16's accessibility work.

### 3.3.2 IPTV and digital signage

ITU‑T Study Group 16 was entrusted with the **Joint Coordination Activity on IPTV** at the end of the last study period and continued the activity during this study period in particular with the organization of **IPTV-GSI** events, showcasing and interop activities, in addition with communication with related groups working in similar areas.

During the study period, it was observed an increasing shift from IPTV more towards e-services.

For this reason, at its closing meeting, Study Group 16 agreed that JCA-IPTV and IPTV-GSI should not continue into the new study period. Instead, it was agreed that a new JCA should be established to focus on coordinating on the standardization of e-services.

Question 13/16 took a lead role in ITU‑T IPTV-GSI, which was the focal point of ITU‑T IPTV for outside entities. The Question also has continued to play an important role in organizing IPTV conformance and interoperability testing events and IPTV application challenges. Moreover, ITU's IPTV IPv6 Global Testbed was launched, connecting sites worldwide to test and showcase ITU‑T's IPTV Recommendations as well as related technologies. All these activities helped many stakeholders to adopt ITU‑T's H.700 series as their standards and solutions of IPTV. Question 13/16 has been in constant liaison activity with other Study Groups. ITU‑T SG16 also joined the IRG-IBB together with ITU‑T SG9 and ITU-R SG6 as parent study groups (§3.3.6). IRG-IBB discusses the coordinated development of Recommendations for integrated broadcast and broadband systems. Question 13/16 promoted harmonization of its work on *inter alia* IPTV metadata, interactive services, rights management, multi-device services, and terminal device discovery with that of other organizations such as ATIS/IIF, W3C, ETSI and IEC.

One of the important study items of Question 14/16 is to develop Recommendations regarding disaster information services over digital signage systems. Question 14/16 coordinated with the ITU-T Focus Group on disaster relief systems, network resilience and recovery (FG DR&NRR, concluded in June 2014), which was under parenthood of ITU-T Study Group 2, during the development of the requirements document on the services at/during disaster (ITU-T H.785.0). Question 14/16 also begun to cooperate with W3C Web-based Signage Business Group, which especially studies web browser specifications for digital signage services, in order to tackle standardizing the whole systems using Web technologies (HSTP.DS-WDS).

### 3.3.3 IoT

The Internet of things (IoT) has been defined as a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies. A Joint Coordination Activity on IoT (JCA-IoT) and an associated GSI (IoT-GSI) existed under the parenthood of ITU-T Study Group 13 until the creation of ITU-T Study Group 20 in June 2015. For several years, the JCA-IoT and IoT-GSI were the focal point for ITU‑T IoT studies to outside entities, and aimed to promote a unified approach in ITU‑T for development of Recommendations enabling the Internet of Things on a global scale – in collaboration with other standards development organizations. Study Group 16 participated as a key contributor to JCA-IoT and IoT-GSI with its Question 25/16 as a leading Question, until the Q25/16 work was transferred to Question 4/20 in October 2015.

### 3.3.4 Accessibility

Under its Question 26/16, ITU‑T Study Group 16 organized two accessibility related workshops and one symposium during the study period to collect input of stakeholders on the development of telecommunication relay services for deaf and speech-impaired persons. Question 26/16 also did the follow up work on the FG AVA (§3.3.7) deliverables, many of which became new work items on accessibility in Study Group 16. In this period, Study Group 16 has coordinated audiovisual media accessibility work with ITU-R WP6 and ITU‑T SG9 in the framework of IRG-AVA (§3.3.5). Q26/16 also joined IPTV-GSI to promote its coordination with other groups, especially in the area of IPTV accessibility profiles, which has become ITU-T H.702. Study Group 16 coordinated its work with that of Question 4/2 on human factors and maintained close liaison with several outside bodies including IEC TC100, ETSI TC HF and ISO/IEC JTC1 SC35.

### 3.3.5 Intelligent transport systems

Intelligent transport systems (ITS) improve safety, management and efficiency of vehicles by taking advantage of a combination of technologies including computers, communication, positioning and automation. Vehicle gateway platforms (VGPs) provide an integrated environment for delivering communication services and are a key element to enable ITS. Question 27/16 has a series work items targeted as ITU‑T Recommendations related to VGP. Recommendation ITU-T F.749.1, which was the first Recommendation completed by the Question, describes functional requirements for VGPs; other work items under development address service requirements and use cases, architecture and functional entities, and finally the communications interface between external applications and the VGP. Question 27/16 closely collaborates with ITU-T Study Group 17 on ITS security, and constantly interchanges information and latest drafts with ISO TC 204 and the CITS.

### 3.3.6 E-health

As the lead Question on multimedia for e-health, Question 28/16 coordinated in the past study period with other bodies to organize the [joint ITU-WHO workshop on e-health standards and interoperability](http://www.itu.int/en/ITU-T/Workshops-and-Seminars/e-Health/201204) in Geneva, 26-27 April 2012. Question 28/16 played an important role in bringing representatives from the Personal Connected Health Alliance (PCHA; formerly Continua Health Alliance), Integrating the Healthcare Enterprise (IHE), ISO TC 215, IEEE-SA, and HL7 together to discuss interoperability. That has led to an increase in activity during this period, as reported above. Question 28/16 has received some of the deliverables from the Focus Group M2M, which have become part of its work items. Q28/16 led the discussion at the ITU Workshop on "[E-health services in low-resource settings: Requirements and ITU role](http://www.itu.int/en/ITU-T/Workshops-and-Seminars/e-Health/201302/Pages/default.aspx)", held on Tokyo, Japan, 4-5 February 2013. Question 28/16 has worked with WHO during this study period, in particular with a draft new Recommendation [ITU-T F.SLD](http://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=10796) on safe listening devices that was a follow-up from the conclusions of the [joint ITU and WHO stakeholders consultation meeting](http://www.who.int/pbd/deafness/news/safe_listening_devices_scope_purpose.pdf) held in Geneva, 1-2 October 2015. A subsequent ITU workshop on [standards for safe listening](http://www.itu.int/en/ITU-T/Workshops-and-Seminars/safelistening/Pages/default.aspx) was organized in Geneva, 6 June 2016 involving WHO and other SDOs. Another area of work under consideration was for extension of the H.810 architecture to support in-vitro diagnostics devices, where ITU would help coordinate the standardization work across several organizations (noticeably CLSI, IEEE PHD WG and PCHA). Q28/16 has hosted a number of showcasing events at ITU Headquarters in Geneva. Q28/16 also joined IPTV-GSI 14 times during this study period.

### 3.3.7 IRG-AVA

The intersector rapporteur group audiovisual media accessibility (IRG-AVA) was created by ITU‑T Study Group 16 together with ITU‑T Study Group 9 and ITU-R Study Group 6 to study topics related to audiovisual media accessibility for the development of draft Recommendations on "access systems" that can be used for a wide range of media delivery systems, including broadcast, cable, Internet, and IPTV. The IRG also addressed 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 group is open to participation from entities able to join the work of its parent groups, thus working as a good mechanism to put into contact the different communities of experts attending these three study groups. The home page of the group is <http://itu.int/en/irg/ava>, and it met seven times during the study period:

− 1st IRG-AVA meeting: Geneva, 2014-02-25 [[details](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=4626&Group=16) | [report](http://www.itu.int/md/T13-SG16-140228-TD-WP2-0180)]

− 2nd IRG-AVA meeting: Sapporo, Japan, 2014-07-02 [[details](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=597&Group=16) | [report](https://www.itu.int/ifa/c/irg/ava/mtg/1407-SAP/IRG-AVA-1407-002-Report.docx)]

− 3rd IRG-AVA meeting: Geneva, 2014-11-10 [[details](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=778&Group=16) | [report](https://www.itu.int/ifa/c/irg/ava/mtg/1411-GVA/IRG-AVA-1411-002-Report.doc)]

− 4th IRG-AVA meeting: Geneva, 2015-02-17 [[details](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=876&Group=16) | [report](http://ifa.itu.int/c/irg/ava/mtg/1502-GVA/IRG-AVA-1502-002_Meeting_report.docx)]

− 5th IRG-AVA meeting: Geneva, 2015-07-21 [[details](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=1210&Group=16) | [report](http://ifa.itu.int/c/irg/ava/mtg/1507-GVA/IRG-AVA-1507-002_Meeting_report.docx)]

− 6th IRG-AVA meeting: Geneva, 2015-10-19 [[details](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=2324&Group=16) | [report](http://www.itu.int/md/T13-SG16-160523-TD-WP2-0467)]

− 7th IRG-AVA meeting: Geneva, 2016-05-30 [[details](http://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=2324&Group=16) | [report](http://ifa.itu.int/c/irg/ava/mtg/1605-GVA/IRG-AVA-1605-002-Meeting_report.docx)]

It is expected that the IRG-AVA will continue in the next study period.

### 3.3.8 IRG-IBB

The intersector rapporteur group on integrated broadcast-broadband (IRG-IBB) was created by ITU‑T Study Group 9 and ITU-R Study Group 6 to study topics related to IBB systems. ITU‑T Study Group 16 joined the group in October 2015 as a parent group.

An IBB system is based on the combination of the technologies of both broadband and various broadcasting including over-the-air and cable. Various multiple devices are used for effective presentation of content and user interactivity. A wide range of services is enabled by the IBB system.

IRG-IBB aims at developing Recommendations and other non-normative materials, and to contribute to the coordination of the standardization work of the involved ITU‑T and ITU‑R groups.

The home page of the IRG-IBB is found at <http://itu.int/en/irg/ibb>, and the group held six meetings

− Geneva, 17 November 2014 - [Details](https://www.itu.int/md/T13-TSB-CIR-0119/en) - [Documentation](https://www.itu.int/ifa/c/irg/ibb/mgt/2014-11_Geneva/)

− E-meeting, 21 January 2015 [[details](https://www.itu.int/en/irg/ibb/Documents/2nd_IRG-IBB-meeting%20announcement.pdf) | [documentation](https://www.itu.int/ifa/c/irg/ibb/mgt/2015-01_e-meeting/)]

− Geneva, 9 February 2015 [[details](http://www.itu.int/en/irg/ibb/Documents/3rd_IRG-IBB-meeting%20announcement.pdf) | [documentation](https://www.itu.int/ifa/c/irg/ibb/mgt/2015-02_Geneva/)]

− E-meeting, 28 April 2015 [[details](http://www.itu.int/en/irg/ibb/Documents/4th_IRG-IBB-meeting%20announcement.pdf) | [documentation](https://www.itu.int/ifa/c/irg/ibb/mgt/2015-04_e-meeting/)]

− Beijing, China, 12 June 2015 [[details](http://www.itu.int/en/irg/ibb/Documents/5th_IRG-IBB-meeting%20announcement.pdf) | [documentation](https://www.itu.int/ifa/c/irg/ibb/mgt/2015-06_Beijing/)]

− Geneva, 26 January 2016 [[details](http://www.itu.int/en/irg/ibb/Documents/6th_IRG-IBB-meeting%20announcement.pdf) | [documentation](https://www.itu.int/ifa/c/irg/ibb/mgt/2016-01_Geneva/)]

It is expected that the IRG-IBB will continue in the next study period.

### 3.3.9 FG AVA

The creation of the ITU‑T Focus Group on Audiovisual Media Accessibility (FG AVA) was proposed by ITU‑T Study Group 16 in November 2009 and it concluded its activities in October 2013. The Terms of Reference of the Focus Group are available at [http://itu.int/en/ITU-T/focusgroups/ava/‌Pages/tor.aspx](http://itu.int/en/ITU-T/focusgroups/ava/Pages/tor.aspx). The main objective of this Focus Group was to address the need to make audiovisual media accessible for persons with disabilities.

The home page of the FG AVA was [http://itu.int/en/ITU‑T/focusgroups/ava](http://itu.int/en/ITUT/focusgroups/ava) and it produced the following deliverables:

− [TR: Part 1: Overview of audiovisual media accessibility: An introduction](http://www.itu.int/pub/publications.aspx?lang=en&parent=T-FG-AVA-2013-P1)

− [TR: Part 2: Vocabulary for ITU‑T Focus Group on Audiovisual Media Accessibility (FG AVA)](http://www.itu.int/pub/publications.aspx?lang=en&parent=T-FG-AVA-2013-P2)

− [TR: Part 3: Using audiovisual media - A taxonomy of participation](http://www.itu.int/pub/publications.aspx?lang=en&parent=T-FG-AVA-2013-P3)

− [TR: Part 4: R: activities: Working Group A "Captioning"](http://www.itu.int/pub/publications.aspx?lang=en&parent=T-FG-AVA-2013-P4)

− [TR: Part 5: R: activities: Working Group B "Audio/Video description and spoken captions"](http://www.itu.int/pub/publications.aspx?lang=en&parent=T-FG-AVA-2013-P5)

− [TR: Part 6: R: activities: Working Group C "Visual signing and sign language"](http://www.itu.int/pub/publications.aspx?lang=en&parent=T-FG-AVA-2013-P6)

− [TR: Part 7: R: activities: Working Group C "Visual signing and sign language" and D "Emerging access services" on common topics](http://www.itu.int/pub/publications.aspx?lang=en&parent=T-FG-AVA-2013-P7)

− [TR: Part 8: R: activities of Working Group F "Participation and digital media"](http://www.itu.int/pub/publications.aspx?lang=en&parent=T-FG-AVA-2013-P8)

− [TR: Part 9: Requirements and good practice for supporting remote participation in meetings for all](http://www.itu.int/pub/publications.aspx?lang=en&parent=T-FG-AVA-2013-P9)

− [TR: Part 10: Draft recommended requirements of TV receiver for closed signing](http://www.itu.int/pub/publications.aspx?lang=en&parent=T-FG-AVA-2013-P10)

− [TR: Part 11: Draft recommended production guidelines for sign language service](http://www.itu.int/pub/publications.aspx?lang=en&parent=T-FG-AVA-2013-P11)

− [TR: Part 12: Methods for improving the intelligibility of audio](http://www.itu.int/pub/publications.aspx?lang=en&parent=T-FG-AVA-2013-P12)

− [TR: Part 13: Audio characteristics for audio descriptions and/or spoken subtitles](http://www.itu.int/pub/publications.aspx?lang=en&parent=T-FG-AVA-2013-P13)

− [TR: Part 14: Draft recommended requirements for the application of the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) for media services for all](http://www.itu.int/pub/publications.aspx?lang=en&parent=T-FG-AVA-2013-P14)

− [TR: Part 15: Draft recommended accessibility features for mobile media devices](http://www.itu.int/pub/publications.aspx?lang=en&parent=T-FG-AVA-2013-P15)

− [TR: Part 16: Interworking and digital audiovisual media accessibility](http://www.itu.int/pub/publications.aspx?lang=en&parent=T-FG-AVA-2013-P16)

− [TR: Part 18: R: Working Group G "Digital broadcast television"](http://www.itu.int/pub/publications.aspx?lang=en&parent=T-FG-AVA-2013-P18)

The deliverables of the FG were provided to ITU‑T SG16 for evaluation and possible adoption as new work items in ITU‑T Study Group 16 and in other groups.

### 3.3.10 Regional groups

There were no regional groups under ITU‑T Study Group 16 during this study period.

# 4 Observations concerning future work

## 4.1 General

ITU‑T Study Group 16 has been created by WTSC-96 as the amalgamation of work in several study groups, to focus on multimedia standardization: multimedia services from ITU‑T Study Group 1, voiceband modems from ITU‑T Study Group 14, media coding from part of ITU‑T Study Group 15, and then WTSA-2000 granted it responsibility for the fax-related work from ITU‑T Study Group 8. In 2004, it received the working party on network signal processing from ITU‑T Study Group 15. ITU‑T SG16 is now a mature study group and as a consequence, observes a consolidation of a number of areas and technologies that flourished in the past, namely videoconferencing and speech/audio/voiceband-related work. This is also observed in the reduction of experts participating in the Questions dedicated to those mature topics. This consolidation has taking the form of a single Question being in charge of the maintenance and extension of previous videoconferencing systems as well as telepresence and media gateway protocols (four Questions); and another Question for managing all standardization aspects of audio/speech and voiceband data (four Questions). These two Questions will provide a home for maintenance of these mature technologies, as well as for possible new standardization projects that may spur from future membership interest.

Counterpart to this maturation, the video compression work, video-centric content delivery, and e‑services continue to be healthy in terms of new work items and well as of sustained or increasing participation. As a general trend, it is foreseen that standardization in the next period will focus on systems and services that combine electronic communication and information technology (digital multimedia data collected, processed, transmitted, stored and retrieved electronically) for service delivery in specific industry areas, such as healthcare, education, administration, commerce, transportation, and entertainment, including video-centric content delivery and immersive live experience. A focus is expected on the human use of these systems, with components of accessibility and artificial intelligence to facilitate user interaction with systems that are more and more complex to configure and use.

This two-pronged approach is believed to reflect areas of significant growth in the industry, and it is expected that ITU‑T SG16's relevant work will, based on member contributions, produce global standards to meet those market needs in the next few years.

## 4.2 Maintenance and enhancement of existing standards

Question 1/16 has historically served to maintain a large collection of multimedia communications Recommendations and is expected to continue in that role during the next study period. Questions 2/16 and 5/16 have completed several major tasks assigned to those Questions during this study period, but documents on telepresence and WebRTC interoperability will be completed as soon as the parallel work in the IETF is complete. It is the expectation of the experts that that work will be finalized as part of the continued work of Question 1/16 during the next study period. Additionally, the work of Question 3/16 is largely mature. No further updates to the core protocol are expected, though packages will continue to be required as access technologies evolve and as new technologies are introduced into networks; these technologies are expected to interwork through gateways. Further consideration will be required regarding the evolution of gateways to new cloud based and network virtualisation paradigms.

On the speech and audio compression front, existing codecs are sufficient for current market needs and it is expected that the main activity will be maintenance of existing voice and audio codecs. Similarly, maintenance is still necessary for legacy technologies such as voiceband modems and facsimile terminals, since they are still used. The transition of TDM (PSTN) to IP-based systems also highlights the needs for gateway systems to be maintained. Other network signal processing technologies, such as echo cancellers, automatic level control and signal enhancement, are also mature but well utilised, thus requiring a home for maintenance.

However, new uses bring every so often need for new features, and these two new maintenance Questions will also provide a home – at least initially – for quickly and efficiently addressing proposals for new projects extending existing mature standards in the respective areas of work.

## 4.3 New services and systems

Question 21/16 ongoing work items will continue with strong support from industry. Further work includes, but not limited to, generic format standards for various multimedia content (of which comics and animation will be the first to be developed), intelligent visual surveillance services and applications, content distribution and delivery services, real-time collaboration services, and cloud-computing-based multimedia services and applications. Updated Question 21/16 (Question D/16 in WTSA-16 Doc.18) will continue to identify and define requirements for service-agnostic multimedia service functions and develop service-agnostic architecture specifications, such as inspection technology and delivery functions.

As a multimedia application platform that allows for the convergence of various e-services, IPTV must continuously evolve to address the new requirements that arise from new applicable scenarios. Digital signage, distributed cinema, immersive experiences, multi-viewing, 360º video, multi-sourced content delivery, are examples of services that can take advantage of IPTV infrastructure. The deployment of such advanced IPTV services must rely on state-of the-art standards able to address their needs. With this motivation, Question 13/16 (Question E/16) will continue its work during the next study period, progressing on the existing IPTV work items, especially the new ones recently proposed (such as virtual terminal devices, multi-device services and scene-based metadata). Moreover, the Question will monitor other standardization activities where the IPTV application platform or its related technologies may apply and possibly start new work items to address new demands. During the next study period, new technologies should be considered for helping the evolution of IPTV services, such as cloud computing, big data, 5G mobile network, network functions virtualization (NFV) and software defined networks (SDN).

Study Group 16 will continue to make sure that accessibility requirements are included where necessary in the work of the ITU. Accessibility work will continue, in particular on telecommunication relay services for persons with disabilities, including Technical Papers, Supplements and Recommendations.

Digital signage systems and services will continuously catch up with appearing enhanced terminal devices and interactivity technologies including the usage of advanced sensors, presentation technics (e.g., virtual reality) and recognition of audiences' actions. Future study of these topics requires closer relationship within ITU‑T and with other bodies.

During this study period, Study Group 16 became the lead Study Group on intelligent transport system (ITS) communications following a significant increase in interest in the standardization of vehicle gateway platforms (VGP) and ITS. SG16 experts joined the Collaboration on ITS Communication Standards (CITS) and contributed to the ongoing drafts on architecture and functional entities and on service and functional requirements for VGP, as well as on the communication interface between external applications and VGPs, for an open interface between the vehicle gateway and ICT devices, and for service capabilities and protocols to support vehicle oriented services.

Work on e-health standardization will continue in the next study period. Study Group 16 will build more on its close relationships with other bodies, including other ITU‑T study groups, ITU-D study groups as well as other SDOs, such as IEEE, ISO, Personal Connected Health Alliance, HL7 and WHO. Study Group 16 will strive to give a clear guidance on various e-health multimedia technologies, to foster interoperability. In the recent years, artificial intelligence has shown much promise in many areas, especially in those where human beings may not be so well suited, such as routine work or extremely tedious and minute tasks. In order to enhance the quality of service of e-health services, application artificial intelligence may be considered. More advanced medical directions in e-health can be gained from elements of bioinformatics (genomics in particular) and brain sciences. Data and information available from these advancing fields of science will enable e-health systems, as multimedia interface to humans, to ameliorate physical conditions and quality of life for people. Study Group 16 has already started its work in this area. Gamification and virtual reality are expected to provide important elements for multimedia interfaces in e-health services, especially in the context of ageing society.

## 4.4 Media coding and signal processing

Work on the further development of High Efficiency Video Coding (HEVC) is a major ongoing area that will remain highly active throughout the next study period. Exploration has already begun toward identifying the potential for a next-generation of video coding beyond the capabilities of HEVC and its current extensions, which could result in additional extensions of HEVC or a new video coding standard. A substantial portion of the image coding work of Question 6/16 will be also conducted jointly with ISO/IEC JTC 1/SC 29/WG 1 (JPEG/JBIG). Concerning video coding, a substantial portion of the Question 6/16 work will be conducted jointly with ISO/IEC JTC 1/SC 29/‌WG 11 (MPEG) in two joint collaboration activities, in particular the Joint Collaborative Team (JCT) on Video Coding (JCT-VC) and the Joint Video Exploration Team (JVET). The JCT-VC is tasked with development of extensions to High Efficiency Video Coding (HEVC, Rec. ITU‑T H.265). JVET is exploring the potential for developing a future video coding standard with substantially improved coding performance relative to HEVC.

The application space for media codecs is fast changing, and many codecs have been developed by SDOs across the globe, inter alia 3GPP, IETF, SMPTE, AVS and ISO/IEC. Users have needed guidance as to which compressions schemes to choose, their characteristics, how they compare, etc. Smooth and backward compatible evolution of telecommunication equipment and services is fundamental to wide market acceptance, so there will remain important requirements of the speech and signal processing work and maintenance of existing Recommendations in this area in future.

# 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 16 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 16 (not already approved as of the publication of this report) is found in Table 8.

The list of Recommendations deleted by Study Group 16 during the study period is found in Table 9.

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

Tables 11 onwards list other publications approved and/or deleted by Study Group 16 during the study period.

TABLE 7
Study Group 16 – Recommendations approved during the study period

| Recommendation | Approval | Status | TAP/AAP | Title |
| --- | --- | --- | --- | --- |
| [F.734](http://handle.itu.int/11.1002/1000/12216) | 2014-10-14 | In force | AAP | Definitions, requirements and use cases for telepresence systems |
| [F.743.1](http://handle.itu.int/11.1002/1000/12450) | 2015-04-29 | In force | AAP | Requirements for intelligent visual surveillance |
| [F.743.2](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10424) | 2016-07-14 | In force | AAP | Requirements for cloud storage in visual surveillance |
| [F.743.3](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10425) | 2016-07-14 | In force | AAP | Requirements for visual surveillance system interworking |
| [F.745](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10421) | 2016-07-14 | In force | AAP | Functional requirements for network-based speech-to-speech translation services |
| [F.746.1](http://handle.itu.int/11.1002/1000/12225) | 2014-10-14 | In force | AAP | Requirements for low-latency interactive multimedia streaming |
| [F.746.2](http://handle.itu.int/11.1002/1000/12050) | 2014-02-13 | In force | AAP | Service description for user data exchange between functional components in network entities and terminals |
| [F.746.3](http://handle.itu.int/11.1002/1000/12619) | 2015-11-29 | In force | AAP | Intelligent question answering service framework |
| [F.747.7](http://handle.itu.int/11.1002/1000/12227) | 2014-10-14 | In force | AAP | Requirements for network-based location information conversion for location-based applications and services |
| [F.749.1](http://handle.itu.int/11.1002/1000/12631) | 2015-11-29 | In force | AAP | Functional requirements for vehicle gateways |
| [F.791](http://handle.itu.int/11.1002/1000/12624) | 2015-11-29 | In force | AAP | Accessibility terms and definitions |
| [G.161.1](http://handle.itu.int/11.1002/1000/12053) | 2014-01-13 | In force | AAP | Do-no-harm testing |
| [G.168](http://handle.itu.int/11.1002/1000/12451) | 2015-04-29 | In force | AAP | Digital network echo cancellers |
| [G.711.1 (2012) Amd. 1](http://handle.itu.int/11.1002/1000/12231) | 2014-10-14 | In force | AAP | New Annex G – An alternative implementation of stereo superwideband extension using floating-point |
| [G.718 (2008) Amd. 3](http://handle.itu.int/11.1002/1000/11856) | 2013-03-16 | In force | AAP | New Annex C describing an alternative floating-point implementation of the superwideband monaural extension |
| [G.722 (2012) Amd. 1](http://handle.itu.int/11.1002/1000/12232) | 2014-10-14 | In force | AAP | New Annex E – An alternative implementation of stereo superwideband extension using floating point |
| [G.729.1 (2006) Amd. 8](http://handle.itu.int/11.1002/1000/11857) | 2013-03-16 | In force | AAP | New Annex G describing an alternative floating-point implementation of the superwideband monaural extension |
| [G.776.4](http://handle.itu.int/11.1002/1000/12233) | 2014-10-14 | In force | AAP | Signal processing network equipment |
| [G.799.1/Y.1451.1 (V2)](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=9150) | 2016-07-14 | In force | AAP | Functionality and interface specifications for GSTN transport network equipment for interconnecting GSTN and IP networks |
| [G.799.4](http://handle.itu.int/11.1002/1000/12234) | 2014-10-14 | In force | AAP | Procedures for the control of de-jitter buffers used in PSTN-IP gateways carrying voiceband data |
| [H.222.0](http://handle.itu.int/11.1002/1000/12359) | 2014-10-14 | In force | AAP | Information technology – Generic coding of moving pictures and associated audio information: Systems |
| [H.222.0 (2012) Amd. 4](http://handle.itu.int/11.1002/1000/12057) | 2014-01-13 | Superseded | AAP | Support for event signalling in Transport Stream in MPEG-2 systems |
| [H.222.0 (2012) Amd. 5](http://handle.itu.int/11.1002/1000/12306) | 2014-10-14 | Superseded | AAP | Transport of MVC depth video sub-bitstream and support for HEVC low delay coding mode |
| [H.222.0 (2012) Amd. 1](http://handle.itu.int/11.1002/1000/12054) | 2014-01-13 | Superseded | AAP | Extensions for simplified carriage of MPEG-4 over MPEG-2 |
| [H.222.0 (2012) Amd. 2](http://handle.itu.int/11.1002/1000/12055) | 2014-01-13 | Superseded | AAP | Signalling of transport profiles, signalling MVC view association to eye and MIME type registration |
| [H.222.0 (2012) Amd. 3](http://handle.itu.int/11.1002/1000/12056) | 2014-01-13 | Superseded | AAP | Transport of HEVC video over MPEG-2 systems |
| [H.222.0 (2014) Amd. 1](http://handle.itu.int/11.1002/1000/12452) | 2015-04-29 | In force | AAP | Delivery of timeline for external data |
| [H.222.0 (2014) Amd. 1 Cor. 1](http://handle.itu.int/11.1002/1000/12625) | 2015-11-29 | In force | AAP | Delivery of Timeline for External Data: Adding cets\_byte\_range\_descriptor to table U-2 |
| [H.222.0 (2014) Amd. 2](http://handle.itu.int/11.1002/1000/12632) | 2015-12-14 | In force | AAP | Carriage of layered HEVC |
| [H.222.0 (2014) Amd. 3](http://handle.itu.int/11.1002/1000/12633) | 2015-12-14 | In force | AAP | Carriage of green metadata in MPEG-2 systems |
| [H.222.0 (2014) Amd.1 Cor.2](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10668) | 2016-07-14 | In force | AAP | Information technology - Generic coding of moving pictures and associated audio information: Systems: Delivery of timeline for external data: Clarifications and corrections on pause flag, URL construction and adaptation field syntax |
| [H.222.0 (2014) Amd.4](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10975) | 2016-07-14 | In force | AAP | Information technology - Generic coding of moving pictures and associated audio information: Systems: New Profiles and Levels for MPEG-4 audio descriptor |
| [H.222.0 (2014) Amd.5](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10976) | 2016-07-14 | In force | AAP | Information technology - Generic coding of moving pictures and associated audio information: Systems: Carriage of MPEG-H 3D audio over MPEG-2 systems |
| [H.222.0 (2014) Amd.6](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10977) | 2016-07-14 | In force | AAP | Information technology - Generic coding of moving pictures and associated audio information: Systems: Carriage of quality metadata in MPEG-2 systems |
| [H.222.0 (2014) Cor.1](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10919) | 2016-07-14 | In force | AAP | Information technology - Generic coding of moving pictures and associated audio information: Systems: Correction to PES header table and removal of semantic element from clause 2.6.61 |
| [H.225.0 v7 (2009) Amd. 1](http://handle.itu.int/11.1002/1000/11859) | 2013-03-16 | In force | AAP | Use of the Facility message to enable call transfer |
| [H.235.0](http://handle.itu.int/11.1002/1000/12058) | 2014-01-13 | In force | AAP | H.323 security: Framework for security in ITU‑T H-series (ITU‑T H.323 and other ITU‑T H.245-based) multimedia systems |
| [H.235.6](http://handle.itu.int/11.1002/1000/12059) | 2014-01-13 | In force | AAP | H.323 security: Encryption profile with native ITU‑T H.235/H.245 key management |
| [H.239](http://handle.itu.int/11.1002/1000/12235) | 2014-10-14 | In force | AAP | Role management and additional media channels for ITU‑T H.300-series terminals |
| [H.248.1 v3](http://handle.itu.int/11.1002/1000/11853) | 2013-03-16 | In force | AAP | Gateway control protocol: Version 3 |
| [H.248.2](http://handle.itu.int/11.1002/1000/11852) | 2013-03-16 | In force | AAP | Gateway control protocol: Facsimile, text conversation and call discrimination packages |
| [H.248.3](http://handle.itu.int/11.1002/1000/11838) | 2013-03-16 | In force | AAP | Gateway control protocol: User interface elements and actions packages |
| [H.248.8](http://handle.itu.int/11.1002/1000/11839) | 2013-03-16 | In force | AAP | Gateway control protocol: Error code and service change reason description |
| [H.248.11](http://handle.itu.int/11.1002/1000/11840) | 2013-03-16 | In force | AAP | Gateway control protocol: Media gateway overload control package |
| [H.248.15](http://handle.itu.int/11.1002/1000/11854) | 2013-03-16 | In force | AAP | Gateway control protocol: SDP ITU‑T H.248 package attribute |
| [H.248.16](http://handle.itu.int/11.1002/1000/11841) | 2013-03-16 | In force | AAP | Gateway control protocol: Enhanced digit collection packages and procedures |
| [H.248.17](http://handle.itu.int/11.1002/1000/11842) | 2013-03-16 | In force | AAP | Gateway control protocol: Line test packages |
| [H.248.18](http://handle.itu.int/11.1002/1000/11843) | 2013-03-16 | In force | AAP | Gateway control protocol: Package for support of multiple profiles |
| [H.248.19](http://handle.itu.int/11.1002/1000/11844) | 2013-03-16 | In force | AAP | Gateway control protocol: Decomposed multipoint control unit, audio, video and data conferencing packages |
| [H.248.20](http://handle.itu.int/11.1002/1000/11845) | 2013-03-16 | In force | AAP | Gateway control protocol: The use of Local and Remote Descriptors with ITU‑T H.221 and ITU‑T H.223 multiplexing |
| [H.248.22](http://handle.itu.int/11.1002/1000/11846) | 2013-03-16 | In force | AAP | Gateway control protocol: Shared Risk Group package |
| [H.248.23](http://handle.itu.int/11.1002/1000/11847) | 2013-03-16 | In force | AAP | Gateway control protocol: Enhanced Alerting packages |
| [H.248.25](http://handle.itu.int/11.1002/1000/11848) | 2013-03-16 | In force | AAP | Gateway control protocol: Basic CAS packages |
| [H.248.26](http://handle.itu.int/11.1002/1000/11849) | 2013-03-16 | In force | AAP | Gateway control protocol: Enhanced analogue lines packages |
| [H.248.29](http://handle.itu.int/11.1002/1000/11850) | 2013-03-16 | In force | AAP | Gateway control protocol: International CAS compelled register signalling packages |
| [H.248.32](http://handle.itu.int/11.1002/1000/11851) | 2013-03-16 | In force | AAP | Gateway control protocol: Detailed congestion reporting package |
| [H.248.36](http://handle.itu.int/11.1002/1000/11836) | 2013-03-16 | In force | AAP | Gateway control protocol: Hanging Termination Detection package |
| [H.248.39](http://handle.itu.int/11.1002/1000/12236) | 2014-10-14 | In force | AAP | Gateway control protocol: ITU‑T H.248 SDP parameter identification and wildcarding |
| [H.248.40](http://handle.itu.int/11.1002/1000/11835) | 2013-03-16 | In force | AAP | Gateway control protocol: Application data inactivity detection package |
| [H.248.41](http://handle.itu.int/11.1002/1000/11860) | 2013-03-16 | Superseded | AAP | Gateway control protocol: IP domain connection package |
| [H.248.41](http://handle.itu.int/11.1002/1000/12626) | 2015-11-29 | In force | AAP | Gateway control protocol: IP domain connection package |
| [H.248.50](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=9581) | 2016-07-14 | In force | AAP | Gateway control protocol: NAT traversal toolkit packages |
| [H.248.57](http://handle.itu.int/11.1002/1000/11861) | 2013-03-16 | Superseded | AAP | Gateway control protocol: RTP control protocol package |
| [H.248.57](http://handle.itu.int/11.1002/1000/12239) | 2014-10-14 | In force | AAP | Gateway control protocol: RTP control protocol package |
| [H.248.61](http://handle.itu.int/11.1002/1000/11834) | 2013-03-16 | In force | AAP | Gateway control protocol: Packages for network level ITU‑T H.248 statistics |
| [H.248.64](http://handle.itu.int/11.1002/1000/11833) | 2013-03-16 | In force | AAP | Gateway control protocol: IP router packages |
| [H.248.66](http://handle.itu.int/11.1002/1000/12634) | 2016-04-13 | In force | AAP | Gateway control protocol: Packages for RTSP and H.248 interworking |
| [H.248.74](http://handle.itu.int/11.1002/1000/12635) | 2016-04-13 | In force | AAP | Gateway control protocol: Media resource control enhancement packages |
| [H.248.78](http://handle.itu.int/11.1002/1000/11832) | 2013-03-16 | Superseded | AAP | Gateway control protocol: Bearer-level application level gateway |
| [H.248.78](http://handle.itu.int/11.1002/1000/12453) | 2015-04-29 | Superseded | AAP | Gateway control protocol: Bearer-level message backhauling and application level gateway |
| [H.248.78](http://handle.itu.int/11.1002/1000/12642) | 2015-11-29 | In force | AAP | Gateway control protocol: Bearer-level message backhauling and application level gateway |
| [H.248.80](http://handle.itu.int/11.1002/1000/12060) | 2014-01-13 | In force | AAP | Gateway control protocol: Usage of the revised SDP offer/answer model with ITU‑T H.248 |
| [H.248.81 (2011) Amd. 1](http://handle.itu.int/11.1002/1000/11862) | 2013-03-16 | In force | AAP | New Appendix II, plus additions and corrections |
| [H.248.81 (2011) Amd. 2](http://handle.itu.int/11.1002/1000/12454) | 2015-04-29 | In force | AAP | DiffServ signalling approach |
| [H.248.82](http://handle.itu.int/11.1002/1000/11863) | 2013-03-16 | In force | AAP | Gateway control protocol: Explicit congestion notification support |
| [H.248.85](http://handle.itu.int/11.1002/1000/11864) | 2013-03-16 | In force | AAP | Gateway control protocol: Usage of loopback in ITU‑T H.248 |
| [H.248.86](http://handle.itu.int/11.1002/1000/12069) | 2014-01-13 | In force | AAP | Gateway control protocol: ITU‑T H.248 support for deep packet inspection |
| [H.248.87](http://handle.itu.int/11.1002/1000/12061) | 2014-01-13 | In force | AAP | Gateway control protocol: Guidelines on the use of ITU‑T H.248 capabilities for performance monitoring in RTP networks in ITU‑T H.248 profiles |
| [H.248.88](http://handle.itu.int/11.1002/1000/12062) | 2014-01-13 | In force | AAP | Gateway control protocol: RTP topology dependent RTCP handling by ITU‑T H.248 media gateways with IP terminations |
| [H.248.89](http://handle.itu.int/11.1002/1000/12240) | 2014-10-14 | In force | AAP | Gateway control protocol: TCP support packages |
| [H.248.90](http://handle.itu.int/11.1002/1000/12241) | 2014-10-14 | In force | AAP | Gateway control protocol: ITU‑T H.248 packages for control of transport security using transport layer security (TLS) |
| [H.248.91](http://handle.itu.int/11.1002/1000/12242) | 2014-10-14 | In force | AAP | Guidelines on the use of ITU‑T H.248 capabilities for transport security in TLS networks in ITU‑T H.248 profiles |
| [H.248.92](http://handle.itu.int/11.1002/1000/12243) | 2014-10-14 | In force | AAP | Gateway control protocol: Stream endpoint interlinkage package |
| [H.248.93](http://handle.itu.int/11.1002/1000/12244) | 2014-10-14 | In force | AAP | Gateway control protocol: ITU‑T H.248 support for control of transport security using the datagram transport layer security (DTLS) protocol |
| [H.248.94](http://handle.itu.int/11.1002/1000/12636) | 2015-11-29 | In force | AAP | Gateway control protocol: Web-based real-time communication services - ITU‑T H.248 protocol support and profile guidelines |
| [H.248.95](http://handle.itu.int/11.1002/1000/12637) | 2015-11-29 | In force | AAP | Gateway control protocol: ITU‑T H.248 support for RTP multiplexing |
| [H.248.96](http://handle.itu.int/11.1002/1000/12638) | 2015-11-29 | In force | AAP | Gateway Control Protocol: ITU‑T H.248 Stream grouping and aggregation |
| [H.248.97](http://handle.itu.int/11.1002/1000/12639) | 2015-11-29 | In force | AAP | Gateway Control Protocol: ITU‑T H.248 support for control of SCTP bearer connections |
| [H.248.98](http://handle.itu.int/11.1002/1000/12640) | 2016-02-29 | In force | AAP | Gateway control protocol: Support of remote media pause and resume |
| [H.262 (2012) Amd. 1](http://handle.itu.int/11.1002/1000/11831) | 2013-03-16 | In force | AAP | Frame packing arrangement signalling for quincunx pattern |
| [H.264](http://handle.itu.int/11.1002/1000/11830) | 2013-04-13 | Superseded | AAP | Advanced video coding for generic audiovisual services |
| [H.264 (V9)](http://handle.itu.int/11.1002/1000/12063) | 2014-02-13 | Superseded | AAP | Advanced video coding for generic audiovisual services |
| [H.264 (V10)](http://handle.itu.int/11.1002/1000/12641) | 2016-02-13 | Superseded | AAP | Advanced video coding for generic audiovisual services |
| [H.264.1](http://handle.itu.int/11.1002/1000/12294) (V5) | 2014-10-14 | Superseded | AAP | Conformance specification for ITU‑T H.264 advanced video coding |
| [H.264.1](http://handle.itu.int/11.1002/1000/12643) (V6) | 2016-02-13 | In force | AAP | Conformance specification for ITU‑T H.264 advanced video coding |
| [H.264.2](http://handle.itu.int/11.1002/1000/12295) | 2015-02-20 | Superseded | AAP | Reference software for ITU‑T H.264 advanced video coding |
| [H.264.2](http://handle.itu.int/11.1002/1000/12644) | 2016-02-13 | In force | AAP | Reference software for ITU‑T H.264 advanced video coding |
| [H.265](http://handle.itu.int/11.1002/1000/11885) (V1) | 2013-04-13 | Superseded | AAP | High efficiency video coding |
| [H.265 (V2)](http://handle.itu.int/11.1002/1000/12296) | 2014-10-29 | Superseded | AAP | High efficiency video coding |
| [H.265 (V3)](http://handle.itu.int/11.1002/1000/12455) | 2015-04-29 | Superseded | AAP | High efficiency video coding |
| [H.265.1](http://handle.itu.int/11.1002/1000/12297) | 2014-10-14 | Superseded | AAP | Conformance specification for ITU‑T H.265 high efficiency video coding |
| [H.265.2](http://handle.itu.int/11.1002/1000/12298) (V1) | 2014-10-14 | Superseded | AAP | Reference software for ITU‑T H.265 high efficiency video coding |
| [H.265.2](http://handle.itu.int/11.1002/1000/12645) (V2) | 2016-02-13 | Superseded | AAP | Reference software for ITU‑T H.265 high efficiency video coding |
| [H.265.2 (V3)](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10449) | 2016-08-13 | In force | AAP | Reference software for ITU‑T H.265 high efficiency video coding |
| [H.323 v7 (2009) Amd. 1](http://handle.itu.int/11.1002/1000/11865) | 2013-03-16 | In force | AAP | Use of Facility message to enable call transfer |
| [H.341 (1999) Cor. 1](http://handle.itu.int/11.1002/1000/12064) | 2014-01-13 | In force | AAP | Updates to MIB definitions |
| [H.420](http://handle.itu.int/11.1002/1000/12245) | 2014-10-14 | In force | AAP | Telepresence system architecture |
| [H.450.4](http://handle.itu.int/11.1002/1000/11867) | 2013-03-16 | In force | AAP | Call hold supplementary service for ITU‑T H.323 systems |
| [H.450.5](http://handle.itu.int/11.1002/1000/11866) | 2013-03-16 | In force | AAP | Call park and call pickup supplementary services in ITU‑T H.323 systems |
| [H.450.7](http://handle.itu.int/11.1002/1000/11868) | 2013-03-16 | In force | AAP | Message waiting indication supplementary service for ITU‑T H.323 systems |
| [H.450.8](http://handle.itu.int/11.1002/1000/11869) | 2013-03-16 | In force | AAP | Name identification supplementary service for ITU‑T H.323 systems |
| [H.460.1](http://handle.itu.int/11.1002/1000/11870) | 2013-03-16 | In force | AAP | Guidelines for the use of the generic extensible framework |
| [H.460.2](http://handle.itu.int/11.1002/1000/11871) | 2013-03-16 | In force | AAP | Number portability interworking between ITU‑T H.323 and switched circuit networks |
| [H.460.6](http://handle.itu.int/11.1002/1000/11872) | 2013-03-16 | In force | AAP | Extended Fast Connect feature |
| [H.460.7](http://handle.itu.int/11.1002/1000/11873) | 2013-03-16 | In force | AAP | Digit maps within ITU‑T H.323 systems |
| [H.460.18](http://handle.itu.int/11.1002/1000/11874) | 2013-03-16 | In force | AAP | Traversal of ITU‑T H.323 signalling across network address translators and firewalls |
| [H.460.19](http://handle.itu.int/11.1002/1000/11875) | 2013-03-16 | In force | AAP | Traversal of ITU‑T H.323 media across network address translators and firewalls |
| [H.460.22](http://handle.itu.int/11.1002/1000/12456) | 2015-04-29 | In force | AAP | Negotiation of security protocols to protect ITU‑T H.225.0 call signalling messages |
| [H.460.24 (2009) Amd. 2](http://handle.itu.int/11.1002/1000/11876) | 2013-03-16 | In force | AAP | Support for ITU H.460.19 multiplex media mode for point-to-point media |
| [H.460.27](http://handle.itu.int/11.1002/1000/12457) | 2015-11-29 | In force | AAP | End-to-end session identifier for ITU‑T H.323 systems |
| [H.622.2](http://handle.itu.int/11.1002/1000/12646) | 2015-11-29 | In force | AAP | Service capabilities and framework for virtual home networks |
| [H.626.1](http://handle.itu.int/11.1002/1000/11877) | 2013-03-16 | In force | AAP | Architecture for mobile visual surveillance |
| [H.702](http://handle.itu.int/11.1002/1000/12648) | 2015-11-29 | In force | AAP | Accessibility profiles for IPTV systems |
| [H.703](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=9721) | 2016-07-14 | In force | AAP | Enhanced user interface framework for IPTV terminal devices |
| [H.721](http://handle.itu.int/11.1002/1000/12458) | 2015-04-29 | In force | AAP | IPTV terminal devices: Basic model |
| [H.722](http://handle.itu.int/11.1002/1000/12065) | 2014-01-13 | In force | AAP | IPTV terminal device: Full-fledged model |
| [H.723](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=9170) | 2016-07-14 | In force | AAP | IPTV Terminal Device: Mobile model |
| [H.741.1 (2012) Amd. 1](http://handle.itu.int/11.1002/1000/11886) | 2013-01-25 | In force | Agreement | New Appendices VIII and IX with XML schema on audience measurement service discovery |
| [H.741.1 (2012) Cor. 1](http://handle.itu.int/11.1002/1000/12459) | 2015-02-20 | In force | Agreement | Correction on XML namespaces |
| [H.741.2 (2012) Amd. 1](http://handle.itu.int/11.1002/1000/12066) | 2013-11-08 | In force | Agreement | New Appendix I with XML schema on the data structures of audience measurement for IPTV services |
| [H.741.2 (2012) Cor. 1](http://handle.itu.int/11.1002/1000/12461) | 2015-02-20 | In force | Agreement | Correction on XML namespaces |
| [H.741.3 (2012) Amd. 1](http://handle.itu.int/11.1002/1000/12462) | 2015-02-20 | In force | Agreement | XML schema on the measurement data structures for linear TV service |
| [H.741.4 (2012) Amd. 1](http://handle.itu.int/11.1002/1000/12463) | 2015-04-29 | In force | AAP | XML schema on the data structures for message delivery |
| [H.742.0](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=9218) | 2016-07-14 | In force | AAP | Use of video sensor devices for IPTV services: architecture and requirements |
| [H.751](http://handle.itu.int/11.1002/1000/11878) | 2013-03-16 | In force | AAP | Metadata for rights information interoperability in IPTV services |
| [H.752](http://handle.itu.int/11.1002/1000/12649) | 2015-11-29 | In force | AAP | Multimedia content provisioning interface for IPTV services |
| [H.761](http://handle.itu.int/11.1002/1000/12237) | 2014-11-29 | In force | AAP | Nested context language (NCL) and Ginga-NCL |
| [H.765](http://handle.itu.int/11.1002/1000/12464) | 2015-04-29 | In force | AAP | Packaged IPTV application (widget) service  |
| [H.770](http://handle.itu.int/11.1002/1000/12465) | 2015-04-29 | In force | AAP | Mechanisms for service discovery and selection for IPTV services |
| [H.772](http://handle.itu.int/11.1002/1000/12650) | 2015-11-29 | In force | AAP | IPTV terminal device discovery |
| [H.781](http://handle.itu.int/11.1002/1000/12466) | 2015-04-29 | In force | AAP | Digital signage: Functional architecture |
| [H.785.0](http://handle.itu.int/11.1002/1000/12247) | 2014-10-14 | In force | AAP | Digital signage: Requirements of disaster information services |
| [H.810](http://handle.itu.int/11.1002/1000/12067) | 2013-12-14 | Superseded | AAP | Interoperability design guidelines for personal health systems |
| [H.810](http://handle.itu.int/11.1002/1000/12651) | 2015-11-29 | Superseded | AAP | Interoperability design guidelines for personal health systems |
| [H.810](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10911) | 2016-07-14 | In force | AAP | Interoperability design guidelines for personal connected health systems |
| [H.811](http://handle.itu.int/11.1002/1000/12652) | 2015-11-29 | Superseded | AAP | Interoperability design guidelines for personal health systems: PAN/LAN/TAN interface |
| [H.811](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10912) | 2016-07-14 | In force | AAP | Interoperability design guidelines for personal health systems: Personal health devices interface |
| [H.812](http://handle.itu.int/11.1002/1000/12653) | 2015-11-29 | Superseded | AAP | Interoperability design guidelines for personal health systems: WAN interface: Common certified device class |
| [H.812](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10913) | 2016-07-14 | In force | AAP | Interoperability design guidelines for personal health systems: Services interface: Common certified capability class |
| [H.812.1](http://handle.itu.int/11.1002/1000/12654) | 2015-11-29 | Superseded | AAP | Interoperability design guidelines for personal health systems: WAN interface: Observation upload certified device class |
| [H.812.1](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10914) | 2016-07-14 | In force | AAP | Interoperability design guidelines for personal health systems: Services interface: Observation upload certified capability class |
| [H.812.2](http://handle.itu.int/11.1002/1000/12655) | 2015-11-29 | Superseded | AAP | Interoperability design guidelines for personal health systems: WAN interface: Questionnaires |
| [H.812.2](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10915) | 2016-07-14 | In force | AAP | Interoperability design guidelines for personal health systems: Services interface: Questionnaires |
| [H.812.3](http://handle.itu.int/11.1002/1000/12656) | 2015-11-29 | Superseded | AAP | Interoperability design guidelines for personal health systems: WAN interface: Capability exchange certified device class |
| [H.812.3](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10916) | 2016-07-14 | In force | AAP | Interoperability design guidelines for personal health systems: Services interface: Capability exchange certified capability class |
| [H.812.4](http://handle.itu.int/11.1002/1000/12657) | 2015-11-29 | Superseded | AAP | Interoperability design guidelines for personal health systems: WAN interface: Authenticated persistent session device class |
| [H.812.4](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10917) | 2016-07-14 | In force | AAP | Interoperability design guidelines for personal health systems: Services interface: Authenticated persistent session capability |
| [H.813](http://handle.itu.int/11.1002/1000/12658) | 2015-11-29 | Superseded | AAP | Interoperability design guidelines for personal health systems: Health record network (HRN) interface |
| [H.813](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10918) | 2016-07-14 | In force | AAP | Interoperability design guidelines for personal health systems: Healthcare information system (HIS) interface |
| [H.821](http://handle.itu.int/11.1002/1000/12248) | 2014-10-29 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: Health record network (HRN) interface |
| [H.821](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10987) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: Health record network (HRN) interface |
| [H.830.1](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10988) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: WAN Interface Part 1: Web services interoperability: Sender |
| [H.830.10](http://handle.itu.int/11.1002/1000/12675) | 2015-11-29 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: WAN interface Part 10: hData observation upload: Receiver |
| [H.830.10](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10989) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: WAN interface Part 10: hData observation upload: Receiver |
| [H.830.11](http://handle.itu.int/11.1002/1000/12676) | 2015-11-29 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: WAN interface Part 11: Questionnaires: Sender |
| [H.830.11](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10990) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: WAN interface Part 11: Questionnaires: Sender |
| [H.830.12](http://handle.itu.int/11.1002/1000/12677) | 2015-11-29 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: WAN interface Part 12: Questionnaires: Receiver |
| [H.830.12](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10991) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: WAN interface Part 12: Questionnaires: Receiver |
| [H.830.2](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10992) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: WAN Interface Part 2: Web services interoperability: Receiver |
| [H.830.3](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10993) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: WAN Interface Part 3: SOAP/ATNA: Sender |
| [H.830.4](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10994) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: WAN Interface Part 4: SOAP/ATNA: Receiver |
| [H.830.5](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10995) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: WAN Interface Part 5: PCD-01 HL7 messages: Sender |
| [H.830.6](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10996) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: WAN Interface Part 6: PCD-01 HL7 Messages: Receiver |
| [H.830.7](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10997) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: WAN Interface Part 7: Consent management: Sender |
| [H.830.8](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10998) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: WAN Interface Part 8: Consent management: Receiver |
| [H.830.9](http://handle.itu.int/11.1002/1000/12660) | 2015-11-29 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: WAN interface Part 9: hData observation upload: Sender |
| [H.830.9](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10999) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: WAN interface Part 9: hData observation upload: Sender |
| [H.831](http://handle.itu.int/11.1002/1000/12249)/H.830.1 | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: WAN interface Part 1: Web services interoperability: Sender |
| [H.832](http://handle.itu.int/11.1002/1000/12250)/H.830.2 | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: WAN interface Part 2: Web services interoperability: Receiver |
| [H.833](http://handle.itu.int/11.1002/1000/12251)/H.830.3 | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: WAN interface Part 3: SOAP/ATNA: Sender |
| [H.834](http://handle.itu.int/11.1002/1000/12252)/H.830.4 | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: WAN interface Part 4: SOAP/ATNA: Receiver |
| [H.835](http://handle.itu.int/11.1002/1000/12253)/H.830.5 | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: WAN interface Part 5: PCD-01 HL7 messages: Sender |
| [H.836](http://handle.itu.int/11.1002/1000/12254)/H.830.6 | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: WAN interface Part 6: PCD-01 HL7 messages: Receiver |
| [H.837](http://handle.itu.int/11.1002/1000/12255)/H.830.7 | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: WAN interface Part 7: Consent management: Sender |
| [H.838](http://handle.itu.int/11.1002/1000/12256)/H.830.8 | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: WAN interface Part 8: Consent management: Receiver |
| [H.840](http://handle.itu.int/11.1002/1000/12257) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN: USB host |
| [H.840](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11000) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN: USB host |
| [H.841](http://handle.itu.int/11.1002/1000/12258) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 1: Optimized exchange protocol: Agent |
| [H.841](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11001) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 1: Optimized exchange protocol: Agent |
| [H.842](http://handle.itu.int/11.1002/1000/12259) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 2: Optimized exchange protocol: Manager |
| [H.842](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11002) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 2: Optimized exchange protocol: Manager |
| [H.843](http://handle.itu.int/11.1002/1000/12260) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 3: Continua Design Guidelines: Agent |
| [H.843](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11003) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 3: Continua Design Guidelines: Agent |
| [H.844](http://handle.itu.int/11.1002/1000/12261) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 4: Continua Design Guidelines: Manager |
| [H.844](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11004) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 4: Continua Design Guidelines: Manager |
| [H.845.1](http://handle.itu.int/11.1002/1000/12262) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5A: Weighing scales: Agent |
| [H.845.1](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11005) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5A: Weighing scales: Agent |
| [H.845.11](http://handle.itu.int/11.1002/1000/12271) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5K: Peak expiratory flow monitor: Agent |
| [H.845.11](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11006) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5K: Peak expiratory flow monitor: Agent |
| [H.845.12](http://handle.itu.int/11.1002/1000/12272) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5L: Body composition analyser: Agent |
| [H.845.12](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11007) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5L: Body composition analyser: Agent |
| [H.845.13](http://handle.itu.int/11.1002/1000/12273) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5M: Basic electrocardiograph: Agent |
| [H.845.13](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11008) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5M: Basic electrocardiograph: Agent |
| [H.845.14](http://handle.itu.int/11.1002/1000/12274) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5N: International normalized ratio: Agent |
| [H.845.14](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11009) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5N: International normalized ratio: Agent |
| [H.845.15](http://handle.itu.int/11.1002/1000/12678) | 2015-11-29 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5O: Sleep apnoea breathing therapy equipment: Agent |
| [H.845.15](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11010) | 2016-07-14 | In force | AAP | Conformance testing: PAN/LAN/TAN interface Part 5O: Sleep apnoea breathing therapy equipment: Agent |
| [H.845.2](http://handle.itu.int/11.1002/1000/12263) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5B: Glucose meter: Agent |
| [H.845.2](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11011) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5B: Glucose meter: Agent |
| [H.845.3](http://handle.itu.int/11.1002/1000/12264) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5C: Pulse oximeter: Agent |
| [H.845.3](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11012) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5C: Pulse oximeter: Agent |
| [H.845.4](http://handle.itu.int/11.1002/1000/12265) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5D: Blood pressure monitor: Agent |
| [H.845.4](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11013) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5D: Blood pressure monitor: Agent |
| [H.845.5](http://handle.itu.int/11.1002/1000/12266) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5E: Thermometer: Agent |
| [H.845.5](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11014) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5E: Thermometer: Agent |
| [H.845.6](http://handle.itu.int/11.1002/1000/12267) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5F: Cardiovascular fitness and activity monitor: Agent |
| [H.845.6](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11015) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5F: Cardiovascular fitness and activity monitor: Agent |
| [H.845.7](http://handle.itu.int/11.1002/1000/12268) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5G: Strength fitness equipment: Agent |
| [H.845.7](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11016) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5G: Strength fitness equipment: Agent |
| [H.845.8](http://handle.itu.int/11.1002/1000/12269) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5H: Independent living activity hub: Agent |
| [H.845.8](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11017) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5H: Independent living activity hub: Agent |
| [H.845.9](http://handle.itu.int/11.1002/1000/12270) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5I: Medication adherence monitor: Agent |
| [H.845.9](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11018) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 5I: Medication adherence monitor: Agent |
| [H.846](http://handle.itu.int/11.1002/1000/12275) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 6: Device specializations: Manager |
| [H.846](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10982) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 6: Device specializations: Manager |
| [H.847](http://handle.itu.int/11.1002/1000/12276) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 7: Bluetooth low energy (BLE): Agent |
| [H.847](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11019) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 7: Bluetooth low energy (BLE): Agent |
| [H.848](http://handle.itu.int/11.1002/1000/12277) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 8: Bluetooth low energy (BLE): Manager |
| [H.848](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=11020) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 8: Bluetooth low energy (BLE): Manager |
| [H.849](http://handle.itu.int/11.1002/1000/12278) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 9: Transcoding for Bluetooth low energy (BLE): Agent |
| [H.849](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10980) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 9: Transcoding for Bluetooth low energy (BLE): Agent |
| [H.850](http://handle.itu.int/11.1002/1000/12279) | 2015-01-13 | Superseded | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN interface Part 10: Transcoding for Bluetooth low energy (BLE): Manager |
| [H.850](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10981) | 2016-07-14 | In force | AAP | Conformance of ITU‑T H.810 personal health devices: PAN/LAN/TAN Interface Part 10: Transcoding for Bluetooth low energy (BLE): Manager |
| [H.860](http://handle.itu.int/11.1002/1000/12163) | 2014-04-13 | In force | AAP | Multimedia e-health data exchange services: Data schema and supporting services |
| [T.24 (1998) Cor. 1](http://handle.itu.int/11.1002/1000/12680) | 2015-11-29 | In force | AAP | Clarifications in Table 1 |
| [T.38](http://handle.itu.int/11.1002/1000/12681) | 2015-11-29 | In force | AAP | Procedures for real-time Group 3 facsimile communication over IP networks |
| [T.38 (2010) Amd. 1](http://handle.itu.int/11.1002/1000/12293) | 2014-10-14 | Superseded | AAP | New Appendix VI, clarifications and corrections |
| [T.800](http://handle.itu.int/11.1002/1000/12682) | 2015-11-29 | In force | AAP | Information technology – JPEG 2000 image coding system: Core coding system |
| [T.800 (2002) Cor. 3](http://handle.itu.int/11.1002/1000/12301) | 2014-10-14 | Superseded | AAP | Information technology - JPEG 2000 image coding system: Core coding system: Correction of equation G-9 |
| [T.800 (2002) Cor.4](http://handle.itu.int/11.1002/1000/12302) | 2014-10-14 | Superseded | AAP | Miscellaneous corrections |
| [T.800 (2002) Amd. 6](http://handle.itu.int/11.1002/1000/11882) | 2013-03-16 | Superseded | AAP | Updated ICC profile support, bit depth and resolution clarifications |
| [T.800 (2002) Amd. 7](http://handle.itu.int/11.1002/1000/12300) | 2014-10-14 | Superseded | AAP | Profiles for an interoperable master format (IMF) |
| [T.801 (2002) Amd. 3](http://handle.itu.int/11.1002/1000/11883) | 2013-03-16 | In force | AAP | Box-based file format for JPEG XR, extended ROI boxes, XML boxing, compressed channel definition boxes, and representation of floating point |
| [T.804 (2002) Amd. 1](http://handle.itu.int/11.1002/1000/12303) | 2014-10-14 | Superseded | AAP | Reference software for the JP2 file format |
| [T.804 (2002) Amd. 2](http://handle.itu.int/11.1002/1000/12473) | 2015-04-29 | Superseded | AAP | Additional reference software |
| [T.808 (2005) Amd. 5](http://handle.itu.int/11.1002/1000/11884) | 2013-03-16 | In force | AAP | UDP transport and additional enhancements to JPIP |
| [T.832 (V3)](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10798) | 2016-08-13 | In force | AAP | Information technology – JPEG XR image coding - revision to define a media type code |
| [T.834](http://handle.itu.int/11.1002/1000/12305) (V2) | 2014-10-14 | In force | AAP | Information technology – JPEG XR image coding system – Conformance testing |
| [T.835 (V3)](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10799) | 2016-08-13 | In force | AAP | Information technology - JPEG XR image coding system - Reference software |
| [Y.4001/F.748.2](http://handle.itu.int/11.1002/1000/12621) | 2015-11-29 | In force | AAP | Machine socialization: Overview and reference model  |
| [Y.4002/F.748.3](http://handle.itu.int/11.1002/1000/12622) | 2015-11-29 | In force | AAP | Machine socialization: Relation management models and descriptions |
| [Y.4103/F.748.0](http://handle.itu.int/11.1002/1000/12228) | 2014-10-14 | In force | AAP | Common requirements for Internet of things (IoT) applications |
| [Y.4106/F.747.3](http://handle.itu.int/11.1002/1000/11855) | 2013-03-16 | In force | AAP | Requirements and functional model for a ubiquitous network robot platform that supports ubiquitous sensor network applications and services |
| [Y.4107/F.747.6](http://handle.itu.int/11.1002/1000/12226) | 2014-10-14 | In force | AAP | Requirements for water quality assessment services using ubiquitous sensor networks (USNs) |
| [Y.4402/F.747.4](http://handle.itu.int/11.1002/1000/12051) | 2013-12-14 | In force | AAP | Requirements and functional architecture for the open ubiquitous sensor network service platform |
| [Y.4405/H.621 (2008) Amd.1](http://handle.itu.int/11.1002/1000/12246) | 2014-10-14 | In force | AAP | Supporting multiple air interfaces |
| [Y.4412/F.747.8](http://handle.itu.int/11.1002/1000/12620) | 2015-11-29 | In force | AAP | Requirements and reference architecture for audience-selectable media service framework in the IoT environment |
| [Y.4413/F.748.5](http://handle.itu.int/11.1002/1000/12623) | 2015-11-29 | In force | AAP | Requirements and reference architecture of the machine-to-machine service layer |
| [Y.4414/H.623](http://handle.itu.int/11.1002/1000/12647) | 2015-11-29 | In force | AAP | Web of things service architecture |
| [Y.4551/F.771 (2008) Amd. 1](http://handle.itu.int/11.1002/1000/12230) | 2014-10-14 | In force | AAP | Supporting multiple air interfaces |
| [Y.4800/F.747.5](http://handle.itu.int/11.1002/1000/12052) | 2014-01-13 | In force | AAP | Requirements and functional architecture of an automatic location identification system for ubiquitous sensor network applications and services |
| [Y.4801/F.748.1](http://handle.itu.int/11.1002/1000/12229) | 2014-10-14 | In force | AAP | Requirements and common characteristics of the IoT identifier for the IoT service |

TABLE 8
Study Group 16 – Recommendations consented/determined at the last meeting
(and not yet approved)

| Recommendation | Consent/‌Determination | TAP/AAP | Title |
| --- | --- | --- | --- |
| [H.264 (V11)](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10797) | 2016-06-03 | AAP | Advanced video coding for generic audiovisual services |
| [H.265 (V4)](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10253) | 2016-06-03 | AAP | High efficiency video coding |
| [H.265.1 (V2)](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10446) | 2016-06-03 | AAP | Conformance specification for ITU‑T H.265 high efficiency video coding |
| [H.273](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=9629) | 2016-06-03 | AAP | Coding-independent code points for video signal type identification |

TABLE 9
Study Group 16 – Recommendations deleted during study period

| Recommendation | Last version | Withdrawal date | Title |
| --- | --- | --- | --- |
| T.24 Amd.1 | 2000 | 2016-02-19 | Set of 1200 pixels/inch variants for images 1-8 |

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

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

TABLE 11
Study Group 16 – Supplements

| Supplement | Date | Status | Title |
| --- | --- | --- | --- |
| [H Suppl. 2](http://handle.itu.int/11.1002/1000/12683) | 2015-10-23 | In force | ITU‑T H.248.x sub-series packages guide – Release 16 |
| [H Suppl. 4](http://handle.itu.int/11.1002/1000/12958) | 2016-06-03 | In force | Repository of generic parameters for ITU‑T H.460.x sub-series Recommendations |
| [H Suppl. 12](http://handle.itu.int/11.1002/1000/12068) | 2013-11-08 | In force | Gateway control protocol: Priority traffic treatment by ITU‑T H.248 gateways |
| [H Suppl. 13](http://handle.itu.int/11.1002/1000/12308) | 2014-07-11 | Superseded | Gateway control protocol: Common ITU‑T H.248 terminology - Release 1 |
| [H Suppl. 13](http://handle.itu.int/11.1002/1000/12684) | 2015-10-23 | In force | Gateway control protocol: Common ITU‑T H.248 terminology - Release 2 |
| [H Suppl. 14](http://handle.itu.int/11.1002/1000/12309) | 2014-07-11 | Superseded | Gateway control protocol: SDP codepoints for gateway control - Release 1 |
| [H Suppl. 14](http://handle.itu.int/11.1002/1000/12685) | 2015-10-23 | In force | Gateway control protocol: SDP codepoints for gateway control - Release 2 |
| [H Suppl. 17](http://handle.itu.int/11.1002/1000/12358) | 2014-11-28 | In force | Guide for addressing accessibility in standards |

TABLE 12
Study Group 16 – Implementors' Guides

| Supplement | Date | Status | Title |
| --- | --- | --- | --- |
| [H.248.x-IG](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=9863) | 2015-10-23 | In force | H.248 Sub-series Implementors' Guide  |
| [H.323-Series IG](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=9856) | 2013-11-08 | In force | Implementors' Guide for Recommendations of the H.323 System |
| [H.323-Series IG](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=9248) | 2013-01-25 | In force | Implementors' Guide for Recommendations of the H.323 System (Packet-based multimedia communications systems) |
| [T.38 (2010) IG](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10390) | 2015-02-20 | In force | Implementors Guide for ITU‑T T.38 (Procedures for real-time Group 3 facsimile communication over IP network) |

TABLE 13
Study Group 16 – Technical Papers

| Designation | Date | Status | Title |
| --- | --- | --- | --- |
| [FSTP.ACC-RemPart](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=9965) | 2015-10-23 | In force | Guidelines for supporting remote participation in meetings for all |
| [FSTP-AM](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=9222) | 2015-10-23 | In force | Guidelines for accessible meetings |
| [FSTP-UMAA](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10126) | 2016-06-03 | In force | Use cases for assisting people with disabilities using mobile applications |
| [HSTP.CONF-H721 (V2)](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=9954) | 2015-02-20 | In force | Conformance testing specification for ITU‑T H.721 |
| [HSTP.CONF-H762](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=9913) | 2013-11-08 | In force | Conformance testing specification for H.762 |
| [HSTP.DS-UCIS](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=9634) | 2014-07-11 | In force | Technical Paper: Digital signage: Use-cases of interactive services |
| [HSTP.IPTV-AM.101](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=9287) | 2013-11-08 | In force | Technical paper: Introduction to H.741-series - A new video engagement audience measurement standard |
| [HSTP.IPTV-Gloss](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=9285) | 2014-07-11 | In force | Technical Paper: Glossary and terminology of IP-based TV-related multimedia services |
| [HSTP-CITS-Reqs](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10217) | 2014-07-11 | In force | Global ITS communication requirements (Version 1) |
| [HSTP-H810](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10091) | 2014-07-11 | In force | Technical Paper: Introduction to the ITU‑T H.810 Continua Design Guidelines |
| [HSTP-H810-XCHF](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=10662) | 2015-10-23 | In force | Technical Paper: Fundamentals of data exchange within ITU‑T H.810 Continua Design Guideline architecture |
| [HSTP-MCTB](http://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=9245) | 2016-06-03 | In force | Media coding toolbox for IPTV: Audio and video codecs |

TABLE 14
Study Group 16 – Technical Reports

| Designation | Date | Status | Title |
| --- | --- | --- | --- |
| [HSTR-IPTV-GB](http://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=11055) | 2015-02-20 | New | ITU‑T Technical Report "*IPTV Green Book*" |

TABLE 15
Study Group 16 – Other publications

| Publication | Date | Status | Title |
| --- | --- | --- | --- |
| [MCSD](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=9602) | 2013-01-25 | Revised | ITU‑T Media Coding Summary Database (MCSD) |
| [RGM-GL](http://ifa.itu.int/t/2013/sg16/exchange/info/1606-SG16-Guidelines-Org-RGM_V1.1.docx) | 2016-06-03 | Revised | ITU‑T SG16 guidelines for organization of Rapporteur Group meetings |

ANNEX 2

Proposed updates to the Study Group 16 mandate and Lead Study Group roles

**(WTSA Resolution 2)**

The following are the proposed changes to the Study Group 16 mandate and Lead Study Group roles agreed at the last Study Group 16 meeting in this study period, based on the relevant portions of WTSA-12 Resolution 2 and modifications introduced by TSAG with the creation of ITU‑T SG20.

Annex A
(to Resolution 2)

Part 1 – General areas of study

**…**

ITU‑T Study Group 16

Multimedia coding, systems and applications

ITU‑T Study Group 16 is responsible for studies relating to ubiquitous applications, multimedia capabilities for services and applications for existing and future networks. This encompasses accessibility; multimedia architectures and applications; human interfaces and services; terminals; protocols; signal processing; media coding and systems (e.g. network signal processing equipment, multipoint conference units, gateways and gatekeepers).

Points of guidance to study groups for the development of the post-2016 work programme (Resolution 2, Annex B)

**…**

PART 2 ‑ Lead Study Groups in specific areas of study

**…**

SG16 Lead study group on multimedia coding, systems and applications
Lead study group on ubiquitous applications
Lead study group on telecommunication/ICT accessibility for persons with disabilities
Lead study group on intelligent transport system (ITS) communications
Lead study group on Internet Protocol television (IPTV) and digital signage
Lead study group on e-services, such as e-government, e-health and e-education

**…**

Annex B
(to Resolution 2)

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

**…**

ITU‑T Study Group 16

Within the context of the SG16 standardization work, e-services are defined as the combined use of electronic communication and information technology (digital multimedia data collected, processed, transmitted, stored and retrieved electronically) for service delivery in a specific industry area, such as healthcare, education, administration, commerce, transportation, entertainment, etc. The distribution and delivery of e-services can be by a multitude of channels capable of transporting multimedia information, for example the Internet, cable networks, NGN, GSTN, IMT-2020, future networks, and wireless networks.

ITU‑T Study Group 16 will work on the following items:

– development of a framework and roadmaps for the harmonized and coordinated development of multimedia telecommunication standardization over wired and wireless networks to provide guidance across all ITU‑T and ITU‑R study groups (in particular ITU‑T Study Group 9 and ITU‑R Study Group 6), and in close cooperation with other regional and international standards-development organizations (SDO) and industry forums; these studies will include mobility, IP and interactive broadcasting aspects; close cooperation between ITU‑T and ITU‑R is encouraged at all levels;

– development and maintenance of a database of existing and planned multimedia standards;

– development of multimedia end-to-end architectures, including home network environments (HNE) and vehicle gateway for intelligent transport system (ITS);

– operation of multimedia systems and applications, including interoperability, scalability and interworking over different networks;

– high-layer protocols and middleware for multimedia systems and applications, including Internet Protocol television (IPTV), digital signage, ubiquitous applications and services for future networks;

– media coding and signal processing;

– multimedia and multimode terminals;

– signal processing network equipment and terminals, gateway implementations, and characteristics;

– quality of service (QoS), quality of experience (QoE) and end-to-end performance in multimedia systems;

– terminology for various multimedia services

– security of multimedia systems and services;

– accessibility to multimedia systems and services for persons with disabilities;

– ubiquitous applications;

– e-services, including, but not limited to, e-government, e-health and e-education;

– studies on appropriate character sets, especially for non-Latin scripts and languages.

**…**

Annex C
(to Resolution 2)

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

**…**

ITU‑T Study Group 16

ITU‑T F.700-series, except those under the responsibility of Study Group 20

ITU‑T G.160-series, ITU‑T G.710 − ITU‑T G.729 (except ITU‑T G.712), ITU‑T G.760‑series (including ITU‑T G.769/ITU‑T Y.1242), ITU‑T G.776.1, ITU‑T G.799.1/ITU‑T Y.1451.1, ITU‑T G.799.2, ITU‑T G.799.3

ITU‑T H-series, except those under the responsibility of Study Group 20

ITU‑T T-series

ITU‑T Q.50-series, ITU‑T Q.115-series

ITU‑T V-series, except those under the responsibility of Study Groups 2 and 15

ITU‑T X.26/ITU‑T V.10 and ITU‑T X.27/ITU‑T V.11

**…**

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