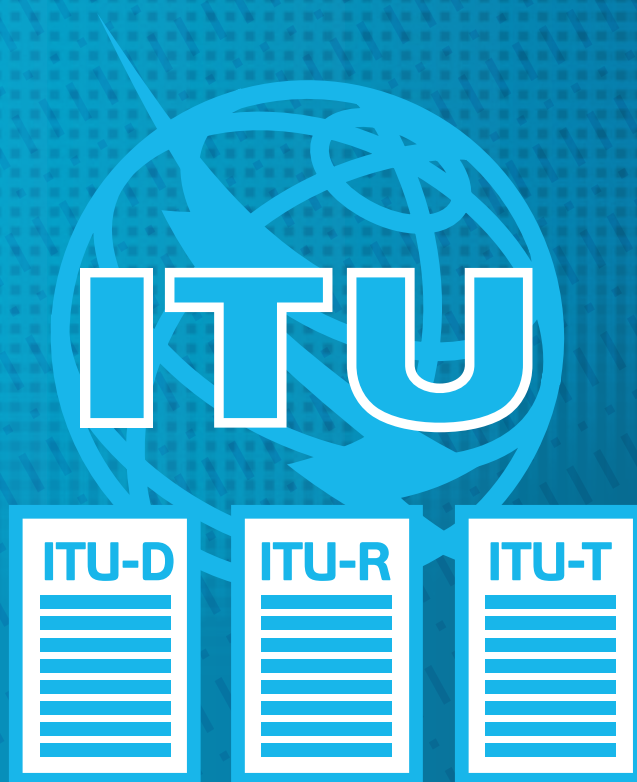


# QUESTION 9-3/2

IDENTIFICATION OF  
STUDY TOPICS IN THE ITU-T AND  
ITU-R STUDY GROUPS WHICH ARE  
OF PARTICULAR INTEREST  
TO DEVELOPING COUNTRIES



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## **QUESTION 9-3/2:**

***Identification of study topics in the ITU-T and ITU-R study groups which are of particular interest to developing countries***



## **ITU-D Study Groups**

In support of the knowledge sharing and capacity building agenda of the Telecommunication Development Bureau, ITU-D Study Groups support countries in achieving their development goals. By acting as a catalyst by creating, sharing and applying knowledge in ICTs to poverty reduction and economic and social development, ITU-D Study Groups contribute to stimulating the conditions for Member States to utilize knowledge for better achieving their development goals.

### **Knowledge Platform**

Outputs agreed on in the ITU-D Study Groups and related reference material are used as input for the implementation of policies, strategies, projects and special initiatives in the 193 ITU Member States. These activities also serve to strengthen the shared knowledge base of the membership.

### **Information Exchange & Knowledge Sharing Hub**

Sharing of topics of common interest is carried out through face-to-face meetings, e-Forum and remote participation in an atmosphere that encourages open debate and exchange of information.

### **Information Repository**

Reports, Guidelines, Best Practices and Recommendations are developed based on input received for review by members of the Groups. Information is gathered through surveys, contributions and case studies and is made available for easy access by the membership using content management and web publication tools.

### **Study Group 2**

Study Group 2 was entrusted by WTDC-10 with the study of nine Questions in the areas of information and communication infrastructure and technology development, emergency telecommunications and climate-change adaptation. The work focused on studying methods and approaches that are the most suitable and successful for service provision in planning, developing, implementing, operating, maintaining and sustaining telecommunication services which optimize their value to users. This work included specific emphasis on broadband networks, mobile radiocommunication and telecommunications/ICTs for rural and remote areas, the needs of developing countries in spectrum management, the use of ICTs in mitigating the impact of climate change on developing countries, telecommunications/ICTs for natural disaster mitigation and relief, conformance and interoperability testing and e-applications, with particular focus and emphasis on applications supported by telecommunications/ICTs. The work also looked at the implementation of information and communication technology, taking into account the results of the studies carried out by ITU-T and ITU-R, and the priorities of developing countries.

Study Group 2, together with ITU-R Study Group 1, also deals with Resolution 9 (Rev. WTDC-10) on the "Participation of countries, particularly developing countries, in spectrum management".

This report has been prepared by many experts from different administrations and companies. The mention of specific companies or products does not imply any endorsement or recommendation by ITU.

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## **QUESTION 9-3/2**

# **Identification of study topics in the ITU-T and ITU-R study groups which are of particular interest to developing countries**

### **1 Introduction**

Question 9-3/2 adopted by WTDC-10 calls for: “Identification on a continuing basis of those study group topics in the ITU T and ITU R which are of particular interest to developing countries.” This Question is for the benefit of both ITU-D Study Groups.

First adapted at WTDC-94, this Question has been renewed for the fourth time at the WTDC-10. The choice of these topics is based on an agreed set of Guidelines which are normally adopted at the first meeting of the Study Group based on proposals made by the Rapporteurs.

The World Telecommunication Development Conference (Hyderabad, 2010) adopted new terms of reference for the two Study Groups. Their mandate is no longer based on separation of technical and infrastructure issues on the one hand and regulatory, policy and economic issues on the other. Resolution 2 has been amended so that Questions now cover all aspects related to the topic, objectives and expected output in line with the related Programme.

There are several hundred work items with work programme of ITU-T and ITU-R Study Groups. Question 9-3/2 identifies the expected outputs as follows:

- Agreed Guideline to the identification process of such topics;
- Annual progress reports indicating status of the selected topics and, where completed, an indication how the outputs can be obtained; and

### **2 Guidelines**

The following types of topics were identified for Question 9-3/2.

- Broad areas of studies undertaken in ITU-T and ITU-R which are of interest to the developing countries, delineated in terms of priorities and resources available;
- Questions in ITU-T and ITU-R Study Groups which are of relevance to Questions under study in ITU-D Study Groups;
- Other additional relevant Questions based on requests of the members of the Study Group during the new life period of this Question; and
- Any new topics not covered by any Question adopted by WTDC-10 for Study Group 1 or Study Group 2.

## **Section 1: ITU-R Questions<sup>1</sup>, Recommendations and Handbooks of particular concern to developing countries**

### **ITU-R**

The role of the Radiocommunication Sector is to ensure the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including those using satellite orbits, and carry out studies without limit of frequency range on the basis of which Recommendations are adopted.

The regulatory and policy functions of the Radiocommunication Sector are performed by World and Regional Radiocommunication Conferences and Radiocommunication Assemblies supported by Study Groups.

The ITU Radiocommunication Sector specializes in facilitating international collaboration to ensure the rational, equitable, efficient and economical use of the radiofrequency spectrum and satellite orbits by:

1. Holding World and Regional Radiocommunication Conferences to expand and adopt Radio Regulations and Regional Agreements covering the use of the radio-frequency spectrum;
2. Approving ITU-R Recommendations, developed by ITU-R Study Groups in the framework set by Radiocommunication Assemblies, on the technical characteristics and operational procedures for radiocommunication services and systems;
3. Coordinating activities to eliminate harmful interference between radio stations of different countries;
4. Maintaining the Master International Frequency Register (MIFR) and
5. Offering tools, information and seminars to assist national radio-frequency spectrum management.

### **World Radiocommunication Conference**

World radiocommunication conferences (WRC) are held every three to four years. It is the job of the WRC to review, and, if necessary, revise the Radio Regulations, the international treaty governing the use of the radio-frequency spectrum and the geostationary-satellite and non-geostationary-satellite orbits. Revisions are made on the basis of an agenda determined by the ITU Council, which takes into account recommendations made by previous world radiocommunication conferences.

The general scope of the agenda of world radiocommunication conferences is established four to six years in advance, with the final agenda set by the ITU Council two years before the conference, with the concurrence of a majority of Member States.

Under the terms of the ITU Constitution, a WRC can:

- revise the Radio Regulations and any associated frequency assignment and allotment plans;
- address any radiocommunication matter of worldwide character;
- instruct the Radio Regulations Board and the Radiocommunication Bureau, and review their activities;
- determine topics for study by the Radiocommunication Assembly and its Study Groups, as well as matters in relation to future Radiocommunication Conferences.

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<sup>1</sup> For more detailed information, please consult: <http://www.itu.int/itu-r>



On the basis of contributions from administrations, the Special Committee, the Radiocommunication Study Groups, and other sources concerning the regulatory, technical, operational and procedural matters to be considered by World and Regional Radiocommunication Conferences, the Conference Preparatory Meeting (CPM) prepares a consolidated report to be used in support of the work of such conferences.

The Last WRC was held in Geneva from 23 January-17 February 2012.

### **Radiocommunication Assembly**

Radiocommunication Assemblies (RA) are responsible for the structure, programme and approval of radiocommunication studies. They are normally convened every three or four years and may be associated in time and place with World Radiocommunication Conferences (WRCs).

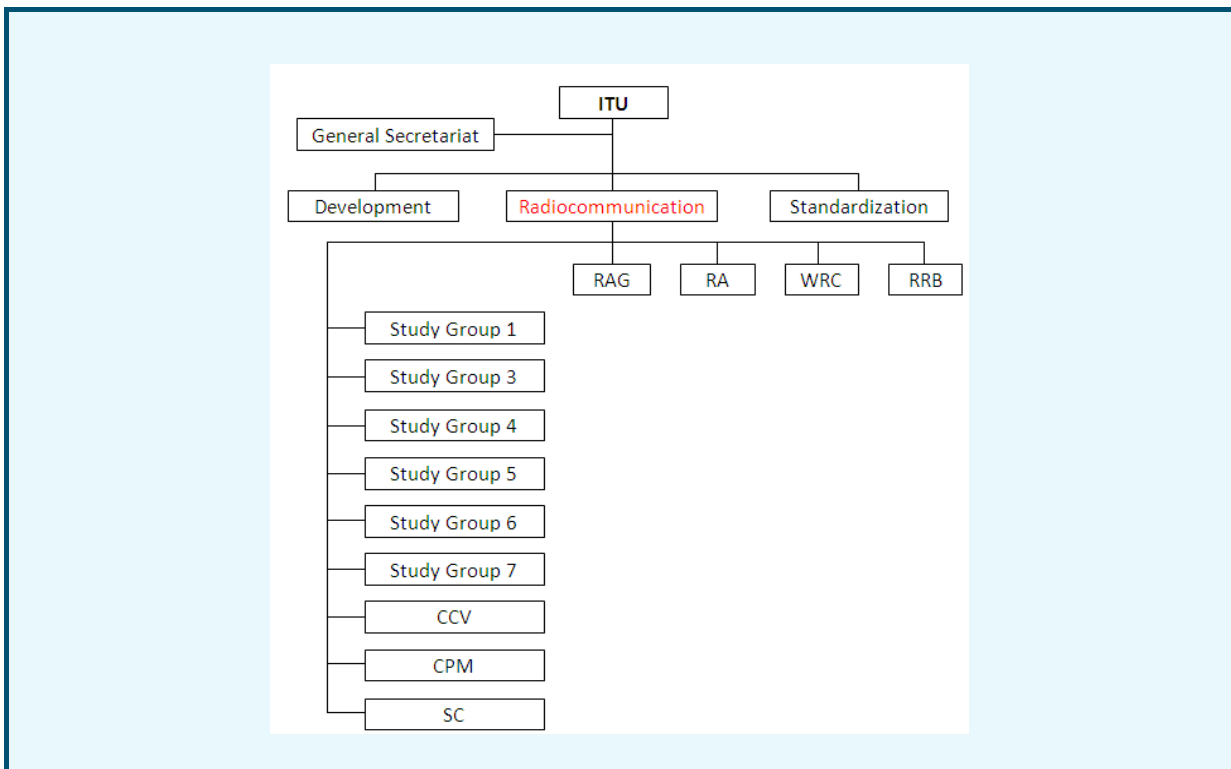
The Assemblies:

- assign conference preparatory work and other questions to the Study Groups;
- respond to other requests from ITU conferences;
- suggest suitable topics for the agenda of future WRCs;
- approve and issue ITU-R Recommendations and ITU-R Questions developed by the Study Groups;
- set the programme for Study Groups, and disband or establish Study Groups according to need.

The last Radiocommunication Assembly was held in Geneva from 16 – 20 January 2012. The Radiocommunication Assembly in 2012 maintained the structure of the ITU-R Study Groups without change.

### **ITU-R Structure**

The Radio Assembly (Geneva, 2012) maintained the ITU-R study groups structure as follows:



### **ITU-R Workshops**

The Radiocommunication Bureau (BR) organizes, in Geneva, world seminars on spectrum management every two years, as well as regional seminars aiming in particular at the needs of developing countries. The main objectives of BR seminars and workshops are: to give assistance to Member States in spectrum management activities, through training, information meetings, seminars, development of handbooks and the provision of tools for automated spectrum management; to expand the assistance offered to Member States in coordinating and registering frequency assignments and in applying the Radio Regulations, with special attention to developing countries and Member States that have recently joined the Union.

The BR also organizes, upon request, individual training in Geneva. This training is usually held in conjunction with important ITU-R meetings and the BR tries to regroup them over a one-week period.

For more information, please consult the following web site: <http://itu.int/ITU-R/index.asp?category=conferences&rlink=seminars>.

### **ITU-R Recommendations**

The ITU-R Recommendations constitute a set of international technical standards developed by the Radiocommunication. They are the result of studies undertaken by Radiocommunication Study Groups on:

- the use of a vast range of wireless services, including popular new mobile communication technologies;
- the management of the radio-frequency spectrum and satellite orbits;
- the efficient use of the radio-frequency spectrum by all radiocommunication services;
- terrestrial and satellite radiocommunication broadcasting;
- radiowave propagation;
- terrestrial and satellite systems and networks;
- space operation, Earth exploration-satellite, meteorological-satellite and radio astronomy services.

The ITU-R Recommendations are approved by ITU Member States. Their implementation is not mandatory, excepting for those incorporated by reference in the Radio Regulations.

The most recent versions of the ITU-R Recommendations in force are published and available at: <http://www.itu.int/pub/R-REC>.

### **ITU-R Reports**

An ITU-R Report is a technical, operational or procedural statement prepared by an ITU-R Study Group on a given subject related to a current ITU-R Question or the results of ITU-R studies. The ITU-R Reports are published and available at: <http://www.itu.int/pub/R-REP>

### **ITU-R Handbooks**

An ITU-R Handbook is a text which provides a statement of the current knowledge, the present position of studies, or of good operating or technical practice, in certain aspects of radiocommunications, which is addressed to a radio engineer, system planner or operating official who plans, designs or uses radio services or systems, paying particular attention to the requirements of developing countries. The ITU-R Handbooks are published and available at: <http://www.itu.int/pub/R-HDB>

### **Radiocommunication Advisory Group (RAG)**

The Radiocommunication Advisory Group (RAG) is tasked to:

- review the priorities and strategies adopted in the Sector;

- monitor progress of the work of the Study Groups;
- provide guidance for the work of the Study Groups;
- recommend measures to foster cooperation and coordination with other organizations and with the other ITU Sectors.

The RAG provides advice on these matters to the Director of the Radiocommunication Bureau (BR). Radiocommunication Assemblies (RAs) may refer specific matters within its competence to the RAG. The RAG may be authorized to act on behalf of the RA between two Assemblies.

### **Coordination Committee for Vocabulary (CCV)**

The CCV is responsible for the coordination and approval in close collaboration with the Radiocommunication Study Groups, the General Secretariat (Conferences and Publications Department) and other interested organizations (mainly the International Electrotechnical Commission (IEC)), concerning:

- vocabulary, including abbreviations and initials;
- related subjects (quantities and units, graphical and letter symbols).

### **Conference Preparatory Meeting (CPM)**

The CPM normally holds two sessions during the interval between WRCs. The first session would be coordinating the work programmes of the relevant ITU-R Study Groups, and preparing a draft structure for the CPM Report, based on the agenda for the next two WRCs, and for taking into account any directives which may have come from the previous WRC.

The second session prepares a consolidated report to be used in support of the work of World Radiocommunication Conferences, based on:

- contributions from administrations, the Special Committee, the Radiocommunication Study Groups, and other sources concerning the regulatory, technical, operational and procedural matters to be considered by such conferences;
- the inclusion, to the extent possible, of reconciled differences in approaches as contained in the source material, or, in the case where the approaches cannot be reconciled, the inclusion of the differing views and their justification.

### **Special Committee on regulatory/procedural matters (SC)**

The Special Committee activities consist of two categories:

- (i) work assigned directly to it by the first session of the CPM and
- (ii) tasks related to regulatory aspects of work assigned by the first session of CPM to the Study Groups and their Working Parties. Assisted by its Working Party, the SC prepares a report for consideration at the second session of the CPM.

## **ITU-R Study Group 1 — Spectrum management**

### **Scope**

Spectrum management principles and techniques, general principles of sharing, spectrum monitoring, long-term strategies for spectrum utilization, economic approaches to national spectrum management, automated techniques and assistance to developing countries in cooperation with the Telecommunication Development Sector.

In addition, inter-service sharing and compatibility (urgent studies by request), including the development of Recommendations(s) or Reports(s) to the Conference Preparatory Meeting in answer to those urgent Questions concerning inter-service sharing and compatibility requiring special attention.

### **Structure**

Three Working Parties (WPs) carry out studies on Questions assigned to Study Group 1:

- WP 1A Spectrum engineering techniques
- WP 1B Spectrum management methodologies and economic strategies
- WP 1C Spectrum monitoring

The goals of ITU-R Working Parties 1A, 1B and 1C activities are to develop and maintain ITU-R Recommendations, Reports and Handbooks relevant to spectrum engineering techniques, spectrum management fundamentals and spectrum monitoring, respectively.

### **Questions**

- Q.205/1: Long-term strategies for spectrum utilization
- Q.208/1: Alternative methods of spectrum management
- Q.216/1: Spectrum redeployment as a method of national spectrum management
- Q.232/1: Methods and techniques used in space radio monitoring
  - Questions 206/1, 214/1, 215/1 and 225/1 were suppressed.

All the ITU-R Questions assigned to Study Group 1 are published and available at: <http://www.itu.int/pub/R-QUE-SG01/en>

### **Relevant Recommendations**

#### **SM series: Spectrum management**

- SM.1131: Factors to consider in allocating spectrum on a worldwide basis
- SM.1133: Spectrum utilization of broadly defined services
- SM.1265: National alternative allocation methods
- SM.1447: Monitoring of the radio coverage of land mobile networks to verify compliance with a given licence
- SM.1682: Methods for measurements on digital broadcasting signals
- SM.1708: Field-strength measurements along a route with geographical coordinate registrations
- SM.1792: Measuring sideband emissions of T-DAB and DVB-T transmitters for monitoring purposes
- SM.1047: National spectrum management

- SM.1049: A method of spectrum management to be used for aiding frequency assignment for terrestrial services in border areas
- SM.1370: Design guidelines for developing automated spectrum management systems
- SM.1392: Essential requirements for a spectrum monitoring station for developing countries
- SM.1413: Radiocommunication Data Dictionary for notification and coordination purposes
- SM.1447: Monitoring of the radio coverage of land mobile networks to verify compliance with a given licence
- SM.1603: Spectrum redeployment as a method of national spectrum management
- SM.1880: Spectrum occupancy measurement
- SM.1896: Frequency ranges for global or regional harmonization of short-range devices (SRDs)

### **Relevant Reports**

- SM.2012: Economic aspects of spectrum management
- SM.2015: Methods for determining national long-term strategies for spectrum utilization
- SM.2093: Guidance on the regulatory framework for national spectrum management
- SM.2130: Inspection of radio stations
- SM.2255: Technical characteristics, standards and frequency bands of operation for radio-frequency identification (RFID) and potential harmonization opportunities
- SM.2256: Spectrum occupancy measurements and evaluation
- SM.2257: Spectrum management and monitoring during major events

### **Handbooks**

- National Spectrum Management, this Handbook covers spectrum management fundamentals, spectrum planning, spectrum engineering, frequency authorization, spectrum use, spectrum control and automation for spectrum management activities. The Handbook describes the key elements of spectrum management and is intended for the use by administrations of both developing and developed countries.
- Spectrum Monitoring, this Handbook covers all essential features of spectrum monitoring techniques and activities, including the establishment of monitoring facilities. The principles governing this handbook show that spectrum monitoring requires equipment, personnel and procedures. The handbook is an essential accessory for all administrations and spectrum monitoring agencies in the world, both for developing and developed countries.
- Computer-aided Techniques for Spectrum Management, this Handbook contains basic material and numerous models for developing efficient projects that will assist in implementing automated spectrum management.

### **Remarks**

In response to Resolution 9 (Rev. Hyderabad, 2010) the “Joint Group on Resolution 9”, established after WTDC-98 as a joint ITU-R/ITU-D group specifically ITU-D SG 2 and ITU-R SG 1, is continuing to assist developing countries in fulfilling their national spectrum management functions. To that aim, the Group has developed and distributed questionnaires on national spectrum management to Member States and Sector Members with the key objective of identifying specific problems that developing countries experience in national spectrum management.

## **ITU-R Study Group 3 — Radiowave propagation**

### **Scope**

Propagation of radio waves in ionized and non-ionized media and the characteristics of radio noise, for the purpose of improving radiocommunication systems.

The Study Group produces Recommendations (in the ITU-R P-series) containing:

- (i) information on the basic propagation characteristics of the troposphere and ionosphere that affect radiowave propagation, and
- (ii) propagation prediction methods for use by the various radiocommunication services.

### **Structure**

The following four Working Parties (WPs) carry out studies on the Questions assigned to Study Group 3:

- WP 3J Propagation fundamentals
- WP 3K Point-to-area propagation
- WP 3L Ionospheric propagation and radio noise
- WP 3M Point-to-point and Earth-space propagation

The principal aim of the Working Parties is to draft Recommendations in the ITU-R P Series for subsequent adoption by Study Group 3 and approval by the Member States. The Working Parties also develop Handbooks that provide descriptive and tutorial material, especially useful for developing countries.

### **Questions**

- Q.201-4/3: Radiometeorological data required for the planning of terrestrial and space communication systems and space research application
- Q.203-5/3: Propagation data and prediction methods for terrestrial broadcasting, fixed (broadband access) and mobile services at frequencies above 30 MHz
- Q.206-3/3: Propagation data and prediction methods for fixed- and broadcasting-satellite services
- Q.208-3/3: Propagation factors in frequency sharing issues affecting fixed-satellite services and terrestrial services
- Q.211-5/3: Propagation data and propagation models in the frequency range 300 MHz to 100 GHz for the design of short-range wireless radiocommunication systems and wireless local area networks (WLAN)

All the ITU-R Questions assigned to Study Group 3 are published and available at: <http://www.itu.int/pub/R-QUE-SG03/>

### **Relevant Reports**

- P.227: General methods of measuring the field strength and related parameters
- P.228: Measurement of field strength for VHF (metric) and UHF (decametric) broadcast services, including television

## Relevant Recommendations

### P-series: Radiowave propagation

- P.1144: Guide to the application of the propagation methods of Radiocommunication Study Group 3
- P.453: The radio refractive index: its formula and refractivity data
- P.837: Characteristics of precipitation for propagation modelling
- P.1406: Propagation effects relating to terrestrial land mobile service and broadcasting in the VHF and UHF bands
- P.1410: Propagation data and prediction methods required for the design of terrestrial broadband radio access systems operating in a frequency range from 3 to 60 GHz
- P.1546: Methods for point-to-point area predications for terrestrial services in the frequency range 30 MHz to 3000 MHz
- P.452: Prediction procedure for the evaluation of interference between stations on the surface of the Earth at frequencies above about 0.1 GHz
- P.1812: A path specific propagation prediction method for point-to-area terrestrial services in the VHF and UHF bands
- P.618: Propagation data and prediction methods required for the design of Earth-space telecommunication systems
- P.620: Propagation data required for the evaluation of coordination distances in the frequency range 100 MHz to 105 GHz
- P.1411: Propagation data and prediction methods for the planning of short-range outdoor radiocommunication systems and radio local area networks in the frequency range 300 MHz to 100 GHz
- P.679: Propagation data required for the design of broadcasting-satellite systems
- P.2001: A general purpose wide-range terrestrial propagation model in the frequency range 30 MHz to 50 GHz

### Handbooks

- Curves for radiowave propagation over the surface of the Earth.
- Radiometeorology, this Handbook provides general information on radiometeorology and covers the following topics: physical characteristics of the atmosphere, atmospheric refraction, particle scattering, atmospheric gaseous attenuation and dispersion, hydrometeor attenuation, radio emissivity, cross-polarization and anisotropy and statistical aspects of atmospheric processes.
- Radiowave propagation information for predictions for Earth-to-space path communications, this Handbook supplies background and supplementary information on Earth-to-space propagation effects in order to assist in the design of different Earth-space communication systems.
- Ionosphere and its effects on radiowave propagation, this Handbook provides radioplanners and users with a guide on ionospheric properties and propagation effects in order to assist in the design of related radiocommunication systems.
- Terrestrial land mobile radiowave propagation in the VHF/UHF bands, this Handbook gives the technical basis for predicting Radiowave propagation in terrestrial point-to-point, point-to-area and point-to-multipoint mobile networks.

- Radiowave propagation information for designing terrestrial point-to-point links, this Handbook supplies background and supplementary information on radiowave propagation effects, and serves as a companion volume and guide to the ITU-R Recommendations that have been developed by Radiocommunication Study Group 3 to assist in the design of terrestrial communication systems.
- ITU-R propagation prediction methods for interference and sharing studies, this Handbook provides technical information and guidance needed for sharing studies and interference assessments using selected ITU-R P-Series RF propagation models and prediction methods. The Handbook is intended to be used in conjunction with ITU-R P-Series Recommendations to assist in performing interference analyses and prediction methods on radiocommunication service systems.



## **ITU-R Study Group 4 – Satellite services**

### **Scope**

Systems and networks for the fixed-satellite service, mobile-satellite service, broadcasting-satellite service and radiodetermination-satellite service.

### **Structure**

Three Working Parties (WPs) carry out studies on Questions assigned to Study Group 4 and one Joint Task Group (JTG) conducts studies on WRC-15 Agenda items 1.1 and 1.2:

- WP 4A Efficient orbit/spectrum utilization for the fixed-satellite service (FSS) and broadcasting-satellite service (BSS)
- WP 4B Systems, air interfaces, performance and availability objectives for the fixed-satellite service (FSS), broadcasting-satellite service (BSS) and mobile-satellite service (MSS), including IP-based applications and satellite news gathering (SNG)
- WP 4C Efficient orbit/spectrum utilization for the mobile-satellite service (MSS) and the radiodetermination-satellite service (RDSS) (WP 4C also deals with the performance issues related to RDSS)
- JTG 4-5-6-7 WRC-15 Agenda items 1.1 and 1.2, which relate to possible new allocations to the mobile service and identifications for International Mobile Telecommunications (IMT)

### **Questions**

- Q.227/4: Technical and operational characteristics of emergency communications in the mobile-satellite service
- Q.290/4: Broadcasting-satellite means for public warning, disaster mitigation and relief
- Q.286/4: Contributions of the mobile and amateur services and associated satellite services to the improvement of disaster communications

All the ITU-R Questions assigned to Study Group 4 are published and available at: <http://www.itu.int/pub/R-QUE-SG04/>

### **Recommendations**

#### **S series: Fixed-Satellite service**

- S.1001-2: Use of systems in the fixed-satellite service in the event of natural disasters and similar emergencies for warning and relief operations
- S.1782-1: Possibilities for global broadband Internet access by fixed-satellite service systems
- S.1783: Technical and operational features characterizing high-density applications in the fixed-satellite service

#### **BO Series: Satellite delivery**

- BO.1774-1: Use of satellite and terrestrial broadcast infrastructures for public warning, disaster mitigation and relief" (Identical to Recommendation BT.1774)

### **M Series: Mobile, radiodetermination, amateur and related satellite services**

- M.1850-1: Detailed specifications of the radio interfaces for the satellite component of International Mobile Telecommunications-2000 (IMT-2000)
- M.1854-1: Use of mobile-satellite service in disaster response and relief
- M.2014: Global circulation of IMT-2000 satellite terminals

### **Reports**

- S.2151-1: Use and examples of systems in the fixed-satellite service in the event of natural disasters and similar emergencies for warning and relief operations
- M.2149-1: Use and examples of mobile-satellite service systems for relief operation in the event of natural disasters and similar emergencies
- M.2176-1: Vision and requirements for the satellite radio interface(s) of IMT-Advanced

### **Handbooks**

- Satellite communications, this Handbook gives a comprehensive description of all issues relative to satellite communication systems operating in the fixed-satellite service (FSS).
- Specifications of transmission systems for the broadcasting-satellite service
- Terrestrial and satellite digital sound broadcasting to vehicular, portable and fixed receivers in the VHF/UHF bands, it describes the system and service requirements for digital sound broadcasting (DSB) to vehicular, portable and fixed receivers, the related propagation factors, the techniques employed in the digital sound broadcasting systems, and considers relevant planning parameters and sharing conditions.
- Mobile-satellite service (MSS), provides brief survey and introduction to the field of MSS.
- Supplement Number 1, 2, 3 and 4 to Handbook on Mobile-satellite service:
  - Supplement 1: Systems aspects of digital mobile Earth Station
  - Supplement 2: Methodology for the derivation of interference and sharing criteria for the Mobile-satellite services
  - Supplement 3: Interference and noise problems for maritime mobile-satellite systems using frequencies in the region of 1,5 and 1,6 GHz
  - Supplement 4: Technical aspects of coordination among mobile-satellite systems using the geostationary-satellite orbit

## **ITU-R Study Group 5 — Terrestrial services**

### **Scope**

Systems and networks for fixed, mobile, radiodetermination, amateur and amateur-satellite services.

### **Structure**

This Study Group was the result of the (RA-07) decision to merge all terrestrial services (except for broadcasting) into one single new Study Group, replacing the former Study Group 8 (mobile, radiodetermination, amateur and related satellite and services) and Study Group 9 (fixed services).

Four Working Parties (WPs) carry out the studies on Questions assigned to Study Group (SG) 5 and one Joint Task Group (JTG) conducts studies on WRC-15 Agenda items 1.1 and 1.2:

- WP 5A: Land mobile service above 30MHz (excluding IMT); wireless access in the fixed service; amateur and amateur-satellite services
- WP 5B: Maritime mobile service including the Global Maritime Distress and Safety System (GMDSS); the aeronautical mobile service and the radiodetermination service
- WP 5C: Fixed wireless systems; HF and other systems below 30 MHz in the fixed and land mobile services
- WP 5D: IMT systems
- JTG 4-5-6-7: WRC-15 Agenda items 1.1 and 1.2

### **Questions**

- Q.7-7/5: Characteristics of equipment for the land mobile service between 30 and 6 000 MHz
- Q.48-6/5: Techniques and frequency usage in the amateur service and amateur-satellite service
- Q.77-7/5: Consideration of the needs of developing countries in the development and implementation of IMT
- Q.209-4/5: Use of mobile, amateur, and amateur satellite services in support of disaster radiocommunications.
- Q.212-4/5: Nomadic wireless access systems including radio local area networks
- Q.215-4/5: Frequency bands, technical characteristics, and operational requirements for fixed wireless access systems in the fixed and/or land mobile services
- Q.229-3/5: Future development of the terrestrial component of IMT
- Q.230-3/5: Software-defined radios
- Q.235/5: Protection criteria for aeronautical and maritime systems
- Q.238-2/5: Mobile broadband wireless access systems
- Q.241-2/5: Cognitive radio systems in the mobile service
- Q.247-1/5: Radio-frequency arrangements for fixed wireless systems
- Q.248/5: Technical and operational characteristics for systems in the fixed service used for disaster mitigation and relief

- Q.250-1/5: Mobile wireless access systems providing telecommunications for a large number of ubiquitous sensors and/or actuators scattered over wide areas as well as machine to machine communications in the land mobile service
- Q.251/5: Technical and operational aspects of passive and active base station antennas for IMT systems
- Q.253/5: Fixed service use and future trends

All the ITU-R Questions assigned to Study Group 5 are published and available at: <http://www.itu.int/pub/R-QUE-SG05/>

## **Recommendations**

### **M series: Mobile, radiodetermination, amateur and related satellite services**

- M.819: International Mobile Telecommunications-2000 (IMT-2000) for developing countries
- M.1041: Future Amateur Radio Systems
- M.1042-3: Disaster communications in the amateur and amateur-satellite services
- M.1043-2: Use of the amateur and amateur-satellite services in the developing countries
- M.1044-2: Frequency sharing criteria in the amateur and amateur-satellite services
- M.1224: Vocabulary of terms for International Mobile Telecommunications (IMT)
- M.1637: Global cross-border circulation of radiocommunication equipment in emergency and disaster relief situations
- M.1826: Harmonized frequency channel plan for broadband public protection and disaster relief operations at 4 940-4 990 MHz in Regions 2 and 3
- M.2009: Radio interface standards for use by public protection and disaster relief operations in some parts of the UHF band in accordance with Resolution 646 (WRC-03)
- M.2015: Frequency arrangements for public protection and disaster relief radiocommunication systems in UHF bands in accordance with Resolution 646 (WRC-03)
- M.1457: Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2000 (IMT-2000)
- M.1579: Global circulation of IMT-2000 terrestrial terminals
- M.2012: Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications Advanced (IMT-Advanced)

### **F series: Fixed service**

- F.701: Radio frequency channel arrangements for analogue and digital point-to-multipoint radio systems operating in frequency bands in the range 1 350-2 690 GHz (1.5, 1.8, 2.0, 2.2, 2.4 and 2.6 GHz)
- F.1098: Radio frequency channel arrangements for fixed wireless systems in the 1 900-2 300 MHz range
- F.1105: Fixed wireless systems for disaster mitigation and relief operations
- F.1242: Radio frequency channel arrangements for digital radio systems operating in the range 1 350-1 530 MHz
- F.1243: Radio frequency channel arrangements for digital radio systems operating in the range 2 290-2 670 MHz

- F.755: Point-to-multipoint systems used in the fixed service
- F.1488: Frequency block arrangements for FWA systems in the range 3 400-3 800 MHz
- F.757: Basic system requirements and performance objectives for fixed wireless access using mobile-derived technologies offering basic telephony and data communication services
- F.1399: Vocabulary of terms for wireless access
- F.1400: Performance and availability requirements and objectives for fixed wireless access to public switched telephone network
- F.1401: Considerations for the identification of possible frequency bands for fixed wireless access and related sharing studies
- F.1402: Frequency sharing criteria between a land mobile wireless access system and fixed wireless access systems using the same equipment type as the mobile wireless access system
- F.1490: Generic requirements for fixed wireless access systems
- F.1500: Preferred characteristics of systems in the fixed service using high altitude platforms operating in the bands 47.2-47.5 GHz and 47.9-48.2 GHz
- F.1501: Coordination distance for systems in the fixed service involving high altitude platforms stations sharing the frequency bands 47.2-47.5 GHz and 47.9-48.2 GHz with other systems in the fixed service
- F.1111: Improved Lincompex systems for HF radiotelephone circuits
- F.1335: Technical and operational considerations in the phased transitional approach for bands shared between the mobile-satellite service and the fixed service at 2 GHz

### Reports

- M.1155: Adaptation of mobile radiocommunication technology to the needs of developing countries
- M.2033: Radiocommunication objectives and requirements for public protection and disaster relief
- M.2085: Role of the amateur and amateur-satellite services in support of disaster mitigation and relief
- M.2117: Software defined radio in the land mobile, amateur and amateur-satellite services
- M.2242: Cognitive radio systems specific for IMT systems
- M.2243: Assessment of the global mobile broadband deployments and forecasts for International Mobile Telecommunications

### Handbooks

- Digital Radio relay systems, this Handbook represents a comprehensive summary of basic principles, design parameters and current practices for the design and engineering of digital radio-relay systems.
- Land mobile (including wireless access), this Handbook provides an overview of principles and approaches to be considered in the evolution of existing and emerging systems towards IMT-2000.

- Volume 1: Fixed wireless Access
- Volume 2: Principles and approaches on evolution to IMT-2000/FPLMTS
- Deployment of IMT-2000 Systems.
- Land mobile (including wireless access), the purpose of this Handbook is to assist in the decision-making process involving planning, engineering and deployment of wireless-based land mobile systems, especially in developing countries.
  - Volume 1: Fixed wireless Access.
  - Volume 2: Principles and Approaches on Evolution to IMT-2000 FPLMTS.
  - Volume 3: Dispatch and Advanced Messaging Systems.
  - Volume 4: Intelligent Transport Systems.
  - Volume 5: Deployment of Broadband Wireless Access Systems.
- Amateur and Amateur-Satellite Services, this Handbook provides general information about the amateur and amateur-satellite services. It also includes a compendium of existing ITU texts of relevance to the amateur and amateur-satellite services.
- Frequency-adaptive communication system and networks in the MF/HF bands, this Handbook is published to assist planners and decision-makers in the deployment of adaptive MF/HF systems in the fixed service, for both commercial and government users in developed and particularly developing countries.
- Migration to IMT-2000 Systems
  - Supplement 1 to Deployment of IMT-2000 Systems.

## **ITU-R Study Group 6 — Broadcasting service**

### **Scope**

Radiocommunication broadcasting, including vision, sound, multimedia and data services principally intended for delivery to the general public.

Broadcasting makes use of point-to-everywhere information delivery to widely available consumer receivers. When return channel capacity is required (e.g. for access control, interactivity, etc.), broadcasting typically uses an asymmetrical distribution infrastructure that allows high capacity information delivery to the public with lower capacity return link to the service provider. This includes production and distribution of programmes (vision, sound, multimedia, data, etc.) as well as contribution circuits among studios, information gathering circuits (ENG, etc.) primary distribution to delivery nodes, and secondary distribution to consumers.

The Study Group, recognizing that radiocommunication broadcasting extends from the production of programmes to their delivery to the general public, as detailed above, studies those aspects related to production and radiocommunication, including the international exchange of programs as well as the overall quality of service.

### **Structure**

This Study Group was created by decision of the Radiocommunication Assembly 2000 to merge the former Study Group 10 (Sound broadcasting) and Study Group 11 (Television broadcasting) into one Study Group. The Radiocommunication Assembly of 2007 decided to transfer the RF spectrum and system aspects of the Broadcasting Satellite Service to Study Group 4.

Three Working Parties (WPs) carry out studies on Questions assigned to Study Group 6, and one Joint Task Group (JTG) conducts studies on WRC-15 Agenda items 1.1 and 1.2:

- WP 6A: Terrestrial broadcasting delivery
- WP 6B: Broadcast service assembly and access
- WP 6C: Programme production and quality assessment
- JTG 4-5-6-7: WRC-15 Agenda items 1.1 and 1.2

### **Questions**

ITU-D SG 2 Question 11 will cover all Questions of particular interest to the development sector. All the ITU-R Questions assigned to Study Group 6 are published and available at: <http://www.itu.int/pub/R-QUE-SG06/en>

### **Recommendations**

ITU-D SG 2 Question 11 will cover all recommendation of particular interest to the development sector.

- BT.1774-1: Use of satellite and terrestrial broadcast infrastructures for public warning, disaster mitigation and relief

### **Reports**

- BT.2140: Transition from Analogue to Digital terrestrial Broadcasting

## **Handbooks**

- Television systems used around the world
- Book of Antenna Diagrams
- Digital television signals, coding and interfacing within studios
- Subjective assessment methodology in television
- Technical specifications of ITU-R teletext systems
- HF Broadcasting system design
- LF/MF system design
- Digital terrestrial television broadcasting in the VHF/UHF bands
- Conclusions of the Extraordinary Meeting of Study Group 11 on High-Definition Television



## **ITU-R Study Group 7 — Science services**

### **Scope**

“Science services” refer to the standard frequency and time signal, space research (SRS), space operation, Earth exploration-satellite (EES), meteorological-satellite (MetSat), meteorological aids (MetAids) and radio astronomy (RAS) services.

The systems linked with Study Group 7 are used in activities that are a critical part of our everyday life such as:

- global environment monitoring – atmosphere (including greenhouse gases emissions), oceans, land surface, biomass, etc.;
- weather forecasting and climate change monitoring and prediction;
- detection and tracking of many natural and man-made disasters (earthquakes, tsunamis, hurricanes, forest fires, oil leaks, etc.);
- providing alerting/warning information;
- damage assessment and planning relief operations.

SG 7 also encompasses systems for the study of outer space:

- satellites for studying the sun, the magnetosphere and all the elements of our solar system;
- Earth and satellite-based radioastronomy to study the universe and its phenomena.

Study Group 7 develops ITU-R Recommendations, Reports and handbooks that are used for development and ensuring non-interference operation of space operation, space research, Earth-exploration and meteorological systems (including the related use of links in the inter-satellite service), radio astronomy and radar astronomy, dissemination, reception and coordination of standard-frequency and time-signal services (including the application of satellite techniques) on a worldwide basis.

### **Structure**

Four Working Parties (WPs) carry out studies on Questions assigned to Study Group 7, and one Joint Task Group (JTG) conducts related studies on WRC-15 Agenda items 1.1 and 1.2:

- WP 7A: Time signals and frequency standard emissions: Systems and applications (terrestrial and satellite) for dissemination of standard time and frequency signals
- WP 7B: Space radiocommunication applications: Systems for transmission/reception of telecommanded and tele-metry data
- WP 7C: Remote sensing systems: for space operation and for space research
- WP 7D: Radio astronomy: remote sensing systems and applications for earth exploration meteorology and planetary sensing
- JTG 4-5-6-7: WRC-15 Agenda items 1.1 and 1.2

### **Questions**

None due to the particular scope of this Study Group. All the ITU-R Questions assigned to Study Group 7 are published and available at: <http://www.itu.int/pub/R-QUE-SG07/en>

## Recommendations

### RS Series: Remote Sensing Systems

- RS.1859: Use of remote sensing systems for data collection to be used in the event of natural disasters and similar emergencies

## Handbooks

- Radio astronomy, this Handbook is concerned with aspects of radio astronomy relevant to frequency coordination, i.e. the management of radio spectrum usage in order to minimize interference between radiocommunication services. It covers areas such as radio astronomy characteristics, preferred frequency bands, special radio astronomy applications, vulnerability to interference from other services, as well as issues associated with the sharing of radio spectrum with other services.
- The selection and use of precise frequency and time systems, this Handbook describes basic concepts, frequency and time sources, measurement techniques, characteristics of various frequency standards, operational experience, problems and future prospects.
- Space research communications, this Handbook presents the basic technical and spectrum requirements for the many different space research programmes, missions and activities. It discusses space research functions and technical implementations, factors that govern frequency selection for space research missions, and space research protection and sharing considerations.
- Use of Radio Spectrum for Meteorology: Weather, Water and Climate Monitoring and prediction, this handbook was developed in cooperation with the Steering Group on Radio Frequency Coordination of the World Meteorological Organization (WMO) and provides comprehensive technical information on the use of radio-based devices and systems, including meteorological and Earth-exploration satellites, radiosondes, weather radars, wind profiler radars, spaceborne remote sensing for weather and climate monitoring and forecasting.
- Satellite Time and Frequency Transfer and Dissemination, this Handbook provides detailed information on the applied methods, technologies, algorithms, data structure and practical use of frequency and timing signals provided by satellite systems.
- Earth exploration satellite Service, this Handbook describes the Earth exploration-satellite service (EESS), its technical characteristics, its applications, its spectrum requirements, as well as its benefits and provides full and comprehensive information on the development of EESS systems. Specifically, it provides basic definitions, sheds light on the technical principles underlying the operation of systems and presents their main applications to assist administrations in the spectrum planning, engineering and deployment aspects of these systems.

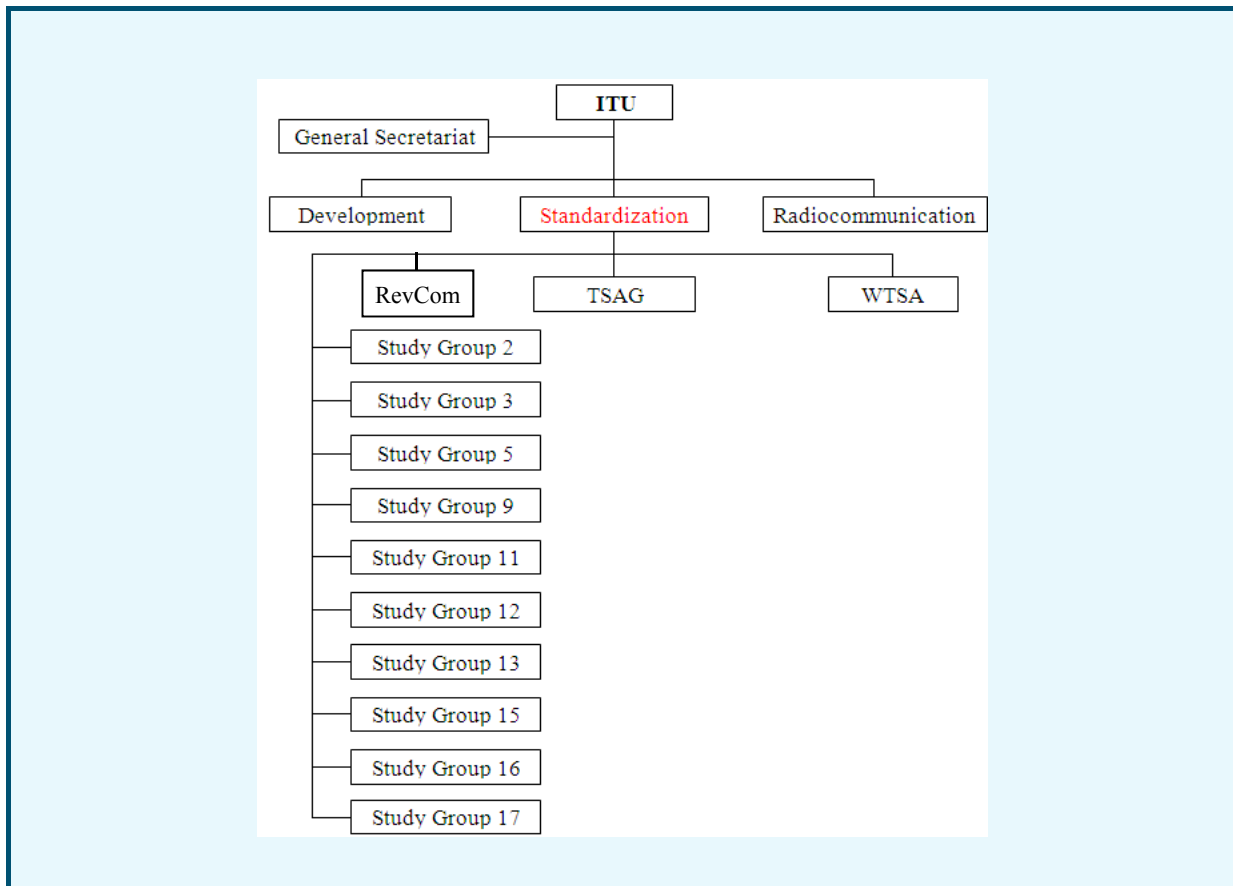
## Section 2: ITU-T Questions<sup>2</sup> of particular concern to developing countries

### ITU-T Mission

The ITU Standardization sector is one of the main ITU three sectors and it is the oldest sector. The ITU-T fulfils the purposes of the ITU relating to telecommunications standardization by studying technical, operating and tariff Questions and adopting on them relevant Recommendations with a view to standardizing telecommunications on a worldwide basis.

Today priority work areas include ensuring the needs of developing countries are taken into account in the roles of Standardization Sector; accessibility; adopting international standards to ensure seamless global communications and interoperability for next generation networks (NGN); building confidence and security in the use of ICTs; emergency communications to develop early warning systems and to provide access to communications during and after disasters and the reduction of the impact of ICTs on climate change as well as create better understanding of how ICTs can mitigate its effects.

### ITU-T Structure



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<sup>2</sup> For more detailed information, please consult: <http://www.itu.int/en/ITU-T/Pages/default.aspx>

## **ITU-T Publications**

A list of all ITU-T publications can be found at: <http://itu.int/en/ITU-T/publications>.

**ITU-T Recommendation** – An ITU-T Recommendation is a normative text approved under the Traditional Approval Process (TAP) of WTS Res. 1 (Revised, Dubai, 2012) or the Alternative Approval Process (AAP) of Rec. ITU-T A.8.

**ITU-T Supplement** – A Supplement is a non-normative text that contains material that is supplementary to and associated with the subject matter of one or more Recommendations but is not essential to their completeness or understanding and implementation.

**ITU-T Handbook** – A handbook is an ITU-T publication providing practical guidance on the application of one or more thematically related ITU-T Recommendations.

**ITU-T Technical Paper** – An ITU-T Technical Paper is a non-normative publication agreed by study groups. They contain technical information that provide early public access to current studies in the study group, or complement existing ITU-T Recommendations to further their understanding.

## **World Telecommunication Standardization Assembly**

The World Telecommunication Standardization Assembly is held every four years and defines the next period of study for ITU-T. The duties of the World Telecommunication Standardization Assembly are set forth in Article 18 of the ITU Constitution. Article 13 of the ITU Convention provides that the WTS shall be convened “to consider specific matters related to telecommunication standardization”.

The Assembly will also review working methods including approval processes, the work programme and the structure of Study Groups.

At its 2011 session (11-21 October), the ITU Council adopted [Resolution 1335](#) by which it resolved that the World Telecommunication Standardization Assembly (WTS-12) shall be convened, with the concurrence of a majority of the Member States, United Arab Emirates kindly hosted the last event in 2012. Preparations for WTS-12 took place throughout 2012 notably in regional preparatory meetings. WTS-12 maintained the ten ITU-T study groups and approved its mandates.

## **ITU-T Review Committee (RevCom)**

WTS-12 established the Review Committee with its [Resolution 82](#) with the core objective of reviewing the structure and working methods of ITU’s Telecommunication Standardization Sector (ITU-T) to ensure that ITU-T continues meeting the standardization needs of an evolving business environment.

The Review Committee will determine how ITU-T can best satisfy the growing demand for ICT standards tailored to the needs across a wide range of industry sectors, in particular energy utilities, transportation, financial services, healthcare and education.

In response to the accelerated rate of change in the global standardization landscape and the proliferation of standards development organizations, forums and consortia, a priority to the Review Committee will be the evaluation of the coordination and collaboration mechanisms that ITU-T maintains with other standards bodies.

The Review Committee will report regularly on its progress to TSAG and contribute to the preparation of ITU-T’s new strategic plan. The recommendations in the Review Committee’s final report will be discussed and acted upon by WTS-16.

The final report of the Review Committee to WTS-16 will also be provided to TSAG to assist in its preparations for the Assembly. In reporting the results of its studies, the committee will identify actions suitable for implementation in the near term, as well as possible actions to be submitted for the consideration of the ITU Plenipotentiary Conference.

To ensure global participation, the Review Committee works not only with ITU-T Study Groups but also with national and regional standards bodies.

### **ITU-T Workshops**

ITU-T organizes since 2001 a series of workshops and seminars, which are of great value to developing countries. The events cover a wide array of topics in the field of information and communication technologies (ICT) and attract high-ranking experts as speakers, and attendees from engineers to high-level management from all industry sectors.

In addition, ITU-T organizes standalone webinars and offers remote participation facilities for many of its workshops. In this way, remote participants can profit from audio, video, power point slides and the possibility to ask presenters questions. Archives are also made available.

For more information, please consult the following web sites:

- <http://itu.int/en/ITU-T/Workshops-and-Seminars>
- <http://itu.int/en/ITU-T/techwatch>

### **Telecommunication Standardization Advisory Group**

TSAG's work is to act as an advisory body to the study groups, membership and staff of ITU-T, keeping in mind the needs of all members, from developed and developing countries, and from industry and governments. It is responsible for the working procedures defined in the A-series Recommendations and the organization of the ITU-T work programme. It performs an extremely important function within ITU-T in following up on the implementation of the work programme and advising the Director of ITU-T's secretariat.

### **ITU-T Study Groups**

Standardization work is carried out by the technical Study Groups (SGs) in which representatives of the ITU-T membership develop Recommendations (standards) for the various fields of international telecommunications.

The SGs drive their work primarily in the form of study Questions. Each of these addresses technical studies in a particular area of telecommunication standardization. Each SG has a SG Chairman and a number of vice-chairmen appointed by the World Telecommunication Standardization Assembly (WTSA).

As a result of the last World Telecommunication Standardization Assembly (Dubai, 2012) the ten ITU-T Study Groups were maintained.

## **ITU-T Study Group 2 — Operational aspects of service provision and Telecommunications Management**

### **Scope**

Study Group 2 is the lead study group for service definition (including all types of mobile services) and for numbering and routing. Study Group 2 has a responsibility for creating principles of service and operational requirements, including billing and operational quality of service/network performance. Service principles and operational requirements are also developed by SG 2 for current and evolving technologies. Study Group 2 is also the lead study group on telecommunications for disaster relief/early warning, network resilience and recovery, and telecommunication management.

### **Responsible for studies relating to:**

- principles of service provision, definition and operational requirements of service emulation;
- numbering, naming, addressing and identification requirements and resource assignment including criteria and procedures for reservation, assignment and reclamation;
- routing and interworking requirements;
- human factors;
- operational and management aspects of networks, including network traffic management, designations, and transport-related operations procedures;
- operational aspects of interworking between traditional telecommunication networks and evolving networks;
- evaluation of feedback from operators, manufacturing companies and users on different aspects of network operation;
- management of telecommunication services, networks, and equipment via management systems, including support for next-generation networks (NGN) and the application and evolution of the telecommunication management network (TMN) framework;
- ensuring the consistency of the format and structure of IdM identifiers; and
- specifying interfaces to management systems to support the communication of identity information within or between organizational domains.

### **Specific areas of study**

- Lead study group for service definition, numbering and routing
- Lead study group on telecommunications for disaster relief/early warning, network resilience and recovery
- Lead study group on telecommunication management

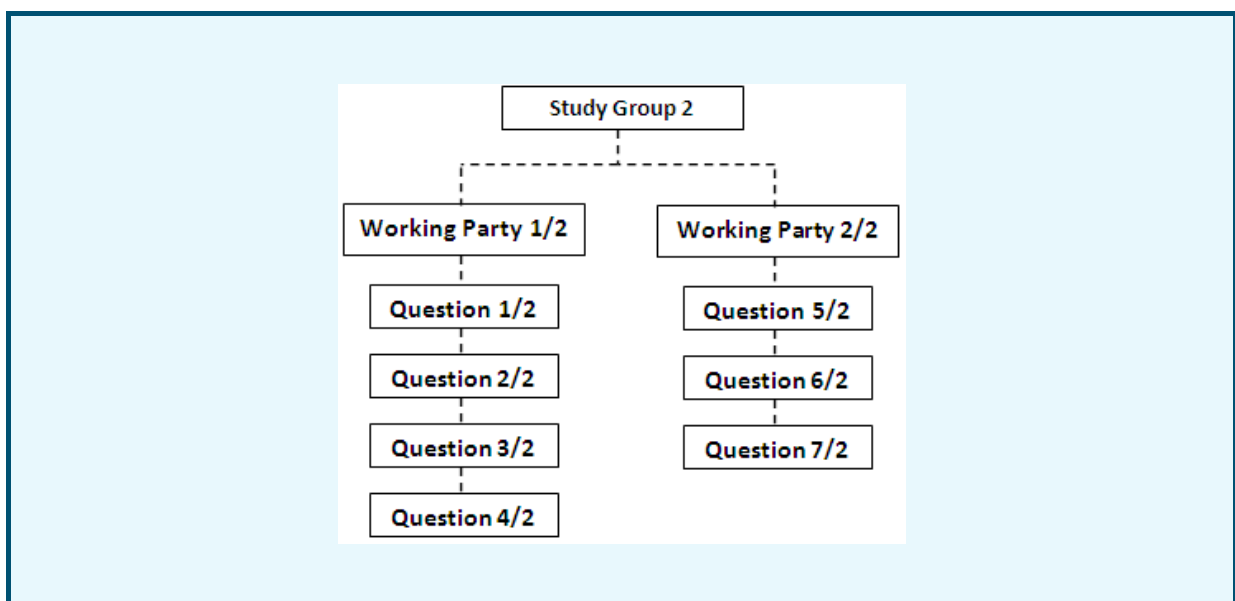
### **Aspects of interest to Developing Countries**

The following topics are of interest to developing countries:

- Calling Party Number Delivery (CPND), Calling Line Identification, Origin Identification (OI)
- E.164 Shared Country Codes (non-geographic resources)
- Globally Harmonized Numbers
- Numbering misuse

- Availability of routing information
- ENUM (Telephone number mapping)
- Emergency telecommunication Services and Cell Broadcast
- Telecommunication for Disaster Relief & Network Resilience and Recovery
- IP address allocation and facilitating the transition to and deployment of IPv6 as of WTSA Resolution 64
- Telecom Finance
- Accessibility and Human Factors

### Study Group 2 Structure



### Questions

The Questions under SG 2 were modified according to the outcomes of WTSA (Dubai, 2012) and the number of questions was reduced from 14 Questions to 7 Questions.

- Q1/2: Application of numbering, naming, addressing and identification plans for fixed and mobile telecommunications services (continuation of Q1/2 and Q6/2 (partially))
- Q2/2: Routing and interworking plan for fixed and mobile networks (continuation of Q2/2)
- Q3/2: Service and operational aspects of telecommunications, including service definition (continuation of Q3/2)
- Q4/2: Human factors related issues for improvement of the quality of life through international telecommunications (continuation of Q4/2)
- Q5/2: Requirements, priorities and planning for telecommunication management and OAM Recommendations (continuation of Q5/2, Q12/2 and Q13/2)
- Q6/2: Management Architecture and Security (continuation of Q6/2 (partially), Q8/2 and Q11/2 (partially))
- Q7/2: Interface specifications and specification methodology (continuation of Q7/2, Q9/2, Q10/2 and Q11/2 (partially))

## General Comments

- Pursuant to Resolution 182 (Guadalajara, 2010) regarding climate change and the protection of the environment, it was agreed that SG 2 meetings will be conducted paperless.
- Pursuant to Resolution 2 (Dubai, 2012), which guided both Study Group 2 and Study Group 3 to hold their meetings back-to-back, ITU-T SG 2 agreed to hold its meeting back-to-back with ITU-T SG 3.
- ITU-T SG 2 agreed to create an ad hoc group on developing country issues.
- ITU-T SG 2 agreed to continue the Service and Networks Operations group (SNO), under Q5/2.
- ITU-T SG 2 agreed to create an ad hoc group and an associated correspondence group to pursue the studies and the implementation of the parts of WTSA Resolution 64 relevant to SG 2.

## Recommendations

### **E series: Overall network operation, telephone service, service operation and human factor**

- E.101: Definitions of terms used for identifiers (names, numbers, addresses and other identifiers) for public telecommunication services and networks in the E-series Recommendations
- E.106: International Emergency Preference Scheme (IEPS) for disaster relief operations
- E.107: Emergency Telecommunications Service (ETS) and interconnection framework for national implementations of ETS
- E.117: Terminal devices used in connection with the public telephone service (other than telephone)
- E.118: The international telecommunication charge card
- E.121: Pictograms, symbols and icons to assist users of the telephone service
- E.123: Notation for national and international telephone numbers, e-mail addresses and Web addresses
- E.129: Presentation of national numbering plans
- E.135: Human factors aspects of public terminals for people with disabilities
- E.152: International free phone service
- E.153: Home country direct
- E.154: International shared cost service
- E.155: International shared cost service
- E.156: Guidelines for ITU-T action on reported misuse of E.164 number resources
- E.156 Suppl1: Best practice guide on countering misuse of E.164 number resources (Approved 2007)
- E.156 Suppl2: Possible Actions to counter misuse (Approved 2011)
- E.157: International Calling Party Number Delivery
- E.161: Arrangement of digits, letters and symbols on telephones and other devices that can be used for gaining access to a telephone network
- E.161.1: Guidelines to select Emergency Number for public telecommunications networks



- E.162: Capability of seven digit analysis for international E.164 numbers at time T
- E.164: The international public telecommunication numbering plan (and Supplements 1,2,3,4,5,6) (amended and approved in 2010)
- E.164.1: Criteria and procedures for the reservation, assignment and reclamation of E.164 country codes and associated identification codes (ICs)
- E.164.2: E.164 numbering resources for trials
- E.164.3: Principles, criteria and procedures for the assignment and reclamation of E.164 country codes and associated identification codes for groups of countries
- E.165.1: Use of escape code '0' within the E.164 numbering plan during the transition period to implementation of number plan interworking (NPI) mechanism
- E.166/X.122: Numbering plan interworking for the E.164 and X.121 numbering plans
- E.168: Application of E.164 numbering plan for UPT
- E.168.1: Assignment procedures for universal personal telecommunications (UPT) numbers in the provisioning of the international UPT service
- E.169: Application of E.164 numbering plan for universal international numbers for international telecommunications services using country codes for global service
- E.169.1: Application of Recommendation E.164 numbering plan for universal international freephone numbers for international freephone service
- E.169.2: Application of Recommendation E.164 numbering plan for universal international premium rate numbers for the international premium rate service
- E.169.3: Application of Recommendation E.164 numbering plan for universal international shared cost numbers for the international shared cost service
- E.190: Principles and responsibilities for the management, assignment and reclamation of E-Series international numbering resources
- E.191: B-ISDN addressing
- E.191.1: Criteria and procedures for the allocation of the ITU-T International Network Designator addresses
- E.193: E.164 country code expansion
- E.195: ITU-T international numbering resource administration
- E.212: Network operational principles for future public mobile systems and services

**F series: Non-telephone telecommunication services**

- F.16: Global virtual network services
- F.902: Interactive services design guidelines
- F.910: Procedures for designing, evaluating and selecting symbols, pictograms and icons

**M series: Telecommunication management, including TMN and network maintenance**

- M.60: Maintenance terminology and definitions
- M.2100: Performance limits for bringing-into-service and maintenance of international PDH paths, sections and transmission systems

*Q9-3/2: Identification of study topics in the ITU-T and ITU-R study groups which are of particular interest to developing countries*

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- M.2101.1: Performance limits for bringing-into-service and maintenance of international SDH paths and multiplex sections
- M.2110: Bringing-into-service of international PDH paths, sections and transmission systems and SDH paths and multiplex sections
- M.3000: Overview of TMN Recommendations
- M.3010: Principles for a Telecommunications Management Network
- M.3013: Considerations for Telecommunication Management Network
- M.3600: Principles for the management of ISDNs
- M.3610: Principles for applying the TMN concept to the management of B-ISDN
- M.3020 Management interface specification methodology

#### **Related Groups**

- ITU-T SG 2 Regional Group for the Arab Region (SG2-RG-ARB)
- ITU-T SG 2 Regional Group for East Africa (SG2RG-EA)
- ITU-T SG 2 Regional Group for the Americas (SG2RG-AMR)
- [Joint Coordination Activity on Accessibility and Human Factors \(JCA-AHF\)](#)
- Focus Group on Disaster Relief Systems, Network Resilience and Recovery (FG-DR&NRR)

#### **Handbooks**

- Instructions for the international telephone service
- Quality of service & network performance

## ITU-T Study Group 3 — Tariff and accounting principles including related telecommunication economic and policy issues

### Scope

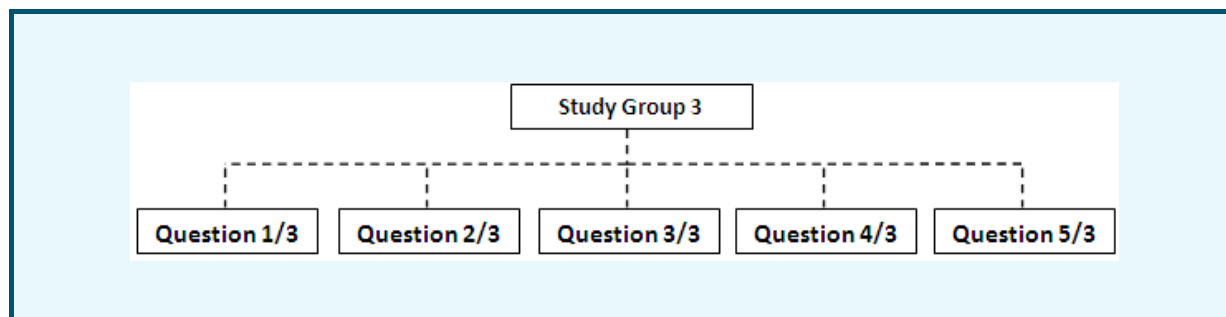
Study Group 3 provides a unique global forum to improve the understanding of the financial and economic aspects associated with the growth of ICT, particularly with respect to the shift to IP-based and NGN/Future Networks and the exponential rise in mobile wireless communications. Key traditional mandates of SG 3, which date back to the early days of the Union, include interconnection, the improvement of daily operations and the settlement of accounts.

### Responsible for studies relating to:

Study Group 3 is responsible for studies related to tariff and accounting principles for international telecommunications services and study of related telecommunication economic and policy issues. Study Group 3 is mandated to foster collaboration among its Members with a view to the establishment of rates at level as low as possible consistent with an efficient service and taking into account the necessity for maintaining independent financial administration of telecommunication a sound basis.

The needs of developing countries are an important focus of the group. In particular, an Ad-Hoc Group on developing country issues meets at every meeting of SG 3. In addition, regional groups play a key role across the globe for the development of regional tariff policy and cost models: there are 4 regional groups for SG 3, namely SG3RG-AFR (Africa), SG3RG-AO (Asia and Oceania), SG3RG-ARB (Arab Region), and SG3RG-LAC (Latin America and the Caribbean). These regional groups meet at least once a year and are preceded by tutorials and seminars on costs and tariffs, in collaboration with the ITU-D.

### Study Group 3 Structure



### Questions

- Q1/3: Development of charging and accounting/settlement mechanisms for international telecommunications services using the Next Generation Networks (NGNs) and any possible future development, including adaptation of existing D-series Recommendations to the evolving user needs
- Q2/3: Development of charging and accounting/settlement mechanisms for international telecommunications services, other than those studied in Question 1/3, including adaptation of existing D-series Recommendations to the evolving user needs
- Q3/3: Study of economic and policy factors relevant to the efficient provision of international telecommunication services
- Q4/3: Regional studies for the development of cost models together with related economic and policy issues

- Q5/3: Terms and definitions for Recommendations dealing with tariff and accounting principles

## **Recommendations**

### **D series: General tariff principles**

- D.000: Terms and definitions for the D-series Recommendations (Approved in 2010)
- D.50: International Internet connection (Amended and approved in 2011)
- D.50 Supp1: General Considerations for traffic measurement and options for International Internet Connectivity (approved in 2011)
- D.50 Supp2: Guidelines for reducing the costs of international internet connectivity (approved, 2013)
- D.98: Charging in International Mobile Roaming Service (Approved in 2012)
- D.120: Charging and accounting principles for the automated telephone credit card service
- D.140: Accounting rate principles for international telephone services
- D.155: Guiding principles governing the apportionment of accounting rates in the intercontinental telephone relations
- D.170: Minimum amounts recommended for queries relating to monthly accounts, in the absence of a specific agreement (and Supplements 1,2,3 & 4) (Approved in 2010)
- D.170 Supp5: Guidelines for Fraud Mitigation (Approved in 2013)
- D.190: Exchange of international traffic accounting data between Administrations using electronic data interchange (EDD) techniques
- D.195: Time-scale for settlement of accounts for international telecommunication services (approved in 2012)
- D.195 Supp1: Credit Management Guidelines (approved in 2013)
- D.195 Supp2: DSO Management Guidelines (approved in 2013)
- D.195 Supp3: Prepayment Guidelines (approved in 2013)
- D.201: General principles regarding call-back practices
- D.300R: Determination of accounting rate shares in telephone relations between countries in Europe and the Mediterranean Basin
- D.301R: as D.300R, but for telex
- D.302R: as D.300R, but for telegrams
- D.303R: as D.300R, but for circuits of sound and television programme transmission
- D.306R: as D.300R, but for public-switched data transmission network
- D.307R: Remuneration of digital systems and channels used in telecommunication relations between the countries of Europe and the Mediterranean Basin
- D.310R: Determination of rentals for the lease of international programme (sound and television) circuits and associated control circuits for the private service in relation between countries in Europe and the Mediterranean basin
- D.400R: Accounting rates applicable to direct traffic relations in voice telephony between countries in Latin America and the Caribbean

- D.500R: Accounting rates applicable to telephone relations between countries in Asia and Oceania
- D.501R: The same as D.500R, but for telex
- D.600R: Determination of accounting rate shares and collection charges in telephone relations between countries in Africa (revision)
- D.601R: The same as D.600R but for telex relations
- D.602R: The same as D.600R but for application of "sender pays transit" principle in transit relations
- D.603R: Minimizing collection charges on inter African calls
- D.604R: Preferential rates in telecommunication relations between countries in Africa

**E series: Overall network operation, telephone service, service operation and human factors**

- E.231/D.103: Charging in automatic service for calls terminating on a recorded announcement stating the reason for the call not being completed
- E.232/D.104: Charging for calls to subscriber's station connected either to the absent subscriber's service or to a device substituting a subscriber in his absence

**Related Groups**

- [Regional Group for Asia and Oceania](#)
- [Regional Group for Africa](#)
- [Regional Group for the Arab Region](#)
- [Regional Group for Latin America and the Caribbean](#)

**Handbooks**

- Costing methodologies

## **ITU-T Study Group 5 — Environment and Climate Change**

### **Scope**

The name and the mandate of Study Group 5 were changed by the Telecommunication Standardization Advisory Group “TSAG” in April 2009 from “Protection against electromagnetic environment effects” to be called “ Environment and Climate Change” and the Last WTSA (Dubai,2012) approved the new Title and the mandate of SG 5.

Study Group 5 is the ITU-T Study Group responsible for studies on methodologies for evaluating the ICT effects on climate change and publishing guidelines for using ICTs in an eco-friendly way. Under its environmental mandate SG 5 is also responsible for studying design methodologies to reduce environmental effects, for example recycling of ICT facilities and equipment.

In addition SG 5 has four main objectives. The first is to protect telecommunication equipment and installations against damage and malfunction due to electromagnetic disturbances, the second is to ensure safety of personnel and users of networks against current and voltages used in telecommunication networks, the third is to avoid health risks from electromagnetic fields (EMF) produced by telecommunication devices and installations, and finally the fourth is to guarantee a good quality of service (QoS) for high speed data services by providing requirements on characteristics of copper cables and on the coexistence of services delivered by different providers.

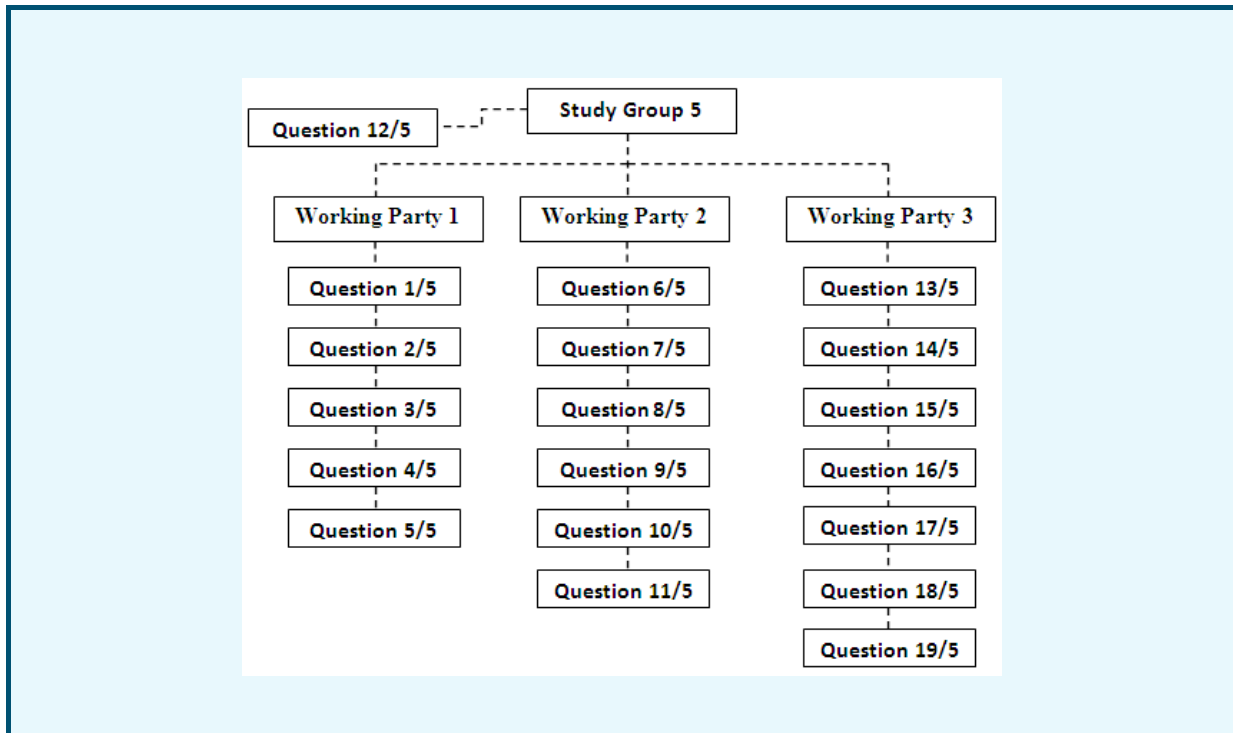
### **Responsible for studies relating to:**

- Study Group 5 is responsible for studying ICT environmental aspects of electromagnetic phenomena and climate change.
- Responsible for studies relating to protection of telecommunication networks and equipment from interference and lightning.
- Also responsible for studies related to electromagnetic compatibility (EMC), to safety and to health effects connected with electromagnetic fields produced by telecommunication installations and devices, including cellular phones.
- Responsible for studies on the existing copper network outside plant and related indoor installations.
- Responsible for studies on methodologies for assessing the environmental impact of ICT, publishing guidelines for using ICTs in an eco-friendly way, tackling e-waste issues, and energy efficiency of the power feeding system.
- Responsible for studies on how to use ICT to help countries and the ICT sector to adapt to the effects of environmental challenges, including climate change.
- It is also identifying the needs for more consistent and standardised eco-friendly practices for the ICT sector (e.g. labelling, procurement practices, eco-rating schemes for mobile phones).

### **Specific areas of study**

- Lead study group on electromagnetic compatibility and electromagnetic effects
- Lead Study Group on ICTs and climate change

## Study Group 5 Structure



## Questions

- Q1/5: Copper cables, networks and fibre-optic connection hardware for broadband access
- Q2/5: Protective components and assemblies
- Q3/5: Interference to telecommunication networks due to power systems and electrified railway systems
- Q4/5: Resistibility and safety in telecommunications
- Q5/5: Lightning protection and earthing of telecommunication systems
- Q6/5: EMC issues arising from the convergence of IT and communication equipment
- Q7/5: Human exposure to electromagnetic fields (EMFs) due to radio systems and mobile equipment
- Q8/5: EMC issues in home networks
- Q9/5: Generic and product family EMC recommendations for telecommunication equipment
- Q10/5: Security of telecommunication and information systems concerning the electromagnetic environment
- Q11/5: EMC requirements for the information society
- Q12/5: Guides and terminology on environment and climate change
- Q13/5: Environmental impact reduction including e-waste
- Q14/5: Setting up a low-cost sustainable telecommunication infrastructure for rural communications in developing countries
- Q15/5: ICTs and adaptation to the effects of climate change

- Q16/5: Leveraging and enhancing the ICT environmental sustainability
- Q17/5: Energy efficiency for the ICT sector and harmonization of environmental standards
- Q18/5: Methodologies for the assessment of environmental impact of ICT
- Q19/5: Power feeding systems

## **Recommendations**

### **K series: Protection against interference**

- K.25: Protection of optical fibre cables
- K.39: Risk assessment of damages to telecommunication sites due to lightning discharges
- K.40: Protection against LEMP in telecommunication centres
- K.46: Protection of telecommunication lines using metallic symmetric conductors against lightning induced surges (Amended and approved in 2012)
- K.47: Protection of telecommunication lines using metallic conductors against direct lightning discharges (Amended and approved in 2012)
- K.56: Protection of radio base stations against lightning discharges (Amended and approved in 2010)
- K.54: Conducted immunity test method and level at fundamental power frequencies
- K.57: Protection measures for radio base stations sited on power line towers (Approved)
- K.50: Safe limits of operating voltages and currents for telecommunication systems powered over the network (Approved)
- K.51: Safety criteria for telecommunication equipment (Approved)
- K.64: Safe working practices for outside equipment installed in particular environments (Approved)
- K.11: Principles of protection against over voltages and over currents
- K.36: Selection of protective devices
- K.71: Protection of customer antenna installations (Approved in 2011)
- K83: Monitoring of EMF levels (Approved)
- K.87: Guide for the application of electromagnetic security requirements (Approved in 2011)
- K.70: Mitigation techniques to limit human exposure to EMFs in the vicinity of radiocommunication stations (Approved)
- K.ntt: Protection of neighborhood of telecommunication towers against lightning (Under Study)
- K.tot: Lightning protection and earthing total solution for Radio Base station site (Under Study)

### **L series: construction, installation and protection of cables and other elements of outside plant**

- L.1000: Universal power adapter and charger solution for mobile terminals and other hand-held ICT devices (approved)



- L.1001: External universal power adapter solutions for stationary information and communication technology devices (approved)
- L.1100: Procedure for recycling rare metals in information and communication technology goods (approved)
- L.1200: Direct current power feeding interface up to 400 V at the input to telecommunication and ICT equipment (approved)
- L.1300: Best practices for green data centres (approved)
- L.1310: Energy efficiency metrics and measurement methods for telecommunication equipment (approved)
- L.1400: Overview and general principles of methodologies for assessing the environmental impact of information and communication technologies (approved)
- L.1410: Methodology for the assessment of the environmental impact of information and communication technology goods, networks and services (approved)
- L.1420: Methodology for energy consumption and greenhouse gas emissions impact assessment of information and communication technologies in organizations (approved)
- L.1430: Methodology for assessment of the environmental impact of information and communication technology greenhouse gas and energy projects (approved)
- L.recBat: Recycling of discarded batteries (under Study)
- L.UPA portable: Universal Power Adapter for portable ICT equipment (under study)
- L.Infrastructure and adaptation: Recommendations to support adaptation to climate change and the ICT infrastructure to the impacts of climate change (under Study)
- L.Green Batteries: Green battery solution for mobile phones and other ICT devices (under study)
- L.Eco\_rating: Development of a Recommendation for eco-specifications and rating criteria for mobile phones eco-rating programs (under study)
- L.AssDC: Data center infrastructure energy efficiency assessment methodology concerning environmental and working conditions (under study)
- L.broad\_impact: Environmental impact assessment of broadcasting services (under study)

### **Related Groups**

- [Study Group 5 Regional Group for Africa \(SG5 RG-AFR\)](#)
- [Study Group 5 Regional Group for the Arab Region \(SG5 RG-ARB\)](#)
- [Study Group 5 Regional Group for the Americas \(SG5 RG-AMR\)](#)
- [Study Group 5 Regional Group for Asia and the Pacific \(SG5 RG-AP\)](#)
- [Focus Group on Smart Sustainable Cities \(FG-SSC\)](#)
- [Focus Group on Smart Water Management \(FG-SWM\)](#)
- [Joint Co-ordination Activity on ICT and climate change \(JCA-ICT&CC\)](#)

### **Handbooks**

- CCITT Directives concerning the protection of telecommunication lines against harmful effects from electrical power and electrified railway, and its volumes

- Mitigation Handbook
- Earthing and bonding Handbook
- Application of surge protective devices
- Guide to the use of ITU-T publications produced by SG 5 aimed at achieving electromagnetic compatibility and safety
- Interference measuring techniques
- Terminology Handbook
- Human exposure to EMF
- Over voltage protection guide

#### **Technical Papers**

- Environmental sustainability in outside plant and ICT equipment – facilities
- Life-cycle management of ICT equipment
- Setting up a low cost sustainable telecommunications infrastructure for rural communications for developing nations
- Life-cycle management of ICT equipment (under study)

#### **Supplements**

- L Suppl.1 ITU-T L.1310 – Supplement on energy efficiency for telecommunication equipment
- Assessment case studies using L.1410 (under study)
- Supplement to L.ICT projects for RNS projects (under study)

## ITU-T Study Group 9 — Television and sound transmission and integrated broadband cable networks

### Scope

ITU-T Study Group 9 carries out studies on the use of telecommunication systems for broadcasting of television and sound programs and furthermore the use of CATV networks to provide interactive video services, telephone and data services, including Internet access. Recent studies focus on the future of cable systems which are being studied by the Focus Group on SmartCable Television (FG SmartCable). Developing countries will benefit by SG 9 Recommendations to implement their cable networks.

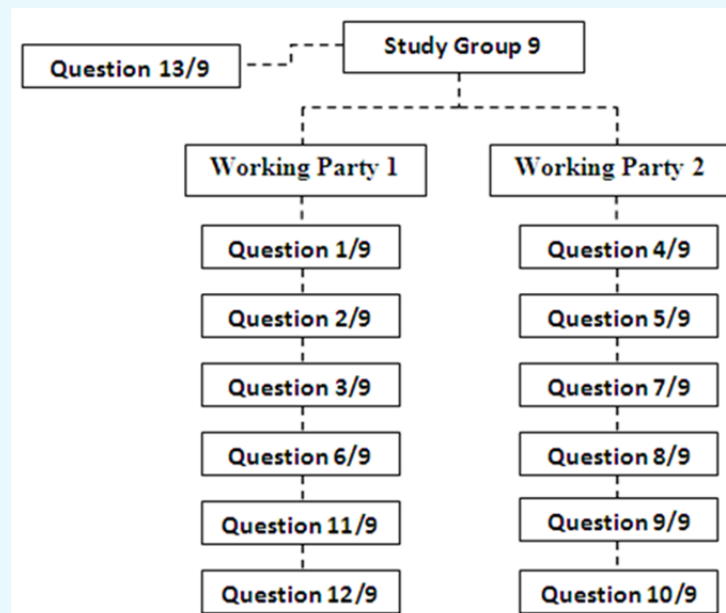
### Responsible for studies relating to:

- The use of telecommunication systems for contribution, primary distribution and secondary distribution of television, sound programmes and related data services including interactive services and applications, extendable to advanced capabilities such as ultra-high definition television, 3D television, etc.;
- The use of cable and hybrid networks, primarily designed for television and sound programme delivery to the home, as integrated broadband networks to also carry voice or other time-critical services, video-on-demand, interactive services, etc. to home and enterprise customer premises equipment (CPE).

### Specific areas of study

- Lead study group on integrated broadband cable and television networks

### Study Group 9 Structure



## Questions

- [Q13/9](#) Work programme, coordination and planning (continuation of Q14/9)
- [Q2/9](#) Measurement and control of the end-to-end quality of service (QoS) for advanced television technologies, from image acquisition to rendering, in contribution, primary distribution and secondary distribution networks
- [Q3/9](#) Methods and practices for conditional access, protection against unauthorized copying and against unauthorized redistribution ("redistribution control" for digital cable television distribution to the home)
- [Q4/9](#) Software components application programming interfaces (APIs), frameworks and overall software architecture for advanced content distribution services within the scope of Study Group 9
- [Q5/9](#) Functional requirements for residential gateway and set-top box for the reception of advanced content distribution services
- [Q6/9](#) Digital programme delivery controls for multiplexing, switching and insertion in compressed bit streams
- [Q7/9](#) Cable television delivery of digital services and applications that use Internet protocol (IP) and/or packet-based data
- [Q8/9](#) The IP enabled multimedia applications and services for cable television networks enabled by converged platforms
- [Q9/9](#) Requirements for advanced service capabilities for broadband cable home networks
- [Q10/9](#) Requirements, methods, and interfaces of the advanced service platforms to enhance the delivery of sound, television, and other multimedia interactive services over cable television network
- [Q11/9](#) Transmission of multichannel analogue and/or digital television signals over optical access networks
- [Q12/9](#) Objective and subjective methods for evaluating perceptual audiovisual quality in multimedia services within the terms of Study Group 9

Question 11-3/2 will cover any Question under ITU-T SG 9 of particular interest to the Development sector.

## Recommendations

All the Recommendations of this Study Groups are addressed to the Industry for manufacturing. They can be accessed at: [http://www.itu.int/ITU-T/recommendations/index\\_sg.aspx?sg=9](http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=9).

## Related Groups

- [Focus Group on Smart Cable Television](#) (FG SmartCable)
- [Focus Group on Machine-to-Machine Service layer](#) (FG M2M)
- [Joint Coordination Activity on Smart Grid and Home Networking](#) (JCA-SG&HN)
- [Joint Coordination Activity on Internet of Things](#) (JCA-IoT)
- [Internet of Things Global Standards Initiative](#) (IoT-GSI)

*Q9-3/2: Identification of study topics in the ITU-T and ITU-R study groups which are of particular interest to developing countries*

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- [IPTV Global Standards Initiative](#) (IPTV-GSI)
- [IPTV Joint Co-ordination Activity](#) (IPTV-JCA)
- [Video Quality Experts Group \(VQEG\)](#)
- [Intersectoral Rapporteur Group \(IRG\) on audiovisual quality assessment \(IRG-AVQA\)](#) [on-going establishment]

## **ITU-T Study Group 11 — Signalling requirements, protocols and test specifications**

### **Scope**

Study Group 11 is the 'signalling and protocols' group within ITU-T. It produces ITU-T Recommendations that define how telephone calls and other calls such as data calls are handled in the network. Study Group 11 is home to Signalling System 7 (SS7), which paved the way for the efficient operation of international telecommunication networks and is currently engaged in standardizing software-defined networking (SDN) as well as machine-to-machine (M2M) communications.

Conformance and Interoperability (C&I) studies are taken in high consideration by SG 11. The research of SG 11 in C&I area encompasses the development of requirements and the relevant test suites for different key areas like: NGN, USN, IoT, QoS/QoE/NP, benchmarking, ICT services, etc. Following SG 11's latest results and activities in the testing area, SG 11 was designated by WTSA-12 Lead Study Group on test specifications, conformance and interoperability testing, responsible for implementation of the ITU C&I Programme. In addition, SG 11 was agreed as a parent group for the joint coordination activity on conformance and interoperability testing (JCA-CIT).

The outcomes of SG 11 on C&I are directed to assist developing countries in implementing ICT equipment, at national and international level, which will be compatible with the existing operator's infrastructure and will be fully compliant with ITU-T Recommendations. A living list of key technologies which are suitable for C&I testing are being maintained by SG 11, which is also looking for several projects on conformity against ITU-T Recommendations.

All related information will be distributed among all interested parties via the [C&I Portal](#) including the relevant ITU Databases (TLs Database and ICT Product conformity Database).

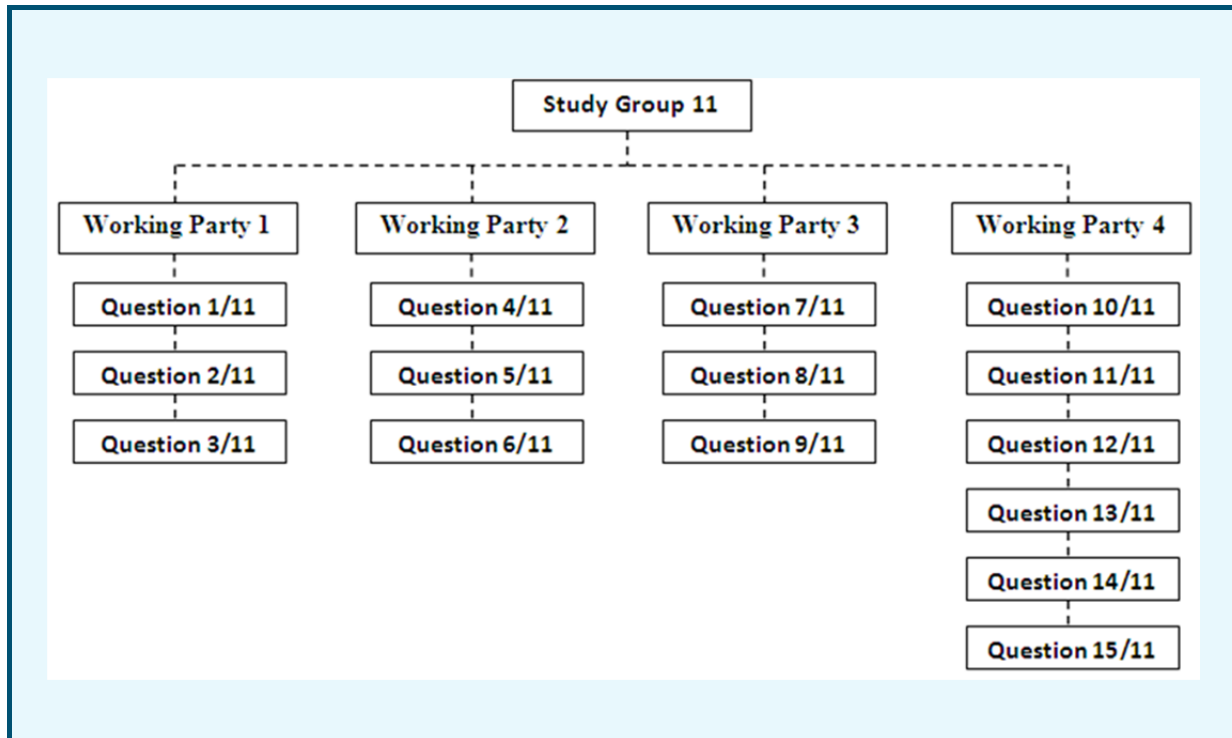
### **Responsible for studies relating to**

Responsible for studies relating to signalling requirements and protocols, including those for IP-based network technologies, next-generation networks (NGN), machine-to-machine (M2M) communication, Internet of things (IoT), future networks (FNs), cloud computing, mobility, some multimedia-related signalling aspects, ad hoc networks (sensor networks, radio-frequency identification (RFID), etc.), quality of service (QoS), and inter-network signalling for legacy networks (e.g. ATM, N-ISDN and PSTN). In addition, studies relating to reference signalling architectures and test specifications for NGN and emerging network technologies (e.g. IoT etc.).

### **Specific areas of study**

- Lead study group on signalling and protocols
- Lead study group on machine-to-machine (M2M) signalling and protocol
- Lead study group on test specifications, conformance and interoperability testing

## Study Group 11 Structure



## Questions

Most of the Questions are addressing signalling requirements and protocols including the support of bearer independent call control (BICC). The related Recommendations are relevant to manufacturing.

Question 8/11 is specifically addressed to developing countries. As networks and protocols in packet-based networks are evolving, the progress achieved by various international standardization bodies has led to the emergence of different solutions to address convergence and interoperability. Many developing countries have expressed their needs for assistance in understanding how the various ITU-T recommendations can be used. Guidelines are needed to assist ITU Members in deciding on deployment strategies in relation to new networks and services and Q8/11 addresses these needs.

Questions 10/11 to 15/11 are focusing on Conformance and Interoperability (C&I) testing under WP4/11. Question 11/11 has a coordination role and might particularly interesting for Developing Countries.

- [Q1/11](#) Signalling and protocol architectures in emerging telecommunication environments
- [Q2/11](#) Signalling requirements and protocols for service and application in emerging telecommunication environments
- [Q3/11](#) Signalling Requirements and Protocol for Emergency Telecommunications
- [Q4/11](#) Signalling requirements and protocols for Bearer and Resource control in emerging telecommunication environments
- [Q5/11](#) Protocol procedures relating to services provided by Broadband Network Gateways
- [Q6/11](#) Protocol procedures relating to specific services over IPv6
- [Q7/11](#) Signalling and control requirements and protocols for network attachment supporting multi-screen service, future networks, and M2M
- [Q8/11](#) Guidelines for implementations of signalling requirements and protocols

- [Q9/11](#) Protocols supporting distributed, smart service networking and end-to-end multicast
- [Q10/11](#) Service and networks benchmarking measurements
- [Q11/11](#) Protocols and networks test specifications; frameworks and methodologies
- [Q12/11](#) Internet of things test specifications
- [Q13/11](#) Monitoring parameters for protocols and emerging networks
- [Q14/11](#) Cloud interoperability testing
- [Q15/11](#) Testing as a service (TAAS)

## **Recommendations**

### **Q series: Switching and signalling**

- Q.9: Vocabulary of switching and signalling terms
- Q.13: International telephone routing plan
- Q.500: Digital local, combined, transitional international exchanges – introduction and field of application
- Q.55: Transmission – characteristics of digital exchanges
- Q.601: Interworking of signalling systems – general
- Q.700: Introduction to CCITT signalling
- Q.933: Digital subscriber signalling
- Q.1000: Structure of the Q.1000 – series Recommendations for public land mobile networks
- Q.1200-Series: Intelligent Network
- Q.1900-Series: Bearer Independent Call Control
- Q.2931: Digital subscriber signalling system
- Q.3900: Methodology of testing and model network architecture for NGN technical means testing in the model and operators networks
- Q.3901: Distribution of tests and services for NGN technical means testing in the model and operate Networks
- Q.3903: Formalized presentation of testing results

## **Technical Papers**

- [Impacts of M2M communications and non-M2M mobile data applications on mobile networks](#)

## **Related Groups**

- [Focus Group on Machine-to-Machine Service layer](#) (FG M2M)
- [IoT Global Standards Initiative](#) (IoT-GSI)
- [IPTV Global Standards Initiative](#) (IPTV-GSI)
- [NGN Global Standards Initiative](#) (NGN-GSI)
- [IoT Joint Coordination Activity](#) (JCA-IoT)
- [NGN Joint Coordination Activity](#) (JCA-NGN)



- [IPTV Joint Coordination Activity](#) (JCA-IPTV)
- [Conformance and Interoperability Testing Joint Coordination Activity](#) (JCA-CIT)
- [Cloud Computing Joint Coordination Activity](#) (JCA-Cloud)
- [Identity Management Joint Coordination Activity](#) (JCA-IdM)
- [Home Networking Joint Coordination Activity](#) (JCA-HN)
- Software-Defined Networking Joint Coordination Activity (JCA-SDN)

#### **Handbooks**

- Deployment of packet-based networks
- Handbook on testing
- Guidelines for preparing and conducting field trials of digital switching equipments
- ISDN field trial guidelines

## ITU-T Study Group 12 — Performance, QoS and QoE

### Scope

In the ITU-T, Study Group 12 is the Lead SG on quality of service and quality of experience as well as driver distraction and voice aspects of car communications, a role that is increasingly important with the advent of commercial VoIP and packet-based next generation networks and terminals. SG 12 recent achievements include several new and revised standards on the planning and deployment of IP-based networks.

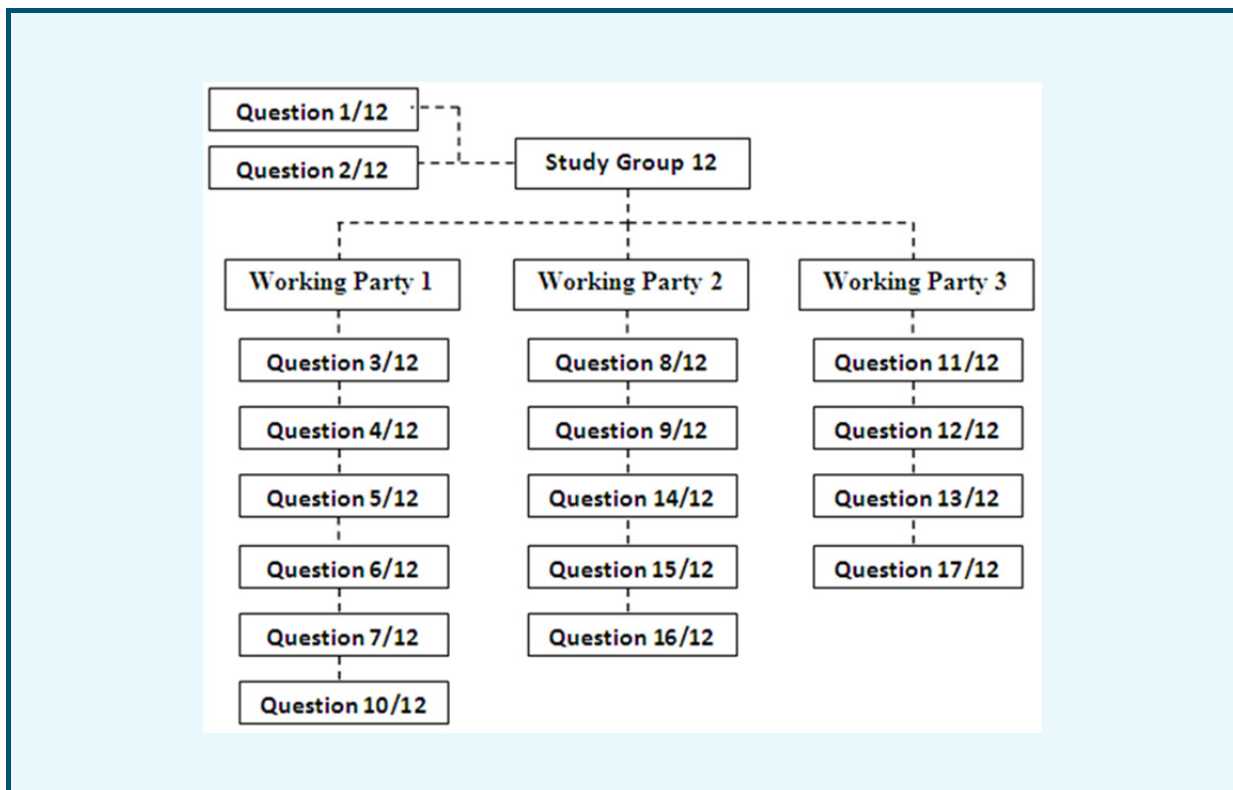
### Responsible for studies relating to

Responsible for Recommendations on performance, quality of service (QoS) and quality of experience (QoE) for the full spectrum of terminals, networks and services ranging from speech over fixed circuit-based networks to multimedia applications over networks that are mobile and packet based. Included in this scope are the operational aspects of performance, QoS and QoE; the end-to-end quality aspects of interoperability; and the development of multimedia quality assessment methodologies, both subjective and objective.

### Specific areas of study

- Lead study group on quality of service and quality of experience
- Lead study group on driver distraction and voice aspects of car communications

### Study Group 12 Structure



### Questions

- Q1/12: SG 12 work programme and QoS/QoE coordination in the ITU T (Continuation of a part of Question 1/12)

- Q2/12: Definitions, guides and frameworks related to QoS/QoE (Continuation of a part of Question 1/12)
- Q12/12: Operational aspects of telecommunication network service quality (Continuation of Q12/12)

### **Recommendations**

#### **G series: Transmission systems and media, digital systems and networks**

- G.113: Transmission impairments due to speech processing
- G.175: Transmission planning for private/public network interconnection of voice traffic
- G.177: Transmission planning for voiceband services over IP connections

#### **Y series: Global information infrastructure, Internet protocol aspects and next-generation networks**

- Y.1545: Roadmap of Quality of Service of Interconnected Networks using Internet Protocol

#### **Technical Papers**

- GSTP-CSS – The composite source signal as a measuring signal and a summary of various investigations on speech echo cancellers
- [Objective Perceptual Assessment of Video Quality: Full Reference Television](#)
- [How to increase QoS/QoE of IP-based platform\(s\) to regionally agreed standards](#)

#### **Related Groups**

- [Quality of Service Development Group](#) (QSDG)
- [Regional Group of SG12 on QoS for the Africa Region](#)
- [Internet Protocol Television - Global Standards Initiative](#) (IPTV-GSI)

NOTE – The following groups recently concluded their activities:

- FG CarCOM: [Focus Group on Car Communication](#) (concluded in March 2013)
- FG Distraction: [Focus Group on Driver Distraction](#) (concluded in March 2013)
- NGN – Global Standards Initiative (GSI)

#### **Handbooks**

- Quality of service and network performance
- Practical procedures for subjective testing
- Handbook on Telephony

## **ITU-T Study Group 13 — Future networks including cloud computing, mobile and Next Generation Networks**

### **Scope**

Study Group 13 leads ITU's work on standards for next generation networks (NGN), mobility management, future networks, cloud computing and software-defined networking.

Of particular interest for the developing countries might be the work on migration scenarios to NGN and their enhancements, IMT and IMS implementation, m-commerce, e-health, u-farming, energy efficiency of networks and emergency communication.

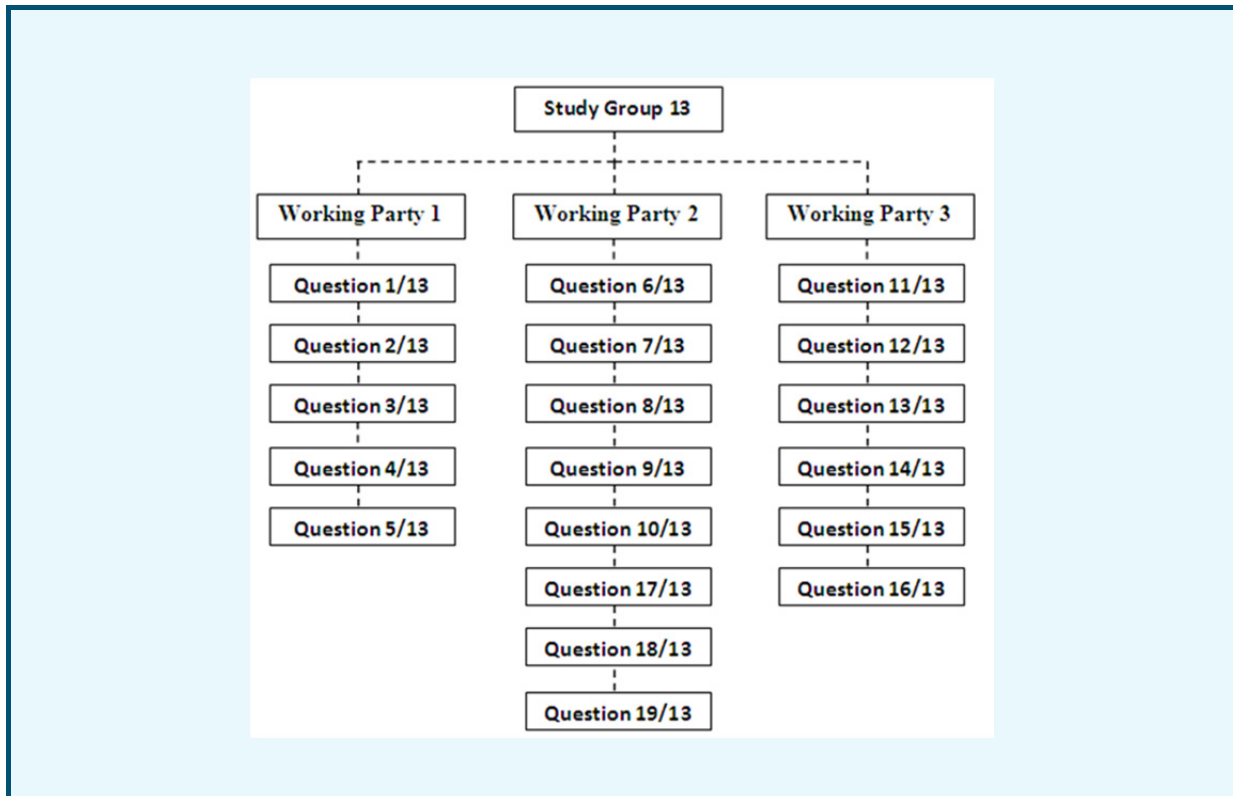
### **Responsible for studies relating to**

Study Group 13 is for studies relating to the requirements, architectures, capabilities and mechanisms of future networks, including studies relating to service awareness, data awareness, environmental awareness and socio-economic awareness of future networks. Responsible for studies relating to cloud computing technologies such as virtualization, resource management, reliability and security. Responsible for studies relating to network aspects of Internet of things (IoT) and network aspects of mobile telecommunication networks, including International Mobile Telecommunications (IMT) and IMT-Advanced, wireless Internet, mobility management, mobile multimedia network functions, internetworking and enhancements to existing ITU-T Recommendations on IMT. Also responsible for studies relating to NGN/IPTV enhancements, including requirements, capabilities, architectures and implementation scenarios, deployment models, and coordination across study groups.

### **Specific areas of study**

- Lead study group on future networks
- Lead study group on mobility management and NGN
- Lead study group on cloud computing
- Lead study group on software-defined networking

## Study Group 13 Structure



## Questions

- Q1/13: Service scenarios, deployment models and migration issues based on convergence services (Continuation of Question 24/13)
- Q2/13: Requirements for NGN evolution (NGN-e) and its capabilities including support of IoT and use of software-defined networking (Continuation of Question 3/13). Q2/13 works on e-health.
- Q5/13: Applying IMS and IMT in developing country mobile telecom networks (Continuation of Question 15/13)
- Q8/13: Security and identity management in evolving managed networks (including software-defined networking) (Continuation of Question 16/13)
- Q11/13: Evolution of user-centric networking, services, and interworking with networks of the future including Software-Defined Networking (Continuation of Question 12/13 and part of Q21/13)
- Q16/13: Environmental and socio-economic sustainability in future networks and early realization of FN (Continuation of part of Question 21/13 and part of Question 12/13)

## NOTES:

- Most of SG 13 Questions are relevant to the NGN and FN.
- SG 13 according to mandate given by WTSA-12 also conducts studies related to Cloud Computing and SDN.

## Recommendations

### Y series: Global information infrastructure, Internet protocol aspects and next-generation networks

- Y.2001: General overview of NGN
- Y.2011: General principles and general reference model for next generation networks
- Y.2262: PSTN/ISDN emulation and simulation towards NGN
- Y.2060: overview of Internet of Things
- Y.2205: Next Generation Networks: Emergency Telecommunications – Technical Considerations
- Y.2111: Resource and admission control functions in next generation networks
- Y.2112: A QoS control architecture for Ethernet-based IP access networks
- Y.2171: Admission control priority levels in Next Generation Networks
- Y.2172: Service restoration priority levels in Next Generation Networks
- Y.2174: Distributed RACF architecture for MPLS networks
- Y.2175: Centralized RACF architecture for MPLS core networks
- Y.3001: Future Networks: Objectives and Design goals
- And Y.3000-family Recommendations

### Technical Papers

- [Migration scenarios from legacy networks to NGN in developing countries \(2013\)](#)
- How to increase QoS/QoE of IP based Platform (2013)
- Mobility Management in ITU-T: Its Current development and Next Steps Heading Towards Future Networks (2013)
- Multiconnection (2012)

### Relevant Groups

- [ITU-T SG13 Regional Group for Africa \(SG13RG-AFR\)](#), established by WTS-12 (Dubai)
- [Focus Group on Smart Grid \(FG Smart\)](#)
- [Focus Group on Smart Cable Television \(FG SmartCable\)](#)
- [Focus Group on Bridging the Gap: from Innovation to Standards \(FG Innovation\)](#)
- [Focus Group on Disaster Relief Systems, Network Resilience and Recovery \(FG-DR&NRR\)](#)
- [Focus Group on M2M Service Layer \(FG M2M\)](#)
- [Joint Coordination Activity on Cloud Computing \(JCA-Cloud\)](#)
- [IPTV Joint Coordination Activity \(JCA-IPTV\)](#)
- [IDM - Joint Coordination Activity for Identity Management \(JCA-IdM\)](#)
- [Internet Protocol Television - Global Standards Initiative \(IPTV-GSI\)](#)
- [Internet of Things Global Standards Initiative \(IoT-GSI\)](#)
- Software-Defined Networking Joint Coordination Activity (JCA-SDN)

### **Handbooks**

- Future Networks (2012)
- Deployment of IMT-2000 Systems (2003 and its 2nd edition under consideration)
- Converging Networks (2010)

## **ITU-T Study Group 15 — Networks, technologies and infrastructures for transport, access and home**

### **Scope**

The international standards (ITU-T Recommendations) produced by Study Group 15 detail technical specifications giving shape to global communication infrastructure. The group's standards define technologies and architectures of optical transport networks enabling long-haul global information exchange; fibre- or copper-based access networks through which subscribers connect; and home networks connecting in-premises devices and interfacing with the outside world.

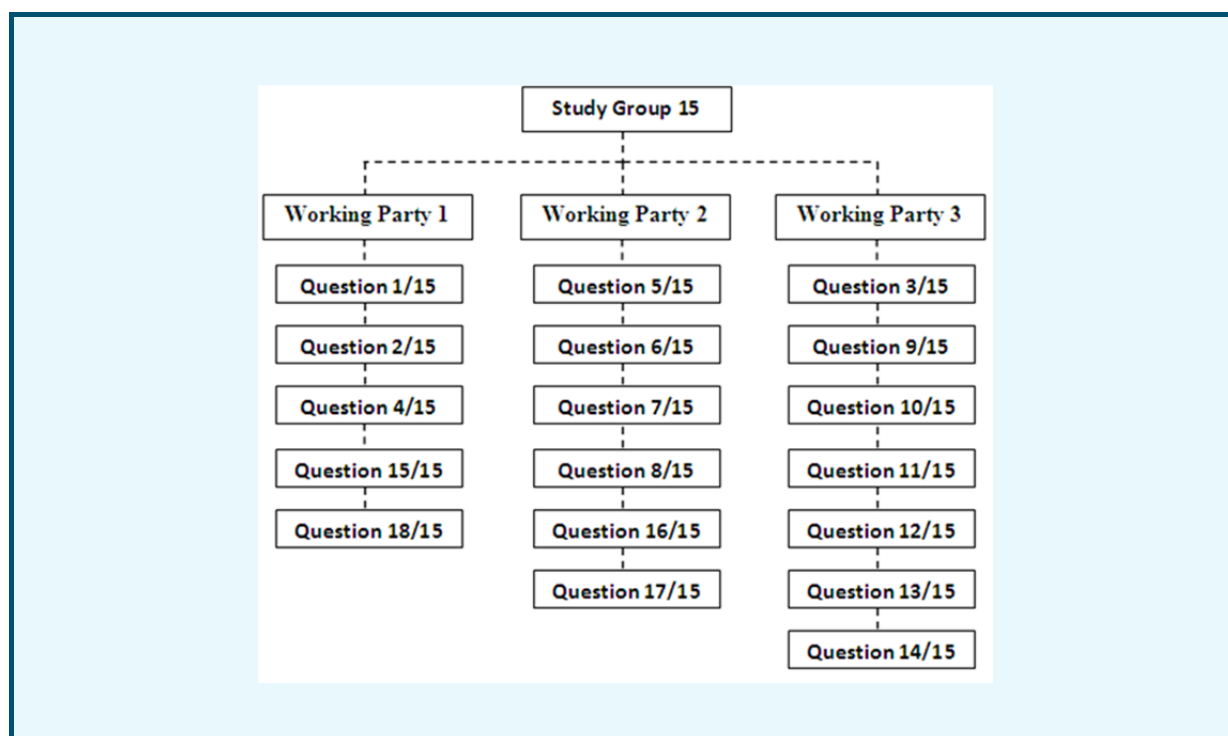
ITU-T Study Group 15 is responsible for the development of standards on optical transport network, access network, home network and power utility network infrastructures, systems, equipment, optical fibres and cables, and their related installation, maintenance, management, test, instrumentation and measurement techniques, and control plane technologies to enable the evolution toward intelligent transport networks, including the support of smart-grid applications. This encompasses the development of related standards for the customer premises, access, metropolitan and long-haul sections of communication networks, as well as for power utility networks and infrastructures from transmission to load.

### **Specific areas of study**

- Lead study group on access network transport
- Lead study group on optical technology
- Lead study group on optical transport networks
- Lead study group on smart grid



## Study Group 15 Structure



### Questions

- Q1/15: Coordination of Access and Home Network Transport standards (continuation of Q1/15)
- Q2/15: Optical systems for fibre access networks (continuation of Q2/15)
- Q5/15: Characteristics and test methods of optical fibres and cables (continuation of Q5/15)
- Q6/15: Characteristics of optical systems for terrestrial transport networks (continuation of Q6/15)
- Q7/15: Characteristics of optical components and subsystems (continuation of part of Q7/15)
- Q8/15: Characteristics of optical fibre submarine cable systems (continuation of Q8/15)
- Q13/15: Network synchronization and time distribution performance (continuation of Q13/15 and Q15/15)
- Q15/15: Communications for Smart Grid (continuation of Q4c/15)
- Q17/15: Maintenance and operation of optical fibre cable networks (continuation of Q17/15)

### Recommendations

#### G series: Transmission systems and media, digital systems and networks

- G.981: PDH optical fibre systems for the local network
- G.983.1: Broadband optical access systems based on Passive Optical Networks (PON)
- G.983.2: ONT management and control interface specification for ATM PON
- G.650.1: Definitions and test methods for liner, deterministic attributes of single-mode fibre and cable

- G.650.2: Definitions and test methods for statistical and non-linear related attributes of single-mode fibre and cable
- G.653: Characteristics of a dispersion-shifted single-mode optical fibre cable
- G.654: Characteristics of a cut-off shifted single-mode optical fibre cable
- G.655: Characteristics of a non-zero dispersion shifted single-mode optical fibre cable
- G.982: Optical access networks to support services up to ISDN primary rate or equivalent bit rates
- G.692: Optical interfaces for multichannel systems with optical amplifiers
- G.958: Digital line systems based on the synchronous digital hierarchy for use on optical fibre cables
- G.957: Optical interfaces for equipment and systems relating to the SDH
- G.971: General features of optical fibre submarine cable systems
- G.972: Definition of terms relevant to optical fibre submarine cable systems
- G.783: Characteristics of synchronous digital hierarchy (SDH) equipment functional blocks
- G.841: Types and characteristics of SDH network protection architectures

**O series: Specifications of measuring equipment**

- O.1: Scope and application of measurement equipment specifications covered in the O-series Recommendations
- O.33: Automatic equipment for rapidly measuring stereophonic pairs and monophonic sound programme circuits, links and connections
- O.41: Psophometer for use on telephone-type circuits
- O.133: Equipment for measuring the performance of PCM encoders and decoders
- O.150: General requirements for performance measurements on digital transmission equipment
- O.181: Equipment to assess performance on STM-N interfaces
- O.191: Equipment to assess ATM layer cell transfer performance
- O.201: Q-factor test equipment to estimate the transmission performance of optical channels.

**L series: Construction, installation and protection of cables and other elements of outside plant**

- L.38: Use of trenchless techniques for the construction of underground infrastructure for telecommunication cable installation
- L.51: Passive node elements for fibre optic networks, General principles and definitions for characterization and performance evaluation
- L.92: Disaster Management for outside plant facilities

### **Technical Papers**

- [Applications of ITU-T G.9960, ITU-T G.9961 transceivers for Smart Grid applications: Advanced metering infrastructure, energy management in the home and electric vehicles](#)
- [Wireline broadband access networks and home networking](#)
- [Guide on the use of ITU-T L-series Recommendations](#)

### **Relevant Groups**

N/A

### **Handbooks**

- Quality of Service and network performance
- Transmission planning guide
- Outside plant technologies for public networks
- Protection of telecommunication buildings from fire
- Optical fibre system planning guide
- Optical fibres for telecommunications

## **ITU-T Study Group 16 — Multimedia coding, systems and applications**

### **Scope**

Study Group 16 leads the ITU-T work on multimedia (MM) coding, terminals, systems and applications, including the coordination of the studies among the various ITU-T SGs. It is also the lead study group for ubiquitous applications (“e-everything”, such as e-health and e-business), and for telecommunication/ICT accessibility for persons with disabilities.

SG 16 is active in all aspects of MM standardization, including terminals, architecture, protocols, security, mobility, interworking and quality of service. It focuses its studies on telepresence and conferencing systems; IPTV; directory services; speech, audio and visual coding; PSTN modems and interfaces; facsimile terminals; ICT accessibility, etc.

As more services and systems become transport-agnostic, an increasing number of them are defined on the higher network layers, which is the standardization domain of ITU-T SG 16. This consideration is of particular for cross-sector standardization topics, such as IoT, e-health and e-government.

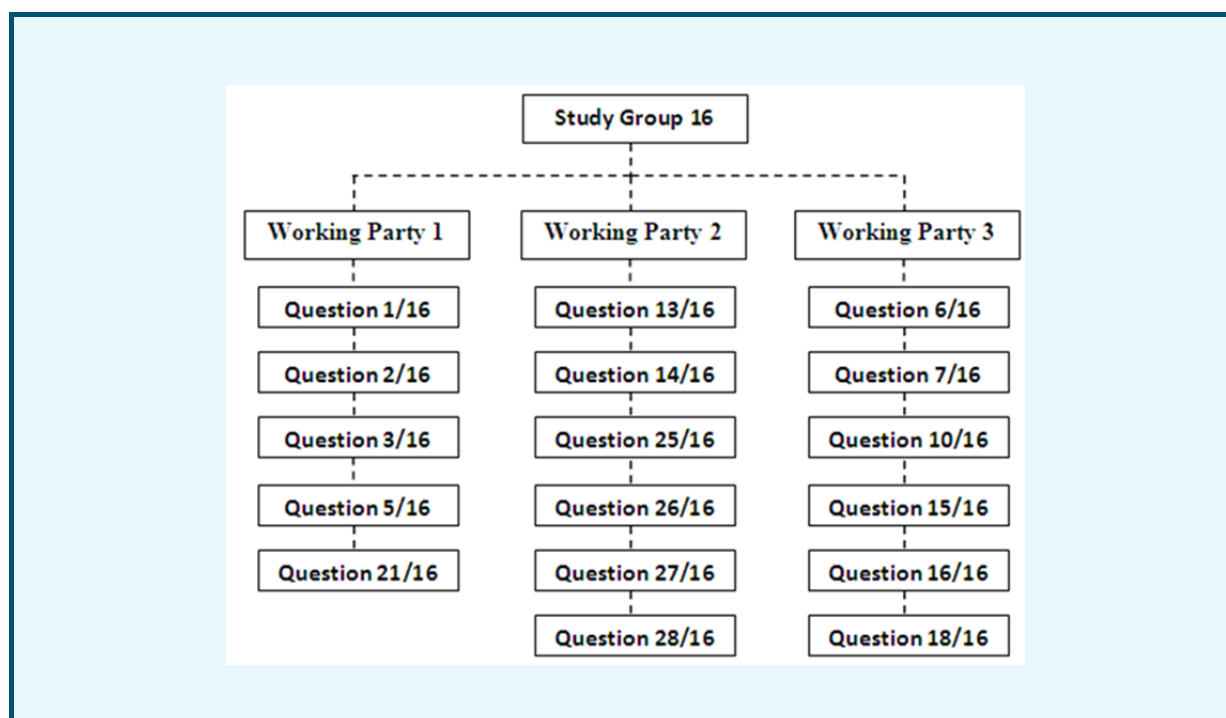
### **Responsible for studies relating to**

Responsible for studies relating to ubiquitous applications, multimedia capabilities for services and applications for existing and future networks, (including NGN and beyond). This encompasses accessibility, multimedia architectures, terminals, protocols, signal processing, media coding and systems (e.g. network signal processing equipment, multipoint conference units, gateways and gatekeepers).

### **Specific areas of study**

- Lead study group on multimedia coding, systems and applications
- Lead study group on ubiquitous and Internet of things (IoT) 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 IPTV

## Study Group 16 Structure



### Questions

- Q1/16: Multimedia systems, terminals and data conferencing (continuation of Q1/16)
- Q2/16: Packet-based conversational multimedia systems and functions (continuation of Q2/16, Q4/16 and Q12/16)
- Q5/16: Telepresence systems (continuation of Q5/16)
- Q7/16: Media coding (continuation of Q7/16)
- Q20/16: Multimedia coordination (continuation of Q20/16)
- Q21/16: Multimedia framework, applications and services (continuation of Q21/16, Q22/16, Q24/16)
- Q25/16: IoT applications services (continuation of Q25/16)
- Q26/16: Accessibility to multimedia systems and services (continuation of Q26/16)
- Q27/16: Vehicle gateway platform for telecommunication/ITS services/applications (continuation of Q27/16)
- Q28/16: Multimedia framework for e-health applications (continuation of Q28/16)

### Recommendations

#### F series: Non-telephone telecommunication services

- F.700: Framework Recommendation for audiovisual/multimedia services
- F.721: Videotelephony teleservice for ISDN
- F.723: Videophone service in the Public Switched Telephone Network (PSTN)
- F.742: Service description and requirements for distance learning services

- F.743: Requirements and service description for visual surveillance
- F.744: Service description and requirements for ubiquitous sensor network middleware
- F.745: Functional requirements for network-based speech-to-speech translation services
- F.746: Requirements of multimedia optimization control components
- F.747.1: Capabilities of ubiquitous sensor networks for supporting the requirements of smart metering services
- F.747.2: Deployment guidelines for ubiquitous sensor network applications and services for mitigating climate change
- F.747.3: Requirements and functional model for ubiquitous network robot platform to support USN applications and services
- F.790: Telecommunications accessibility guidelines for older persons and persons with disabilities

#### **H series: Audiovisual and multimedia systems**

- H.222.0: Information technology – Generic coding of moving pictures and associated audio information: System
- H.310: Broadband audiovisual communication systems and terminals
- H.320: Narrow-band visual telephone systems and terminal equipment
- H.321: Adaptation of H.320 visual telephone terminals to B-ISDN environments
- H.323: Packet-based multimedia communications systems
- H.248 series: Media gateway protocol (80+ Recommendations)
- H.262: MPEG2 Video compression
- H.264: Advanced Video Coding for generic audiovisual services
- H.265: High-efficiency video coding
- H.700 series for IPTV
- H Series supplement 1 Requirements on video communication for sign language and lip reading

#### **T series: Terminals for telematic services**

- T.30 series for fax protocol (PSTN and IP)
- T.80 series for JPEG and JBIG image compression
- T.140: General presentation protocol for text conversation
- T.134: Text conversation in the T120 data conferencing environment
- T.800 series for JPEG 2000 image compression
- T.830 series for JPEG XR image compression

#### **V series: Data communication over the telephone network**

- V.18: Harmonization of text telephony
- V.151: Procedures for the end-to-end connection of analogue PSTN text telephones over an IP network utilizing text relay
- V.152: Procedures for supporting voice-band data over IP networks

ITU-D Question 14 will continue covering all relevant activities, in particular for e-Health applications.

### Technical Papers

- Advanced Multimedia Systems (AMS)
  - [HSTP-AMSR - AMS Requirements](#)
- Audio and speech coding
  - [GSTP-ACP1 – Selection Test Results for G.718 Baseline and Qualification Phase Test Results for G.729.1](#)
  - [GSTP-G7291 – Performance of ITU-T G.729.1](#)
  - [GSTP-GSAD – Generic Sound Activity Detector](#)
  - [GSTP-GVBR – Performance of ITU-T G.718](#)
  - [GSTP-G.711AppIII – Performance of ITU-T G.711 Appendix III \(Audio quality enhancement toolbox\)](#)
- E-Health and telemedicine
  - [FSTP-RTM – Roadmap for Telemedicine](#)
- Firewall and NAT Traversal Problems in H.323 Systems
  - [HSTP-FNTP – Firewall and NAT Traversal Problems in H.323 Systems](#)
  - [HSTP-NFWT – Requirements for Network Address Translator and Firewall Traversal of H.323 Multimedia Systems](#)
- H.323 Multimedia mobility
  - [HSTP-H.510M – Usage of the H.510 protocol for the support of H.323 based Multimedia Services within GPRS/IMT2000 networks](#)
  - [HSTP-MMSM – Technical Paper on Service Mobility for new Multimedia Service Architecture](#)
- IPTV
  - [HSTP-MCTB – Media coding toolbox for IPTV: Audio and video codecs](#)
  - [HSTP-CONF-H.701 – Conformance testing specification for H.701](#)
  - [HSTP-CONF-H721 – Conformance testing specification for H.721](#)
  - [HSTP-CONF-H.761 – Conformance testing specification for H.761](#)
  - [HSTP-CONF-H762 – Conformance testing specification for H.762](#)
  - [HSTP-CONF-H770 – Conformance testing specification for H.770](#)
  - [HSTP-IPTV-AISC – Access to Internet-sourced contents](#)
  - [HSTP-IPTV-ISPF – IPTV retail service provider model](#)
  - HSTP-IPTV-PITD – Delivery and control protocols handled by IPTV terminal devices
- Telecommunications Accessibility
  - [FSTP-TACL – Telecommunications Accessibility Checklist](#)

### **Relevant Groups**

- [Focus Group on Audiovisual Media Accessibility](#) (FG AVA)
- [Focus Group on Disaster Relief Systems, Network Resilience and Recovery](#) (FG-DR&NRR)
- [Focus Group on M2M Service Layer](#) (FG M2M)
- [Global Standards Initiative on Internet of Things \(IoT-GSI\)](#)
- [Global Standards Initiative on IPTV](#) (IPTV-GSI)
- [Joint Coordination Activity on Cloud Computing](#) (JCA-Cloud)
- [Joint Coordination Activity on Internet of Things](#) (JCA-IoT)

### **Handbooks**

- GSAD test methodology Handbook



## **ITU-T Study Group 17 — Security**

### **Scope**

Within ITU-T, Study Group 17 coordinates security-related work across all study groups. SG 17 is the Lead study group on security, identity management (IdM) and languages and description techniques.

### **Responsible for studies relating to**

Responsible for building confidence and security in the use of information and communication technologies (ICTs). This includes studies relating to cybersecurity, security management, countering spam and identity management. It also includes security architecture and framework, protection of personally identifiable information, and security of applications and services for the Internet of things, smart grid, smartphone, IPTV, web services, social network, cloud computing, mobile financial system and telebiometrics. Also responsible for the application of open system communications including directory and object identifiers, and for technical languages, the method for their usage and other issues related to the software aspects of telecommunication systems, and for conformance testing to improve quality of Recommendations.

### **Specific areas of study**

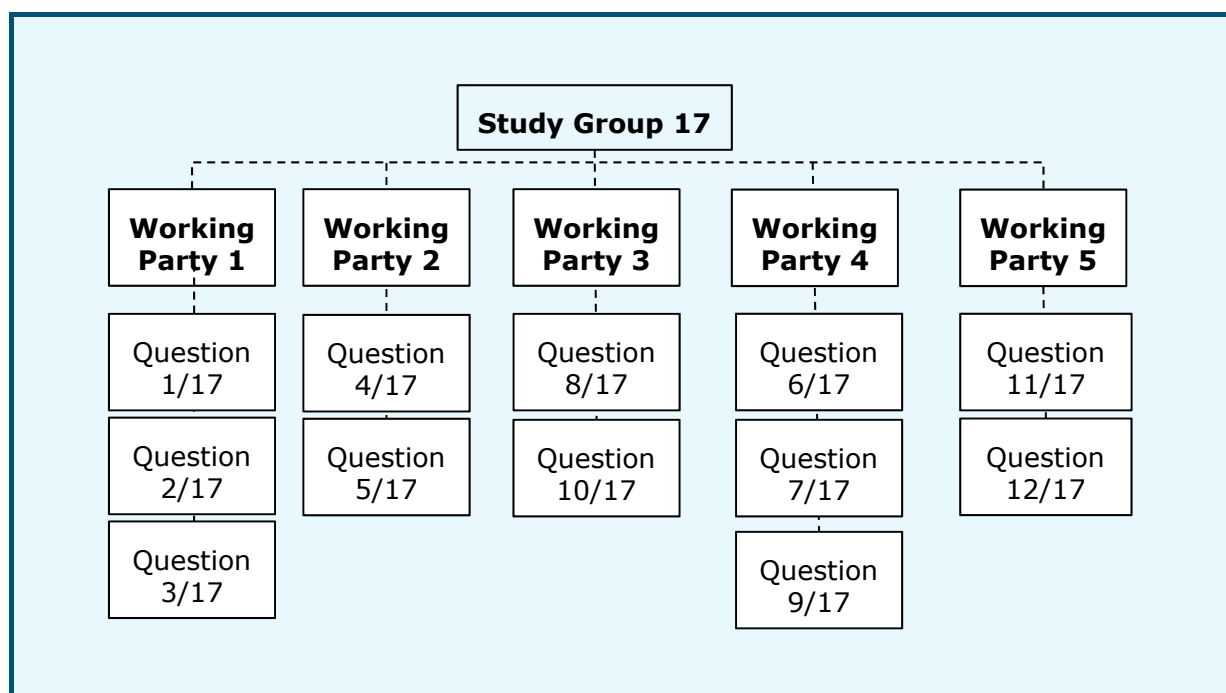
- Lead study group on security
- Lead study group on identity management (IdM)
- Lead study group on languages and description techniques

### **Aspects of interest to Developing Countries**

While all activities of SG 17 are of potential interest to developing countries, the following topics are believed to be of particular interest:

- Security architecture,
- Cybersecurity,
- Countering spam,
- Cloud computing security,
- Identity management, and
- Child online protection.

## Study Group 17 Structure



## Questions

- Q1/17: Telecommunication/ICT security coordination (Continuation of Q1/17)
- Q2/17: Security architecture and framework (Continuation of Q2/17)
- Q3/17: Telecommunication information security management (Continuation of Q3/17)
- Q4/17: Cybersecurity (Continuation of Q4/17)
- Q5/17: Countering spam by technical means (Continuation of Q5/17)
- Q6/17: Security aspects of ubiquitous telecommunication services (Continuation of Q6/17)
- Q7/17: Secure application services (Continuation of Q7/17)
- Q8/17: Cloud computing security (Continuation of Q8/17)
- Q9/17: Telebiometrics (Continuation of Q9/17)
- Q10/17: Identity management architecture and mechanisms (Continuation of Q10/17)
- Q11/17: Generic technologies to support secure applications (Continuation of Continuation of Q11/17, Q12/17, Q15/17 and the ODP part of Q13/17)
- Q12/17: Formal languages for telecommunication software and testing (Continuation of part of Q13/17, and part of Q14/17)

## Relevant Recommendations

### E series: Overall network operation, telephone service, service operation and human factor

- E.115: Computerized directory assistance

**X series: Data networks, open system communications and security**

- X.500: Information technology – Open Systems Interconnection – The Directory: Overview of concepts, models and services
- X.501: Information technology – Open Systems Interconnection – The Directory: Models
- X.509: Information technology – Open systems interconnection – The Directory: Public-key and attribute certificate frameworks
- X.511: Information technology – Open Systems Interconnection – The Directory: Abstract service definition
- X.518: Information technology – Open Systems Interconnection – The Directory: Procedures for distributed operation
- X.519: Information technology – Open Systems Interconnection – The Directory: Protocols
- X.520: Information technology – Open Systems Interconnection – The Directory: Selected attribute types
- X.521: Information technology – Open Systems Interconnection – The Directory: Selected object classes
- X.525: Information technology – Open Systems Interconnection – The Directory: Replication
- X.660: Information technology – Procedures for the operation of object identifier registration authorities: General procedures and top arcs of the international object identifier tree
- X.667: Information technology – Procedures for the operation of Object Identifier Registration Authorities: Generation of universally unique identifiers and their use in object identifiers
- X.672: Information technology – Open systems interconnection – Object identifier resolution system (ORS)
- X.674: Procedures for the registration of arcs under the Alerting object identifier arc
- X.1032: Architecture of external interrelationships for a telecommunication IP-based network security system
- X.1034: Guidelines on extensible authentication protocol based authentication and key management in a data communication network
- X.1052: Information security management framework
- X.1054: Information technology – Security techniques – Governance of information security
- X.1057: Asset management guidelines in telecommunication organizations
- X.1080.1: e-Health and world-wide telemedicines – Generic telecommunication protocol
- X.1081: The telebiometric multimodal model – A framework for the specification of security and safety aspects of telebiometrics
- X.1090: Authentication framework with one-time telebiometric templates
- X.1091: A guideline for evaluating telebiometric template protection techniques
- X.1092: Integrated framework for telebiometric data protection in e-health and telemedicines
- X.1101: Security requirements and framework for multicast communication
- X.1153: Management framework of a one time password-based authentication service

- X.1154: General framework of combined authentication on multiple identity service provider environments
- X.1156: Non-repudiation framework based on a one time password
- X.1164: Use of service providers' user authentication infrastructure to implement public key infrastructure for peer-to-peer networks
- X.1192: Functional requirements and mechanisms for the secure transcoding of IPTV
- X.1193: Key management framework for secure internet protocol television (IPTV) services
- X.1194: Algorithm selection scheme for service and content protection descrambling
- X.1195: Service and content protection interoperability scheme
- X.1196: Framework for the downloadable service and content protection system in the mobile Internet Protocol television environment
- X.1197: Guidelines on criteria for selecting cryptographic algorithms for IPTV service and content protection
- X.1198: Virtual machine-based security platform for renewable IPTV service and content protection
- X.1209: Capabilities and their context scenarios for cybersecurity information sharing and exchange
- X.1243: Interactive gateway system for countering spam
- X.1245: Framework for countering spam in IP-based multimedia applications
- X.1252: Baseline identity management terms and definitions
- X.1253: Security guidelines for identity management systems
- X.1254: Entity authentication assurance framework
- X.1255: Framework for discovery of identity management information
- X.1275: Guidelines on protection of personally identifiable information in the application of RFID technology
- X.1303: Common Alerting Protocol (CAP1.1)
- X.1311: Information technology – Security framework for ubiquitous sensor networks
- X.1312: Ubiquitous sensor network middleware security guidelines
- X.1313: Security requirements for wireless sensor network routing
- X.1500: Overview of cybersecurity information exchange
- X.1500.1: Procedures for the registration of arcs under the object identifier arc for cybersecurity information exchange
- X.1520: Common vulnerabilities and exposures
- X.1521: Common vulnerability scoring system
- X.1524: Common weakness enumeration
- X.1526: Open Vulnerability and Assessment Language
- X.1528: Common platform enumeration
- X.1528.1: Common platform enumeration naming

- X.1528.2: Common platform enumeration name matching
- X.1528.3: Common platform enumeration dictionary
- X.1528.4: Common platform enumeration applicability language
- X.1541: Incident object description exchange format
- X.1544: Common attack pattern enumeration and classification
- X.1570: Discovery mechanisms in the exchange of cybersecurity information
- X.1580: Real-time inter-network defence
- X.1581: Transport of real-time inter-network defence messages

**Z series: Languages and general software aspects for telecommunication systems**

- Z.100: Specification and Description Language – Overview of SDL-2010
- Z.101: Specification and Description Language – Basic SDL-2010
- Z.102: Specification and Description Language – Comprehensive SDL-2010
- Z.103: Specification and Description Language – Shorthand notation and annotation in SDL-2010
- Z.104: Specification and Description Language – Data and action language in SDL-2010
- Z.105: Specification and Description Language – SDL-2010 combined with ASN.1 modules
- Z.106: Specification and Description Language – Common interchange format for SDL-2010
- Z.107: Specification and Description Language – Object-oriented data in SDL-2010
- Z.109: Specification and Description Language – Unified modeling language profile for SDL-2010
- Z.120: Message Sequence Chart (MSC)
- Z.150: User Requirements Notation (URN) – Language requirements and framework
- Z.151: User Requirements Notation (URN) – Language definition
- Z.161: Testing and Test Control Notation version 3: TTCN-3 core language
- Z.161.1: Testing and Test Control Notation version 3: TTCN-3 language extensions: Support of interfaces with continuous signals
- Z.161.2: Testing and Test Control Notation version 3: TTCN-3 language extensions: Configuration and deployment support
- Z.161.3: Testing and Test Control Notation version 3: TTCN-3 language extensions: Advanced parameterization
- Z.161.4: The Testing and Test Control Notation version 3: TTCN-3 Language Extensions: Behaviour Types
- Z.164: Testing and Test Control Notation version 3: TTCN-3 operational semantics
- Z.165: Testing and Test Control Notation version 3: TTCN-3 runtime interface (TRI)
- Z.165.1: Testing and Test Control Notation version 3: TTCN-3 extension package: Extended TRI
- Z.166: Testing and Test Control Notation version 3: TTCN-3 control interface (TCI)
- Z.167: Testing and Test Control Notation version 3: TTCN-3 mapping from ASN.1

- Z.168: Testing and Test Control Notation version 3: TTCN-3 mapping from CORBA IDL
- Z.169: Testing and Test Control Notation version 3: TTCN-3 mapping from XML data definition
- Z.170: Testing and Test Control Notation version 3: TTCN-3 documentation comment specification

### **Handbooks**

- [1993 Introduction to CHILL](#)
- [1986 CHILL User Manual](#)
- [1982 CHILL Formal Definition – Volume I, Parts 1, 2, 3](#)
- [1982 CHILL Formal Definition – Volume II, Part 4](#)
- [2010 Object identifiers \(OIDs\) and their registration authorities](#)
- [2012 Security in Telecommunications and Information Technology](#)
- [2009 Security in Telecommunications and Information Technology](#)
- [2006 Security in Telecommunications and Information Technology](#)
- [2004 Security in Telecommunications and Information Technology](#)
- [2003 Security in Telecommunications and Information Technology](#)

## **ITU-T Focus Groups**

ITU-T Focus Groups are an instrument created by ITU-T that augment the Study Group work programme by providing an alternative working environment for the quick development of specifications in their chosen areas. The procedures for such groups are found in Rec. ITU-T A.7. ITU-T Focus Groups are now widely used to address industry needs as they emerge, and when they are not covered within an existing Study Group. The key difference between Study Groups and Focus Groups is the freedom that they have to organize and finance themselves. Focus Groups can be created very quickly, are usually short-lived and can choose their own working methods, leadership, financing, and types of deliverables.

Currently, no new Focus Groups are being considered for creation.

The following page contains information on the Focus Groups that concluded their activities: <http://itu.int/en/ITU-T/focusgroups/Pages/concluded.aspx>.

### **FG SSC — Focus Group on Smart Sustainable Cities**

The Focus Group on Smart Sustainable Cities (FG-SSC) was established by ITU-T SG 5 in February 2012. The FG acts as an open platform for smart-city stakeholders – such as municipalities; academic and research institutes; non-governmental organizations (NGOs); and ICT organizations, industry forums and consortia – to exchange knowledge in the interests of identifying the standardized frameworks needed to support the integration of ICT services in smart cities. The webpage of the group is found at <http://itu.int/en/ITU-T/focusgroups/ssc>.

### **FG SmartCable – Focus Group on Smart Cable Television**

ITU-T Focus Group on Smart Cable Television (FG SmartCable) was established by ITU-T SG 9 at its meeting in Geneva, 30 April - 4 May 2012. The objective of this Focus Group is to collect and analyze information from existing relevant activities as well as to develop deliverables that would assist the future development of ITU-T Recommendations to support "Smart Cable Television" including requirements, use cases, technical methods, etc. The webpage of the group is found at <http://itu.int/en/ITU-T/focusgroups/smartcable>.

### **FG Innovation – Focus Group on Bridging the Gap: from Innovation to Standards**

ITU-T Focus Group on Bridging the Gap: from Innovation to Standards (FG Innovation) was established by ITU-T TSAG at its meeting in Geneva, 10-13 January 2012. The objective of this Focus Group is to document and analyze successful cases of ICT innovations and identify relevant standardization gaps which can lead to new study items for ITU-T. The group webpage is found at <http://itu.int/en/ITU-T/focusgroups/innovation>.

### **FG DR&NRR – Focus Group on Disaster Relief Systems, Network Resilience and Recovery**

ITU-T Focus Group on Disaster Relief Systems, Network Resilience and Recovery (FG-DR&NRR) was established by the ITU-T TSAG meeting in Geneva, 10-13 January 2012. The objective of the Focus Group is to collect and document information and concepts that would be helpful for the work on disaster relief systems/applications, network resilience and recovery from a telecommunication perspective. Its parent group was changed from TSAG to ITU-T SG 2 by the TSAG meeting in Geneva 4-7 June 2013. The group webpage is found at <http://www.itu.int/en/ITU-T/focusgroups/dnrrr>.

### **FG M2M – Focus Group on M2M Service Layer**

ITU-T Focus Group on M2M Service Layer (FG M2M) was established by ITU-T TSAG at its meeting in Geneva, 10-13 January 2012. The objective of this Focus Group is to develop technical reports to support the progress on M2M APIs and protocols to support M2M services and applications. The group webpage is found at <http://itu.int/en/ITU-T/focusgroups/m2m>.

### **FG AVA – Focus Group on Audiovisual Media Accessibility**

ITU-T Focus Group on Audiovisual Media Accessibility (FG AVA) was proposed by ITU-T Study Group 16 (Geneva, 14-25 March 2011) and established after consultation of ITU-T study groups and membership. The Focus Group objective is to make audiovisual media accessible for persons with disabilities. The group webpage is found at <http://itu.int/en/ITU-T/focusgroups/ava>.

### **FG SWM – Focus Group on Smart Water Management**

The Focus Group on Smart Water Management (FG-SWM) was established by the ITU-T TSAG meeting in Geneva, 4-7 June 2013. FG-SWM will provide a platform to share views, develop a series of deliverables and showcasing initiatives, projects, policies and standards activities that are taking place in the area of smart water management. The group webpage is found at <http://itu.int/en/ITU-T/focusgroups/swm>.

### **ITU-T Focus Group Publications**

<b>FG Cloud – Cloud computing Focus Group</b>
<a href="#">2012 - Technical Report: Part 1: Introduction to the cloud ecosystem: definitions, taxonomies, use cases and high-level requirements</a>
<a href="#">2012 - Technical Report: Part 2: Functional requirements and reference architecture</a>
<a href="#">2012 - Technical Report: Part 3: Requirements and framework architecture of cloud infrastructure</a>
<a href="#">2012 - Technical Report: Part 4: Cloud Resource Management Gap Analysis</a>
<a href="#">2012 - Technical Report: Part 5: Cloud security</a>
<a href="#">2012 - Technical Report: Part 6: Overview of SDOs involved in cloud computing</a>
<a href="#">2012 - Technical Report: Part 7: Cloud computing benefits from telecommunication and ICT perspectives</a>
<b>FG Distraction – Driver Distraction Focus Group</b>
<a href="#">2013 - Report on Situational Awareness Management</a>
<a href="#">2013 - Report on Use Cases</a>
<a href="#">2013 - Report on User Interface Requirements for Automotive Applications</a>
<a href="#">2013 - Report on Vehicle-to-Applications Communications Interface</a>
<a href="#">2013 - Final Report</a>
<b>FG DR&amp;NRR – Focus Group on Disaster Relief Systems, Network Resilience and Recovery</b>
<a href="#">2013 - Technical Report on Telecommunications and Disaster Mitigation</a>
<b>FG FS-VDSL – Full-Service VDSL Focus Group</b>
<a href="#">2002 - Technical Specifications: Part 1: Operator Requirements</a>
<a href="#">2002 - Technical Specifications: Part 2: System Architecture</a>
<a href="#">2002 - Technical Specifications: Part 3: Customer Premises Equipment</a>
<a href="#">2002 - Technical Specifications: Part 4: Physical Layer Specification for Interoperable VDSL Systems</a>
<a href="#">2002 - Technical Specifications: Part 5: Operations, Administration and Maintenance &amp; Provision aspects for FS-VDSL Services</a>
<b>FG IPTV – IPTV Focus Group</b>
<a href="#">2008 - Proceedings</a>
<b>FG OCAF – Open Communications Architecture Forum Focus Group</b>
<a href="#">2005 - Carrier Grade Open Environment Reference Model</a>



## **Annexes**

**Annex 1: Composition of the Rapporteur Group for Question 9-3/2**

**Annex 2A: Relationship of Questions of Study Group 1 to Questions in ITU-T and ITU-R**

**Annex 2B: Relationship of Questions of Study Group 2 with Questions in ITU-T and ITU-R**



## **Annex 1: Composition of the Rapporteur Group for Question 9-3/2**

<b>Question 9-3/2: Identification of study topics in the ITU-T and ITU-R study groups which are of particular interest to developing countries</b>	<b>Name / Country / Organization</b>
Rapporteur	Mr Nasser Al Marzouqi
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## Annex 2A: Relationship of Questions in Study Group 1 to Questions in ITU-T and ITU-R

Question	Title of the Question	BDT Programme/ Initiative	Possible relationship with ITU-R Study Group Questions and activities	Possible relationship with ITU-T Study Group Questions and activities
<b>Question 7-3/1</b>	Implementation of universal access to broadband services	<b>Programme 3</b>	<a href="#">ITU-R SG 1 Spectrum management;</a> <a href="#">ITU-R SG 4 Satellite services;</a> <a href="#">ITU-R SG 5 Terrestrial services</a>	<a href="#">ITU-T SG 13 Future networks including cloud computing, mobile and next-generation networks;</a> <a href="#">ITU-T SG 15 Networks, Technologies and Infrastructures for Transport, Access and Home;</a> <a href="#">ITU-T SG 9 Television and sound transmission and integrated broadband cable networks</a>
<b>Question 10-3/1</b>	The impact of the licensing and authorization regime and other relevant regulatory measures on competition in a converged telecommunication/ICT environment	<b>Programme 3</b>		
<b>Question 12-3/1</b>	Tariff policies, tariff models and methods of determining the costs of services on national telecommunication networks, including next-generation networks	<b>Programme 3</b>		<a href="#">ITU-T SG 3 Economic and Policy issues;</a>
<b>Question 18-2/1</b>	Enforcing national policies and regulations on consumer protection notably in a converging environment		<a href="#">ITU-R SG 1 Spectrum management;</a>	
<b>Question 19-2/1</b>	Implementation of IP telecommunication services in developing countries	<b>Programme 1</b>		<a href="#">ITU-T SG 13 Future networks including Cloud Computing, Mobile and Next-generation networks;</a> <a href="#">ITU-T SG 16 Multimedia;</a> <a href="#">IPTV Global Standards Initiative (IPTV-GSI)</a> under ITU-T SG 16

Question	Title of the Question	BDT Programme/ Initiative	Possible relationship with ITU-R Study Group Questions and activities	Possible relationship with ITU-T Study Group Questions and activities
<b>Question 20-1/1</b>	Access to telecommunication/ICT services by persons with disabilities and with special needs	<b>Programme 4</b>	<a href="#">ITU-R SG 6 Broadcasting service;</a>	<a href="#">ITU-T SG 16 Multimedia;</a> <a href="#">Question 26/16 - Accessibility to multimedia systems and services</a> <a href="#">ITU-T SG 2 Operational aspects;</a> <a href="#">Question 4/2;</a> <a href="#">Joint Coordination Activity on Accessibility and Human Factors (JCA-AHF)</a>
<b>Question 22-1/1</b>	Securing information and communication networks: best practices for developing a culture of cybersecurity	<b>Programme 2</b> General Secretariat – Global Cybersecurity Agenda		<a href="#">ITU-T SG 17 Security</a>
<b>Question 23/1</b>	Strategies and policies concerning human exposure to electromagnetic fields	<b>Programme 1</b>	<a href="#">ITU-R SG 1 Spectrum management;</a> <a href="#">Working Party 1C Spectrum monitoring;</a>	<a href="#">ITU-T SG 5 Environment and climate change;</a>
<b>Question 24/1</b>	Strategies and policies for the proper disposal or reuse of telecommunications/ICT waste material	<b>Programme 5</b>		<a href="#">ITU-T SG 5 Environment and climate change;</a>

## Annex 2B: Relationship of Questions in Study Group 2 to Questions in ITU-T and ITU-R

Question	Title of the Question	BDT Programme/ Initiative	Possible relationship with ITU-R Study Group Questions	Possible relationship with ITU-T Study Group Questions
<b>Question 9-3/2</b>	Identification of study topics in the ITU-T and ITU-R study groups which are of particular interest to developing countries	<b>All</b>	All	All For Conformance and Interoperability testing: <a href="#">ITU-T Study Groups 11 Signalling requirements, protocols and test specifications</a>
<b>Question 10-3/2</b>	Telecommunications/ICT for rural and remote areas	<b>Programme 1;</b> Connect a School, Connect a Community	<a href="#">ITU-R SG 4 Satellite services;</a>	<a href="#">ITU-T Study Group 16 Multimedia;</a>
<b>Question 11-3/2</b>	Examination of terrestrial digital sound and television broadcasting technologies and systems, interoperability of digital terrestrial systems with existing analogue networks, and strategies and methods of migration from analogue terrestrial techniques to digital techniques	<b>Programme 1</b>	<a href="#">ITU-R SG 6 Broadcasting service;</a>	<a href="#">ITU-T Study Group 16 Multimedia on IPTV, video coding and accessibility (e.g. captioning/sub-titling);</a> <a href="#">ITU-T Study Group 9 Television and sound transmission and integrated broadband cable networks</a>
<b>Question 14-3/2</b>	Information and telecommunications/ICTs for e-Health	<b>Programme 2</b>		<a href="#">ITU-T Study Group 16 Multimedia;</a> <a href="#">Question 28/16 Multimedia framework for e-health applications;</a> <a href="#">ITU-T SG 13 Future networks including Cloud Computing, Mobile and Next-generation networks;</a> <a href="#">Question 2/13 Requirements for NGN evolution (NGN-e) and its capabilities including support of IoT (on mobile health)</a> <a href="#">ITU-T SG 17 Security;</a> <a href="#">Question 9/17 Telebiometrics</a> <a href="#">Focus Group on M2M</a>

Question	Title of the Question	BDT Programme/ Initiative	Possible relationship with ITU-R Study Group Questions	Possible relationship with ITU-T Study Group Questions
<b>Question 17-3/2</b>	Progress on e-government activities and identification of areas of application of e-government for the benefit of developing countries	<b>Programme 2</b>		<a href="#">ITU-T SG 17 Security; ITU-T SG 13 Future networks including cloud computing, mobile and next-generation networks;</a> <a href="#">Question 8/13 Security and identity management in evolving managed networks</a>
<b>Question 22-1/2</b>	Utilization of telecommunications/ICTs for disaster preparedness, mitigation and response	<b>Programme 1 and Programme 5</b>	<a href="#">ITU-R SG 4 Satellite service;</a> ITU-R SG 5 Terrestrial Services <a href="#">ITU-R SG 7 Science services;</a>	<a href="#">ITU-T SG 5 Environment and climate change;</a> ITU-T SG 2 Operational aspects; <a href="#">Question 3/2 Service and Operational aspects of telecommunications, including service definition FG-DR&amp;NRR</a>
<b>Question 24/2</b>	ICT and climate change	<b>Programme 5</b>	<a href="#">ITU-R SG 7 Science services;</a>	<a href="#">ITU-T SG 5 Environment and climate change;</a> ITU-T IoT-GSI and JCA-IoT
<b>Question 25/2</b>	Access technology for broadband telecommunications including IMT, for developing countries	<b>Programme 1</b>	<a href="#">ITU-R SG 4 Satellite service;</a>  <a href="#">ITU-R SG 5 Terrestrial services;</a>	<a href="#">ITU-T SG 13 Future networks including Cloud Computing, Mobile and Next-generation networks;</a> <a href="#">ITU-T SG 15 Networks, technologies and infrastructures for transport, access and home;</a> <a href="#">ITU-T Study Group 9 Television and sound transmission and integrated broadband cable networks</a>

Q9-3/2: Identification of study topics in the ITU-T and ITU-R study groups which are of particular interest to developing countries

Question	Title of the Question	BDT Programme/ Initiative	Possible relationship with ITU-R Study Group Questions	Possible relationship with ITU-T Study Group Questions
<b>Question 26/2</b>	Migration from existing networks to next-generation networks for developing countries: technical, regulatory and policy aspects	<b>Programme 1</b>		<a href="#">ITU-T SG 3 Economic and policy issues; Question 1/3 Development of charging and accounting settlement mechanisms for international telecommunications services using the NGNs and any possible future development;</a> <a href="#">ITU-T SG 13 Future networks including Cloud Computing, Mobile and Next-generation networks;</a> <a href="#">ITU-T SG 11 Signalling requirements, protocols and test specifications</a> <a href="#">ITU-T SG 12 Performance, QoS and QoE;</a> <a href="#">Question 17/12 Performance of packet-based networks and other networking technologies;</a> <a href="#">ITU-T SG 3 Economic and policy issues;</a>



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