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|  | INTERNATIONAL TELECOMMUNICATION UNION  **TELECOMMUNICATION STANDARDIZATION SECTOR**  STUDY PERIOD 2025-2028 | | TSAG-TD23 | | |
| TSAG | | |
| Original: English | | |
|  | |  | | Geneva, 26-30 May 2025 | |
| **TD** | | | | | |
| **Source:** | | Chair, ITU-T Study Group 11 | | | |
| **Title:** | | ITU-T SG11 Lead Study Group Report | | | |
| **Contact:** | | Tejpal Singh India | | | E-mail: [tejpal.singh70@gov.in](mailto:tejpal.singh70@gov.in) |

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| **Abstract:** | This document contains the Report of the ITU-T SG11 on lead study group activities (August 2024 - May 2025). |

1. **Background**

According to Resolution 2 of WTSA-24, ITU-T Study Group 11 is the lead study group on:

* signalling and protocols;
* establishing test specifications, conformance and interoperability testing for all types of networks, technologies and services that are the subject of study and standardization by all ITU-T study groups;
* combating counterfeiting and tampering of ICT devices;
* combating the use of stolen ICT devices.

1. **General information**

Following the results of WTSA-24, at its first meeting held in Geneva from 19 to 28 February 2025, SG11 approved its new structure for current study period (2025-2028), which includes three Working Parties and CASC. Also, SG11 appointed WPs and CASC leadership and appointed Rapporteurs, Associate Rapporteurs and liaison officers. More details are available in [SG11-TD18/GEN](https://www.itu.int/md/T25-SG11-250219-TD-GEN-0018/en).

At this particular meeting, SG11 approved one draft Recommendation ([TSB Circular 34](https://www.itu.int/md/T25-TSB-CIR-0034/en)) and determined two draft Recommendations ([TSB Circular 35](https://www.itu.int/md/T25-TSB-CIR-0035/en)). Also, SG11 consented nine draft Recommendations, including the Revision of existing Recommendation, agreed one supplement and six technical reports and initiated 23 new work items. The complete lists of documents approved/determined/consented/agreed as well as new work items agreed at this particular meeting are available in [SG11-TD14-R1/GEN](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T25-SG11-250219-TD-GEN-0014) and [SG11-TD15/GEN](https://www.itu.int/md/T25-SG11-250219-TD-GEN-0015/en) accordingly.

In addition, due to several outstanding issues requiring resolution, SG11 decided to defer the approval procedure for determined draft Recommendation ITU-T Q.5010 to next SG11 meeting (Geneva, 17-26 November 2025). See [TSB Circular 34](https://www.itu.int/md/T25-TSB-CIR-0034/en).

SG11 approved its action plan for the study period 2025-2028 ([SG11-TD198/GEN](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T25-SG11-250219-TD-GEN-0198)). The action plan contains highlights of the WTSA-24 Resolutions relevant to ITU-T Study Group 11.

More details are available in the [executive summary](https://www.itu.int/en/ITU-T/studygroups/2025-2028/11/Pages/exec-sum-202502.aspx) and the SG11 reports posted as [SG11-R1](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T25-SG11-R-0001), [SG11-R2](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T25-SG11-R-0002), [SG11-R3](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T25-SG11-R-0003), [SG11-R4](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T25-SG11-R-0004).

SG11 also agreed to organize 14 interim RGM e-meetings for most SG11 Questions particularly Q1, 2, 3, 4, 5, 6, 7, 8, 12, 13 and 14/11 and two interim CASC e-meetings by mid of September 2025.

The next SG11 meeting is planned to be held in Geneva from 17 to 26 November 2025 (TBA).

1. **Report of ITU-T SG11 on lead study group activities (August 2024 - May 2025)**
   1. **Signalling and protocols, including IMT-2020, CPN, BNG, P2P communications and emergency telecommunications**

SG11 advanced 48 ongoing work items and initiated 19 new work items on signalling and protocols-related aspects.

SG11 agreed a new Supplement and consented two new Recommendations, which were further approved following AAP LC:

* ITU-T Q.5033 (ex Q.NCMST) “Network coding multistream protocol for parallel data transmission”
* ITU-T Q.3722 (ex Q.BNG-CA) “Signalling requirements of virtual Broadband Network Gateway for cloud access”
* Q Suppl.78 (ex Q.Suppl.heter\_SI) “Signalling requirements of SFC with non-uniformly encoded SI in SFP changing scenarios”

Due to several outstanding issues requiring resolution, SG11 decided to defer the approval procedure for determined draft ITU-T Q.5010 to next SG11 meeting to be held in Geneva, 17-26 November 2025 (see cl.3 above). The discussion will continue during interim Q7/11 RGM e-meeting which is preliminary scheduled to be held in July 2025 (see [SG11-TD16-R1/GEN](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T25-SG11-250219-TD-GEN-0016)). More information will be circulated via Q7/11 mailing list ([t25sg11q7@lists.itu.int](mailto:t25sg11q7@lists.itu.int)).

SG11 made progress on Q.SARO, Q.SFCO, Q.sup.sdwan-srv6, Q.sup.netsoft-roadmap, Q.CPN-TP-SA, Q.S-NICE-SA, Q.FMSC-SA, Q.CPN-RM-SA, Q.SA-CSB.

With regard to new signalling-related work, SG11 started:

* Revision of Recommendation ITU-T Q.5006 “Signalling requirements for hierarchical network slicing service”
* Q.Suppl.ANCRP: Adaptive Network Coding Relay Protocol
* Q.FMSC-SMSR-m: Session management signalling requirements of supporting mobility for fixed, mobile and satellite
* Q.SNICE-DLT-SA: Signalling architecture of distributed S-NICE based on DLT
* Q.NRS-DLT-SA: Signalling architecture for network resource sharing based on distributed ledger technology
* TR.SA-IoTC: Signalling architecture of enhanced land-based core network to support IoT-NTN based real-time communication

**Broadband Network Gateway signalling**

SG11 made progress on five work items related to Broadband Network Gateway, particularly Q.CNCG-IC, Q.BNG-IBN, Q.Sup.BNG-fd, Q.BNG-SFC and Q.BNG-SLA. Also, three new draft Recommendations were initiated during this meeting:

* Q.BNG-SLL: Signalling Requirements for the Session Based Leased-Line of Broadband Network Gateway
* Q.BNG-CPP: Signalling requirements for control plane pool of virtualized broadband network gateway
* Q.BNG-IE: Signalling requirements of intelligent enhancement for broadband network gateway

**Signalling requirements for emergency telecommunications**

SG11 started revision of Q.Suppl.62, Q.Suppl.69 and Q.Suppl.72. Also, the progress was achieved on draft Q.Req\_Frame\_RRDN “Requirements and framework for rapid response to sudden natural disasters in network” and ITU-T Q.IEM\_arch\_req “Reference architecture and signalling requirements for interactive emergency messaging through mobile network”.

**Computing Power Network (CPN)**

SG11 consented draft new Recommendation ITU-T Q.4144 (ex Q.CSO) “Signalling requirements for cross-operator service orchestration in computing power network” which was further approved following AAP LC. Also, SG11 advanced Q.cco-mec, Q.cpi and initiated a new work item Q.CPN-SA “Signalling architecture of computing power network”.

**Signalling of IMT-2020 and beyond**

SG11 made progress on Q.SP-IBMO, Q.PMEE, Q.PIRSO, Q.IMT2020-PFW, Q.PDS, Q.PDN, Q.SDTN, Q.PCNC-FMSC, Q.SPLC, Q.SPACDN, Q.SPMA, Q.IEC- SPDM, Q.AIDCS-SRA, Q.IEC-PDMF. Also, SG11 started the following new work items:

* QSTR.SP-NEG: Protocol enhancement for supporting negotiation mechanism in IMT-2020 network and beyond
* QSTR.SP-IMT2030: Signalling and Protocol Consideration on IMT-2030 networks
* Q.SPDDP: Signalling and protocol for distributed data plane in future network including IMT-2020
* Q.IEC-EEMA-LCM: Life cycle management interface of edge-aided energy management agent in microservice-based intelligent edge computing
* Q.det-IWC: Overlay signalling requirements and architecture for the operation and management of latency-deterministic industrial wireless communication services

**Signalling for P2P communications**

SG11 made progress on ITU-T Q.HP2P-svcfrw, Q.HP2P-fvcp, and X.mp2p-srdtf. It was recognized that the editors of the Q.HP2P-fvtp and Q.HP2P-fvcp remain actively engaged in open-source activities via a shared repository (<https://github.com/ITU-T-SG11-Q8>).

**Signalling for metaverse**

SG11 initiated a new work item Q.FITSM “Framework of interoperable telepresence suits for metaverse” and agreed to add the proposed Q.PMV into the [Q8/11 living list](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T25-SG11-250219-TD-GEN-0318).

More details are available in WP1/11 and WP2/11 reports ([SG11-R2](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T25-SG11-R-0002) and [SG11-R3](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T25-SG11-R-0003)).

**QKDN protocols**

As a continuation of studies related to signalling protocols for QKDN, ITU-T SG11 consented draft Revised Recommendation ITU-T Q.4164 “Protocols for Ck interfaces for quantum key distribution networks” which was further approved following AAP LC. Also, SG11 made progress on draft Recommendations ITU-T Q.QKDNi\_profr, Q.QKDNi\_KM, Q.QKDN\_Mk, Q.QKDN\_Cq, Q.QKDN\_GC.

SG11 initiated a new work item related to QKDN monitoring – QSTR.MP\_QKDN “Monitoring parameters for quantum key distribution network”.

More details are available in WP1/11 and WP3/11 reports ([SG11-R2](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T25-SG11-R-0002) and [SG11-R4](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T25-SG11-R-0004)).

**Signalling security**

Since 2016, ITU-T SG11 continues its studies on implementation of security measures, in particular to use digital public-key certificates in the signalling level in order to cope with different types of attacks on existing ICT infrastructure and services (e.g., OTP intercept, calls intercept, spoofing numbers, robocalls, etc.). More details are available on dedicated webpage at: <https://itu.int/go/SIG-SECURITY>.

SG11 made a good progress on draft Recommendation Q.TSCA “Requirements for issuing End-Entity and Certification Authority certificates for enabling trustable signalling interconnection between network entities”. SG11 considered [SG2-LS35](http://handle.itu.int/11.1002/ls/sp18-sg2-oLS-00009.docx) and thanked SG2 for starting a new work item E.RAA4QTSCA “Registration Authority Assignment criteria to issue digital public certificates for use by Q.TSCA”. Following discussion, SG11 suggests the demarcation lines between draft Recommendations developed by SG2 and SG11. The relevant LS was sent to SG2 and TSAG accordingly ([SG11-LS36](https://www.itu.int/net/itu-t/ls/ls.aspx?isn=33018)).

Also, SG11 discussed the text incorporated from CA/Browser Forum in draft Q.TSCA, and requested TSB to explore collaboration with CA/Browser Forum. In particular, TSB was requested to provide analyses for A.5 qualification of CA/Browser Forum at the next SG11 meeting (Geneva, 17-26 November 2025, TBA).

The output baseline text of Q.TSCA, which reflects the proposed demarcation lines, is available in [SG11-TD334/GEN](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T25-SG11-250219-TD-GEN-0334).

Also, SG11 made a good progress on Q.DMSA “Principles for detection and mitigation of signalling attacks in telecommunication networks”.

ITU-T SG11 continues close collaboration with ITU-T SG17 and ITU-T SG2 on this subject matter and informed them via LS accordingly ([SG11-LS36](https://www.itu.int/net/itu-t/ls/ls.aspx?isn=33018), [SG11-LS40](https://www.itu.int/net/itu-t/ls/ls.aspx?isn=33022)).

More details are available in WP1/11 report ([SG11-R2](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T25-SG11-R-0002)).

**AI/ML related work**

Among SG11 studies are topics related to Artificial Intelligence and Machine Learning, as follows:

* TR.PML-IMT-2020: Protocol to provide Machine Learning in future networks including IMT-2020 (Q6/11)
* Q.PMEE: Protocol for managing energy efficiency with AI-assisted analysis in IMT-2020 networks and beyond (Q6/11)
* Q.SPACDN: Signalling and protocol for AI enabled Cross-Domain Network in future network including IMT-2020 (Q6/11)
* Q.AIDCS-SRA: Signalling requirements and architecture for AI data centre (Q7/11)
* Q.MMAI: Methods and metrics for monitoring ML/AI in future networks including IMT-2020 (Q13/11)

More details are available in WP2/11 and WP3/11 reports ([SG11-R3](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T25-SG11-R-0003) and [SG11-R4](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T25-SG11-R-0004)).

* 1. **Establishing test specifications, conformance and interoperability testing for all types of networks, technologies and services that are the subject of study and standardization by all ITU‑T study groups**

ITU-T SG11 consented five new Recommendations, agreed six Technical Reports and started four new work items related to testing and monitoring specifications.

**Federated testbeds**

SG11 consented three draft Recommendations, which were further approved following AAP LC, and agreed five Technical Reports, which were developed based on FG-TBFxG outcomes, as follows:

* Recommendation ITU-T Q.4078 (ex Q.URRM): User requirements and reference model for Testbed as a Service
* Recommendation ITU-T Q.4077 (ex Q.TADIR): Testbed as a Service application program interfaces descriptions and interoperability requirements
* Recommendation ITU-T Q.4076 (ex Q.ETFRM): Evolution of the Testbeds Federations Reference Model
* Technical Report ITU-T QSTR.FTT (ex Q.FTT) “Federated testbeds taxonomy”
* Technical Report ITU-T QSTR-TFR “Testbeds Federation roadmap”
* Technical Report ITU-T QSTR-UCFTBS “Use cases for federated testbeds and business scenarios”
* Technical Report ITU-T QSTR-GDM “Guide on development and maintenance of ONPs (Open Networking Platforms) and federations for IMT-2020 and beyond”
* Technical Report ITU-T QSTR-USO “Use of open-source and open hardware projects/products in testbed federations for IMT-2020 and beyond”

**Interconnection testing**

SG11 continues its studies related to testing of interconnection and interworking scenarios. At this particular meeting SG11 consented Recommendation ITU-T Q.3956 (ex. Q.VoiNR-test) “VoNR/ViNR interconnection testing for interworking and roaming scenarios” which was further approved following AAP LC. Also, SG11 made progress on Q.DPI-TR.

**IoT testing**

SG11 made progress on Q.MUD\_IOT and initiated a new work item Q.TFCT\_IoT “Test Framework for Conformance Testing of IoT protocols used in IoT networks”.

**Interoperability testing and monitoring**

SG11 made a progress on draft Recommendations Q.CPNP, Q.MMPS, Q.MMAI, Q.MFDC, Q.CED, Q.MPSG and started two new work items:

* QSTR.MEML: Methods and metrics for evaluating ML models of ML marketplace in future networks including IMT-2020
* QSTR.SRv6\_Conf: Method for Verifying Conformance to SRv6

**Testing of cloud/edge computing**

SG11 consented draft Recommendation ITU-T Q.3957 (ex. Q.vbng-pup-iopt) “Interoperability testing suite for cloud-based control plane and pooled user plane of virtualized broadband network gateway”, which was further approved following AAP LC, and agreed Technical Report ITU-T QSTR.MPM-SRv6 “Methods for Performance Monitoring of SRv6 Network”. Also, SG11 made progress on Q.NGNe-O-iopt, Q.CSP-IOPT and Q.BaaS-iopt-ts.

More details are available in WP3/11 report ([SG11-R4](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T25-SG11-R-0004)).

**Conformity Assessment Steering Committee (CASC)**

The eighteenth meeting of the ITU-T Conformity Assessment Steering Committee (CASC) was held in Geneva on 21 February 2025 during the ITU-T SG11 meeting.

The current status of the ITU Testing Laboratories database was presented by TSB ([SG11-TD17/GEN](https://www.itu.int/md/T25-SG11-250219-TD-GEN-0017/en)). As of February 2025, there are 14 testing laboratories registered in ITU Testing Laboratories database, including one new TL which was registered since last SG11 meeting (May 2024).

Following the presentation on testing laboratories database, TSB was requested to add a hyperlink to the TL Database on the CASC webpage (the relevant links were added on the web: <https://itu.int/go/casc>).

CASC discussed the instructions contained in Resolution 76 WTSA-24, particularly those which request the ITU-T study groups *“to submit to CASC a list of ITU-T Recommendations which could be candidates for the certification scheme, taking into account market needs”*. The meeting discussed the need to develop CASC guidance to all ITU-T SGs in order to get information about laboratories and vendors using the ITU-T Recommendations for testing and certification.

The representative of International Accreditation Forum (IAF) gave an overview of IAF certification schemes and their current activities ([SG11-TD230/GEN](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T25-SG11-250219-TD-GEN-0230)). He provided details on how a new certification scheme is established by IAF.

Following the discussion of received contribution [SG11-C119](https://www.itu.int/md/T25-SG11-C-0119/en), it was proposed to send out two oLSs. One is to invite SGs to appoint technical experts, while the second one would invite SGs to provide ITU-T standards which may become candidates for certification scheme. The discussion of the draft oLSs is planned to be held during interim CASC e-meetings.

Also, it was proposed to develop a questionnaire which allows to assess the use of ITU-T Recommendations in national conformity assessment systems, including type approval. The questionary would also be developed during interim CASC meetings and to be discussed at the next CASC meeting in November 2025. Afterwards, the questionary will be circulated by TSB to Member States.

The interim CASC e-meetings are scheduled for 8 May and 12 September 2025. The announcement will be circulated through the CASC mailing list ([tsg11casc@lists.itu.int](mailto:tsg11casc@lists.itu.int)).

More details are available in CASC report (see Annex 6 to [SG11-R1](https://ituint-my.sharepoint.com/personal/denis_andreev_itu_int/Documents/SGs_Study_Period_2025-2028/16)_TSAG/2025/SG11-R1)) and its webpage at: <https://itu.int/go/casc>.

* 1. **Combating counterfeiting and tampering of ICT devices and the use of stolen ICT devices**

At this particular meeting, SG11 took the following decisions (see cl.1-2 above):

* Approved Recommendation ITU-T Q.5054 (ex Q.CCF-CCSD): Consumer centric framework for combating counterfeit and stolen ICT mobile devices
* Determined draft Recommendation ITU-T Q.5055 (ex Q.CEIR): Technical requirement, interfaces and generic functions of CEIR
* Determined draft Recommendation ITU-T Q.5056 (ex Q.FC-MCM): Framework for combating online Multimedia Content Misappropriation

SG11 made progress on Q.GIR, Revision of Q.Suppl.75, TR-CF-QoS and Q.F-MSCF. There were no new work items started.

More details are available in WP3/11 report ([SG11-R4](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T25-SG11-R-0004)).

1. **ITU-T SG11 Workshops, Webinars and ad-hoc sessions**

Since last SG11 meeting (May 2024), ITU organized one webinar on SG11 related topic:

[Digital Financial Services (DFS) Webinar Series: Addressing SS7 Vulnerabilities affecting Digital Financial Services](https://www.itu.int/en/ITU-T/webinars/dfs/20250218/Pages/default.aspx) (virtual, 18 February 2025).

SG11 will organize a Workshop during its meeting on 17 November 2025. It will be announced accordingly.

1. **SG11 Regional Groups**

There are two Regional Groups of SG11:

* SG11RG-EECAT: Study Group 11 Regional Group for Eastern Europe, Central Asia and Transcaucasia;
* SG11RG-AFR: Study Group 11 Regional Group for Africa.

There were no meetings of SG11RG-EECAT and SG11RG-AFR since last SG11 meeting *(May 2024)*.

The next [SG11RG-EECAT](https://www.itu.int/en/ITU-T/regionalgroups/sg11-eecat/Pages/default.aspx) will be held in Saint Petersburg, Russian Federation from 9 to 11 June 2025. It is collocated with SG13RG-EECAT, SG20RG-EECAT and [ITU Regional Forum “Future Technologies: AI, Metaverse, HTC and other ICT Applications and Services. Vision 2030”](https://www.itu.int/en/ITU-D/Regional-Presence/CIS/Pages/EVENTS/2025/FoCForum.aspx) to be held in the same venue.

All details are available in the regional groups’ webpages ([SG11RG-AFR](https://www.itu.int/en/itu-t/regionalgroups/sg11-afr/Pages/default.aspx) and [SG11RG-EECAT](https://www.itu.int/en/ITU-T/regionalgroups/sg11-eecat/Pages/default.aspx#gsc.tab=0)).

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