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

1. **Background**

According to Resolution 2 of WTSA-20, 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 of ICT devices;
* combating the use of stolen ICT devices.

1. **General information**

SG11 conducted interim WP1/11, WP2/11, WP3/11 and WP4/11 meetings (virtual, 7 February 2024) which was held back-to-back with RGM e-meetings (29 January – 6 February 2024). During these meetings only one supplement was agreed. More details are available in [SG11-R19](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T22-SG11-R-0019), [SG11-R20](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T22-SG11-R-0020), [SG11-R21](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T22-SG11-R-0021), [SG11-R22](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T22-SG11-R-0022).

SG11 conducted its fourth meeting in Geneva from 1 to 10 May 2024. During this meeting, SG11 determined two, consented 23 draft Recommendations, including Amendments to existing Recommendations and initiated 33 new work items. More details are available in the [executive summary](https://www.itu.int/en/ITU-T/studygroups/2022-2024/11/Pages/exec-sum-20240501.aspx) and the SG11 reports posted as [SG11-R23](https://www.itu.int/md/T22-SG11-R-0023/en), [SG11-R24](https://www.itu.int/md/T22-SG11-R-0024/en), [SG11-R25](https://www.itu.int/md/T22-SG11-R-0025/en), [SG11-R26](https://www.itu.int/md/T22-SG11-R-0026/en) and [SG11-R27](https://www.itu.int/md/T22-SG11-R-0027/en).

SG11 also agreed to organize three RGM e-meetings for Q4/11, Q8/11 and Q13/11 by end of July 2024.

The next SG11 meeting is planned to be held in Geneva from 19 to 28 February 2025 (TBC).

1. **Report of ITU-T SG11 on lead study group activities (January – July 2024)**
   1. **Signalling and protocols, including IMT-2020, CPN and P2P communications related issues**

In February 2024, WP1/11 agreed Q.Suppl.77 (ex.Q.Suppl.pSFC) “Signalling requirements for parallel SFC packet processing”.

In May 2024, ITU-T SG11 determined new Recommendation ITU-T Q.5010 (ex. Q.UAMS-SRA) “Signalling requirements and architecture for urban air mobility service environment”. This Recommendation provides the signalling requirements and architecture for urban air mobility (UAM) services. These requirements include signalling information over each reference points and service procedures for communication between the user equipment (UE), access layer, core layer and service layer for UAM services.

Moreover, in May 2024, SG11 started the new Technical Report TR.SP-UAV “Signalling requirements and protocols between unmanned aerial vehicles and unmanned aerial vehicle controllers using IMT-2020 networks and beyond”. The ITU-R WPs, ICAO, several ITU-T SGs, ISO/IEC and TSAG were informed ([SG11-LS157](https://www.itu.int/net/itu-t/ls/ls.aspx?isn=30273)).

Also, ITU-T SG11 finalized and consented the following draft Recommendations on signalling aspects, including IMT-2020:

* ITU-T Q.3064 (ex. Q.NICE-SA): Signalling architecture of NICE (Network intelligence capability enhancement) in support of awareness capabilities;
* ITU-T Q.3648 (ex. Q.DC-SA): Signalling architecture of data channel enhanced IMS network;
* ITU-T Q.3742 (ex. Q.SD-DCI): Signalling requirements and data models for SD-DCI service;
* ITU-T Q.4143 (ex. Q.BNG-PUP): Signalling requirements for cloud-based control plane and pooled user plane of vBNG (virtualized Broadband Network Gateway);
* ITU-T Q.5009 (ex. Q.PEC): Signalling Requirements and Protocols for enhanced quality assured connections in IMT-2020 network and beyond;
* ITU-T Q.5011 (ex. Q.IEC-EEMA): Signalling requirements and interfaces of edge-aided energy management agent at intelligent edge computing;
* ITU-T Q.5012 (ex. Q.WLAN5G-REQ): Signalling architecture of WLAN access network for interworking with 5G network;
* ITU-T Q.5013 (ex. Q.SP-twqos): Signalling requirements and protocol procedures for two-way QoS mechanism between access networks and core networks in IMT-2020 network and beyond;
* ITU-T Q.5029 (ex. Q.IEC-DTINF): Data management interfaces in digital twin smart aquaculture system with intelligent edge computing;
* ITU-T Q.5030 (ex. Q.IEC-FWINF): Data management interfaces for intelligent edge computing-based flowing-water smart aquaculture system;
* ITU-T Q.5031 (ex. Q.PMMC): Protocol for traffic flow coordination of multi-modality communication;
* ITU-T Q.5032 (ex. Q.NCRP): Network coding protocol for network repeaters.

With regard to Computing Power Network (CPN), SG11 consented the draft Recommendation ITU-T Q.4142 (ex. Q.SASO) “Signalling architecture for service orchestration in computing power network”.

Also, two new Recommendations and two amendments on Hybrid P2P communications were consented during this SG11 meeting, as follows:

* ITU-T Amd.1 to Q.4102: Hybrid peer-to-peer (P2P) communications: Peer protocol;
* ITU-T Amd.1 to Q.4103: Hybrid peer-to-peer communications: Overlay management protocol;
* ITU-T Q.4104 (ex. Q.HP2P-dss): Hybrid peer-to-peer (P2P) communications: Signalling requirements for data streaming service;
* ITU-T Q.4105 (ex. Q.HP2P-fvsigreq): Hybrid P2P communications: signalling requirements for feature-based video services.

ITU-T SG11 advanced 49 ongoing work items and agreed to initiate 16 new work items on signalling and protocols-related aspects. All new work items started by SG11 are listed in [SG11-TD816-R1/GEN](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T22-SG11-240501-TD-GEN-0816).

More details are available in WP1/11 and WP2/11 reports ([SG11-R24](https://www.itu.int/md/T22-SG11-R-0024/en) and [SG11-R25](https://www.itu.int/md/T22-SG11-R-0025/en)).

* 1. **QKDN protocols**

As a continuation of studies related to signalling protocols for QKDN, ITU-T SG11 started two new work items and the revision of ITU-T Q.4164:

* Q.QKDN\_GC: General control protocols for interfaces on quantum key distribution network controller for quantum key distribution networks;
* Q.QKDN\_Cq: Protocols for Cq interfaces for quantum key distribution networks;
* Q.4164\_rev: Revision of ITU-T Q.4164 “Protocols for Ck interfaces for quantum key distribution networks”.

The complete list of new work items agreed at this particular meeting is available in [SG11-TD816-R1/GEN](https://www.itu.int/md/T22-SG11-240501-TD-GEN-0816/en).

More details are available in WP1/11 report ([SG11-R24](https://www.itu.int/md/T22-SG11-R-0024/en)).

* 1. **Security issues of SS7**

Since 2016, ITU-T SG11 continues its studies on implementation of security measures on 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.).

All ITU-T SG11 results and related events (workshops, webinars) on signalling security are available on dedicated web page at: <https://itu.int/go/SIG-SECURITY>.

The meeting discussed the draft Recommendation ITU-T Q.TSCA based on the contributions received. The meeting did not reach consensus on the content of this document for starting the approval process via determination. Several issues need to be clarified and confirmed in the future meeting. The latest version of the baseline text is available in [SG11-TD1006/GEN](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T22-SG11-240501-TD-GEN-1006).

ITU-T SG11 continues close collaboration with ITU-T SG17 and ITU-T SG2 on this subject matter and keep them informed via LS ([SG11-LS156](https://www.itu.int/net/itu-t/ls/ls.aspx?isn=30272)).

Following discussion at the SGs Chairs meeting, SG11 management team provided TSAG with an update on the progress of SG11 work item ITU-T Q.TSCA ([SG11-LS210](https://www.itu.int/net/itu-t/ls/ls.aspx?isn=30351)).

More details are available in WP1/11 report ([SG11-R24](https://www.itu.int/md/T22-SG11-R-0024/en)).

* 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**
     1. **Testing and monitoring specifications, including federated testbeds**

ITU-T SG11 consented two new Recommendations which deal with IoT testing, as follows:

* ITU-T Q.4074 (ex. Q.TSN): Testing of robotics based on a model network;
* ITU-T Q.4075 (ex. Q.TSRT\_IoT): Test specifications for remote testing of Internet of Things using the probes.

Also, SG11 started the new work item Q.MUD\_IOT: Framework for testing and monitoring IoT devices & networks using technical Requirements from Manufacturer Usage Description (MUD).

ITU-T SG11 consented three new Recommendations related to testing and monitoring specifications, including:

* ITU-T Q.4072 (ex.Q.PIS): Monitoring Parameters for Intelligent Speech in Future Networks;
* ITU-T Q.4047 (ex. Q.Scvh-iopt): Interoperability testing between software-defined networking (SDN) and hypervisor based computing virtualization;
* ITU-T Q.4073 (Q.FW-IVV5G): Framework for interconnection testing of Voice, Video over 5G.

Moreover, SG11 started a new work item which considers the aspects related to Unmanned Aerial Vehicle (UAV)-based Power-Grid inspection — ITU-T Q.MPSG “Monitoring parameters for IMT-2020 networks and beyond supporting smart grid”. The ICAO, SG13 and SG20 were kept informed ([SG11-LS199](https://www.itu.int/net/itu-t/ls/ls.aspx?isn=30318)).

ITU-T SG11 advanced 18 ongoing work items and started 12 new work items including a series of new work items on federated testbeds based on the outcomes of the [FG-TBFxG](https://www.itu.int/en/ITU-T/focusgroups/tbfxg/Pages/default.aspx), which completed its lifecycle.

More details are available in WP3/11 report ([SG11-R26](https://www.itu.int/md/T22-SG11-R-0026/en)).

* + 1. **Conformity Assessment Steering Committee (CASC)**

The seventeenth meeting of the ITU-T Conformity Assessment Steering Committee (CASC) was held in Geneva on 3 May 2024, during the ITU-T SG11 meeting. The detailed presentation about the current status of the ITU Testing Laboratories database is available in [[SG11-TD818/GEN](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T22-SG11-240501-TD-GEN-0818)](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T22-SG11-220706-TD-GEN-0123).

As of June 2024, there are 14 testing laboratories registered in ITU database (<https://itu.int/go/tldb>).

Among recent updates, there are three new Testing Laboratories registered in the ITU TL Database, as well as updates for existing entries. Also, it was noted that validity of accreditation of Bharat Test House Pvt. Ltd. is expired. CASC encourages TSB to communicate with the testing laboratory and provide updates for the next CASC meeting.

It was noted that according to [TSB Circular 368](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSB-CIR-0368) (31 January 2022), all testing laboratories registered in the ITU TL database, are invited to register ICT products, which are tested in this TL against ITU-T Recommendations, in the ITU Product Conformity Database (<https://itu.int/go/tcdb>).

TSB also showed a [video guideline](https://www.itu.int/webcast/archive/t2022-24sg11) about ITU Testing Laboratories and the ITU Product Conformity Databases and gave a presentation on the [ITU Tutorial on Testing Laboratories recognition procedure](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/2023/1012/Pages/default.aspx) which was held in Geneva on 12 October 2023. It was noted that the tutorial was aimed at guiding all stakeholders on Testing Laboratories recognition procedure established by ITU, its benefits and all logistical details needed for submitting applications.

All details are available in the CASC report ([Annex 6](#_Annex_6) to [SG11-R23](https://www.itu.int/md/T22-SG11-R-0023/en)).

* + 1. **Conformance and interoperability programme**

SG11 noted the updated reference table of ITU-T Recommendations to be used for conformance and interoperability testing ([https://itu.int/go/reference-table](https://www.itu.int/go/reference-table)).

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

In May 2024, SG11 determined Recommendation ITU-T Q.5054 “Consumer centric framework for combating counterfeit and stolen ICT mobile devices”. This Recommendation provides a framework to enable consumers to verify the regularity of mobile telecommunications/ICT devices ubiquitously and provide a comprehensive overview to law enforcement agencies and regulators while enabling other stakeholders.

Also, SG11 completed and consented draft Recommendation ITU-T Q.5055 “Technical requirement, interfaces and generic functions of CEIR” which defines requirements for Central Equipment Identity Register (CEIR).

SG11 updated the draft Supplement ITU-T Q.Supplement.75-Rev: Use cases on the combat of counterfeit ICT stolen mobile devices, based on the received contributions, including multi-country contributions which were received following discussion at the SG11 Regional Group for Africa ([SG11RG-AFR](https://www.itu.int/en/itu-t/regionalgroups/sg11-afr/Pages/default.aspx)).

ITU-T SG11 advanced six ongoing work items and started the new work item Q.F-MSCF which will define framework on the use of market surveillance for combat counterfeit Telecommunications/ICT equipment.

More details are available in WP4/11 report ([SG11-TD860-R1/GEN](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T22-SG11-240501-TD-GEN-0860)).

1. **Preparation for WTSA-24**

During its meeting held in Geneva in May 2024, SG11 finalized the preparations for WTSA and agreed on the revised Questions ToR as well as the SG11 title, mandate, points of guidance and lead SG roles (updates to Resolution 2 of WTSA-20) for next study period.

Based on the discussion it was decided to merge Q15/11 and Q17/11. With such change the number of questions of SG11 is reduced to 13 Questions in total.

The outcomes of the SG11 NSP-WTSA discussion are available in:

* [SG11-TD821-R1/GEN](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T22-SG11-240501-TD-GEN-0821): Consolidated text of ToR of SG11 Questions for next Study Period (2025-2028) (Geneva, 1-10 May 2024)
* [SG11-TD822/GEN](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T22-SG11-240501-TD-GEN-0822): Consolidated text of SG11 Mandate for next Study Period (2025-2028) (Geneva, 1-10 May 2024)

Also, SG11 agreed the observations concerning future work of ITU-T SG11 for the upcoming study period 2025-2028 ([SG11-TD931-R3/GEN](https://www.itu.int/md/T22-SG11-240501-TD-GEN-0931/en)). These observations will be included in the SG11 Chair report to WTSA (Part I). SG11 informed TSAG RG-IEM about these observations ([SG11-LS207](https://www.itu.int/net/itu-t/ls/ls.aspx?isn=30326)) and TSAG and all SGs on its progress on preparation for WTSA-24 ([SG11-LS163](https://www.itu.int/net/itu-t/ls/ls.aspx?isn=30277)).

SG11 discussed LS from TSAG on latest WTSA Action Plan and draft “WTSA preparation guideline on Resolutions” ([SG11-TD878/GEN](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T22-SG11-240501-TD-GEN-0878)). SG11 provides updates for its latest activities with respect to the Resolution 96 and Resolution 97 of WTSA. The response is to be found in [SG11-LS206](http://handle.itu.int/11.1002/ls/sp17-sg11-oLS-00206.docx).

Also, SG11 considered iLS from TSAG on draft analysis of operational parts (resolves, instructs etc) of WTSA/PP/WTDC/Council/ITU-R Resolutions ([SG11-TD968/GEN](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T22-SG11-240501-TD-GEN-0968)). Since the SGs mandate should be general and could not cover many details in each study area, SG11 indicated that the resolves and instructs highlighted in the WTSA/PP/WTDC/Council/ITU-R Resolutions can help to identify Study Groups working on relevant study areas. The response is available in [SG11-LS209](http://handle.itu.int/11.1002/ls/sp17-sg11-oLS-00209.docx).

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

ITU continues organizing a series of events related to SG11 activities.

Since October 2023, SG11 along with SG2 organized informal ad-hoc meeting dedicated to discussion on work item Q.TSCA (virtual, 9 January 2024). More details are available in the LS addressed to WP1/11 in February 2024 ([SG11-TD132/WP1](https://www.itu.int/md/T22-SG11-240207-TD-WP1-0132)) and report submitted to TSAG ([TSAG-TD461](https://www.itu.int/md/T22-TSAG-240122-TD-GEN-0461/en)).

Additional informal ad-hoc session among SG2, SG11 and SG17 was organized on 23 May 2024 where SG11 experts introduced achieved progress.

Also, ITU organized a special session ITU “Ask the Expert” dedicated to “[Guardians of Authenticity: Battling Counterfeiting](https://www.itu.int/cities/digitaltransformationdialogues/counterfeiting/)” on 28 March 2024.

1. **ITU-T Focus Group on Testbeds Federations for IMT-2020 and beyond (FG-TBFxG)**

ITU-T SG11 was informed that during its last meeting held in Sophia Antipolis (France) on 10-12 April 2024, ITU-T FG-TBFxG completed and approved all its deliverables.

FG-TBFxG was established by ITU-T SG11 in 2021 in order to harmonize testbeds specifications across SDOs and Fora, develop the required application program interfaces (APIs) aligned with the testbeds federations reference model defined in Recommendation ITU-T Q.4068, as well as define a set of use cases for federated testbeds and associated APIs, such as “Testbed-as-a Service” (TaaS). The Focus Group was established following the results of the joint [ITU/IEEE/ETSI Workshop](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/20210316/Pages/default.aspx), which was organized in 2021.

Since its first meeting in April 2022, FG-TBFxG conducted eight meetings. It organized several introductory sessions, in form of webinars during the FG’s meetings, where different stakeholders shared their insights. In addition, the Focus Group leadership organized the webinar [Episode #27](https://www.itu.int/cities/standards4dt/ep27): Digital transformation of testing: federated testbeds as a service (virtual, 21 June 2023) which provided a general overview of the FG activities and the issue of distributed remote testing (federated testbeds).

Within two years term, the FG-TBFxG developed eight deliverables, which includes a set of 18 use cases for testbeds federations and associated requirements for different APIs. During its lifetime the FG-TBFxG actively collaborated with several SDOs/Fora and other stakeholders. The detailed presentation is available in [SG11-TD977/GEN](https://www.itu.int/md/T22-SG11-240501-TD-GEN-0977/en).

The progress report as well as all deliverables agreed by the FG-TBFxG are contained in [SG11-TD954/GEN](https://www.itu.int/md/T22-SG11-240501-TD-GEN-0954/en) and available on the Focus Group webpage at: <https://itu.int/go/fgtbf>.

Based on the received contributions, SG11 started eight new work items based on all FG-TBFxG deliverables. More details are available in WP3/11 report ([SG11-R26](https://www.itu.int/md/T22-SG11-R-0026/en)).

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.

SG11RG-AFR conducted its virtual meeting on 25-27 March 2024. As a result, two multi-country contributions were submitted and discussed at this particular SG11 meeting. The report was presented and noted during SG11 opening plenary ([AFR-R2](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T22-SG11RG.AFR-R-0002)).

There were no meetings of SG11RG-EECAT since last SG11 meeting.

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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