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| **Keywords:** | Signalling; protocols; IMT-2020, conformance; interoperability; testing; counterfeiting; stolen; ICT devices; CASC; |
| **Abstract:** | This document contains the report of the ITU-T SG11 on lead study group activities (January-September 2021). |

1. **Background**

According to Resolution 2 of WTSA-16, ITU-T SG11 is the lead study group on:

* Signalling and protocols, including for IMT-2020 technologies;
* 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. **Report of ITU-T SG11 on lead study group activities (January-September 2021)**
   1. **Signalling and protocols, including for IMT-2020 technologies**
      1. **Approved ITU-T Recommendations and agreed Supplements and Corrigendum on signalling aspects**

ITU-T SG11 is developing signalling requirements and protocols for VoLTE, IMS-based networks, computing power networks, virtual broadband network services, cloud-network-converged networks gateway, Service Function Chain, Quantum key distribution networks, Network intelligence capability enhancement, etc.

Since January 2021, SG11 approved new Recommendation ITU-T Q.4067 “Signalling requirements for VNF lifecycle management under the testing environment”. It specifies the process and signalling requirements for virtualized network function (VNF) lifecycle management in a testing environment by architecturally adding the testing platform in the network functions virtualization (NFV) framework. The signalling focuses on the interface between the VNF instantiation functional component in a testing platform and the network functions virtualization orchestrator (NFVO) functional component in management and orchestration (MANO).

SG11 continues progressing 22 ongoing work items on signalling aspects.

* + 1. **IMT-2020 and managed P2P communications related issues**

ITU-T SG11 continues activities which are aimed at developing standards on IMT-2020-related protocols.

Since January 2021, SG11 approved new Recommendation ITU-T Q.5023 “Protocol for managing intelligent network slicing with AI-assisted analysis in IMT-2020 network”. It specifies protocol for managing intelligent network slicing with AI-assisted network analysis function in IMT-2020 networks. It describes architectural concept of intelligent network slicing APIs and management system, reference points among relevant functional elements, signalling flows over each reference point, and message formats with detail information.

Currently, there are eleven ongoing work items on IMT-2020-related issues.

Regarding managed P2P communications, SG11 approved new Recommendation ITU-T Q.4101 “Hybrid peer-to-peer (P2P) communications: Tree and data recovery procedures”. It specifies the procedures for construction and recovery of the tree-based hybrid overlay network, and also specifies the procedures for recovering data that may been lost during the tree recovery procedures.

SG11 continues progressing three ongoing work items on signalling aspects for P2P communications.

* + 1. **Security issues of SS7 and other protocols**

Following the approval of Recommendation ITU-T Q.3057 “Signalling requirements and architecture for interconnection between trustable network entities”, SG11 continues working on Q.PRO-Trust “Signalling procedures and protocols for enabling interconnection between trustable network entities in support of existing and emerging networks”, which will be based on TCAPSec (3GPP TS 33.204 Release 16) for existing STPs to support it without requiring an update. The draft Q.PRO-Trust defines the signalling procedures and protocols involved in the application of the signalling requirements and architecture, TSa, Sa and Sc defined in ITU-T Q.3057 for interconnection between trustable network entities in support of existing and emerging networks.

Also, SG11 continues improving signalling-based services and protocols to be used for calling party identification presentation/restriction (e.g., basic calls, supplementary services such as CLIP/CLIR, USSD, etc.) for all types of networks. Currently, SG11 develops:

* Draft Recommendation ITU-T Q.CIDA “Signalling procedures of calling line identification authentication”, which will use X.509 digital certificates signed by a TSCA;
* Draft Technical Report ITU-T TR-USSD “Low resource requirement, quantum resistant, encryption of USSD messages for use in Financial services”.

In order to follow the demarcation lines established between two Study Groups ([TSAG-TD934](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSAG-210111-TD-GEN-0934)), SG11 kept SG17, particularly Q11/17, informed on the progress of ITU-T Q.Pro-Trust and ITU-T TR-USSD. With regard to Q.Pro-Trust, SG11 seeks SG17’s view on the techniques and information elements required for a secure authentication of ownership of the security domain that the operator wishes to receive an End Entity Certificate (EEC).

SG11 continues progressing three ongoing work items on security of signalling protocols.

* + 1. **VoLTE/ViLTE interconnection and VoLTE-related issues**

SG11 has made progress on the following draft Recommendations:

* ITU-T Q.LiteIMS-SA “Signalling architecture of Lite IMS for IMT-2020 advanced network”;
* ITU-T Q.VoLTE-SAO-FP “Framework and protocols for signalling network analyses and optimization in VoLTE”;
* ITU-T Q.Sig\_Req\_ETS\_IMS\_roaming “Signalling requirements for emergency telecommunication service in IMS roaming environment”.

SG11 started a new work item Q.ISDN-SIP “Interworking between ISDN and the IP Multimedia (IM) Core Network (CN) subsystem”.

In order to provide overview of SG11 achievements and to identify the future standardization activities on IMS/VoLET/ViLTE-related signalling issues, SG11 organized a Workshop on protocol enhancements for IMS to be used in LTE/IMT-2020 Networks and Beyond (virtual, 5 July 2021, [www.itu.int/go/IMS4-5GB](http://www.itu.int/go/IMS4-5GB)). It was organized back-to-back with SG11 RGM e-meetings followed by WP1/11, WP2/11 and WP3/11 virtual meetings.

* 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. **Approved ITU-T Recommendations on conformance and interoperability testing**

SG11 approved the following new Recommendations:

* ITU-T Q.4065 “Framework of model network for Tactile Internet testing” describes the architecture, scenarios, and key networks metrics for establishing model network for testing tactile Internet services. Specifically, the aim of a model network is to study the general principles of data generation for transmission of a tactile sensation through the telecommunication networks, including analysis of the network latency and other network performance parameters.
* ITU-T Q.4044 “Test suite for interoperability testing of virtual switch” provides test suite for interoperability testing of virtual switch, which contains test cases specifying the test objective, test procedures and expected results.
* ITU-T Q.4068 “Open APIs for interoperable testbed federations” presents a set of open APIs for interoperable testbed federation able to manage not only the interconnection and the interoperability of testbeds in a federation, but also to handle the resources advertisement, allocation and provision. The APIs are designed to manage the users involved in the federation like the experimenters and to assign roles to the users. In the same way, the usage of a resource is attributed to an experimenter through the open APIs for interoperable testbed federation.

The Corrigendum 1 to Recommendation ITU-T Q.3961 “Parameters for bottleneck evaluation of the web-browsing service” was approved by SG11.

Following oLS that SG11 sent to ITU-R WP5D in December 2020, SG11 was kept informed that the Technical Paper TP-TEST-UE-MS “Guideline for general test procedure and specification for measurements of the LTE, 3G/2G user equipment/mobile stations (UE/MS) for over-the-air performance testing” falls within the R-sector. ITU-T SG11 understood that the matter that is addressed is under the responsibility of the ITU-R and SG11 decided to withdraw this report. The report will remain available from the webpage, as all deleted/withdrawn ITU-T documents should stay available for historical purposes due to possible cross referencing from external publications.

SG11 continues progressing six ongoing work items on testing aspects.

* + 1. **Implementation of ITU C&I Programme**

ITU-T SG11 maintains the reference table of ITU-T Recommendations suitable for C&I testing ([www.itu.int/go/reference-table](https://www.itu.int/go/reference-table)). The information is made available on the [ITU C&I Portal](https://www.itu.int/en/ITU-T/C-I/Pages/default.aspx).

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

The twelfth meeting of the ITU-T Conformity Assessment Steering Committee (CASC) was held virtually on 19 March 2021 during the ITU-T SG11 virtual meeting.

Following presentation provided by ILAC, it was noted that ILAC develops a procedure for Testing Laboratories seeking accreditation for ITU Recommendations. According to this procedure, a testing laboratory that wishes to become an ITU recognized testing laboratory, and which is already accredited for ITU Recommendations may apply to ITU for recognition. ITU can confirm validity by communicating directly with the relevant Accreditation Body, which is a normal procedure if a risk to validity is considered. The procedure will be finalized and made available by the end of 2021. There are no financial implications for ITU for implementing such procedures. Financial implications for TLs are to be covered by the cost structures of the ABs.

CASC decided that ITU may recognize TLs that have been accredited by ILAC MRA signatories AB which have ITU Recommendations in its scope of accreditation. ITU may approach those TLs. A test laboratory accredited for ITU Recommendations may apply to ITU for recognition by supplying, amongst other things: the identity of the AB (ILAC MRA signatory) performing the accreditation and relevant part of the scope of accreditation. TSB was requested to create relevant application form to be made available on the C&I Portal.

More details are available in the [ITU-T CASC report](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-SG11-R-0042).

The next CASC virtual meeting is scheduled for 3 December 2021. It will be held during next SG11 meeting (virtual, 1-10 December 2021). More information is available on the [CASC web page](https://www.itu.int/en/ITU-T/studygroups/2017-2020/11/Pages/CASC.aspx).

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

SG11 approved new Recommendation ITU-T Q.5053 “Mobile device access list audit interface”. It defines different types of methodologies and interfaces to check and reconcile the Mobile device access list used by the Mobile Network Operators to comply with the regulations with the Mobile device access list Audit System (MDALAS).

SG11 agreed two Supplements:

* ITU-T Q Suppl.73 “Guidelines for Permissive versus Restrictive System Implementations to address counterfeit, stolen and illegal mobile devices” provides guidelines for permissive versus restrictive system deployments that should be considered when deciding what approach to employ in order to address the issues of counterfeit, illegal and stolen mobile devices;
* ITU-T Q Suppl.74 “Roadmap for the Q.5050-series - Combat of Counterfeit ICT and Stolen Mobile Devices” provides an overall index and relation of the ITU-T Q.5050-series of Recommendations. Additionally, it provides a cross-reference of the macro-process for combating counterfeit ICT and stolen mobile devices with the related Recommendations, Technical Reports and Supplements.

In March 2021, following TSAG endorsement of the set of Questions for all the ITU-T study groups for the remainder of the Study Period, SG11 started a new Question 17/11 “Combating counterfeit or tampered telecommunication/ICT software”. The first work item TR-MCM-Use-Cases “Use Cases on the combat of Multimedia Content Misappropriation” was successfully started in March 2021.

SG11 continues progressing six ongoing work items on this subject matter.

1. **ITU-T SG11 Workshops**

Since January 2021, SG11 organized four Workshops/Webinars, as follows:

* **Joint ITU-ETSI-IEEE Brainstorming Workshop on Testbeds Federations for 5G and Beyond: Interoperability, Standardization, Reference Model and APIs** (virtual, 15-16 March 2021).

This Workshop provided a platform for ETSI, ITU-T and IEEE to Brainstorm and share ideas on Testbeds Federation Challenges, including:

* + The Testbeds Federation Reference Model being jointly standardized by ETSI and ITU;
  + APIs Requirements for Testbeds Federations and what may have been achieved in this area with respect to existing API implementations by Research communities and the Industry;
  + How to use the Reference Model to guide Research and Industry to contribute to the development of the APIs being prescribed by the Reference Model;
  + How the SDOs can potentially share the burden on APIs Standardization and on Roadmaps in a harmonized and collaborative way;
  + Potential New Business Models for Testbeds Suppliers that derive from the Testbeds Federations Reference Model.

According to the key takeaways of the Workshop, the creation of the ITU-T Focus Group on Testbed Federations might be a good way forward in order to engage various stakeholders to contribute. The official proposals on the creation of such group are highly encouraged.

Following the outcomes of the Workshop and received Contribution, SG11 has made progress on draft ITU-T Q.4068 “Open API for interoperable testbed federations”, which defines reference model and APIs of Testbed Federations. This work went in close collaboration with ETSI TC INT. The Recommendation ITU-T Q.4068 was finalized and finally approved in August 2021.

The summary and the key takeaways of the Workshop are available at: [www.itu.int/go/BTF4-5G](http://www.itu.int/go/BTF4-5G).

* **Session 406 “Combating counterfeit telecommunication/ICT devices and software”** during WSIS Forum 2021 (virtual, 7 May 2021).

The session objectives were to provide an overview of existing challenges, solutions and standardization activities on combating counterfeiting of ICT devices and software which are currently under study in ITU-T SG11. It was also used as a platform for discussion among all stakeholders about the key challenges that they now face and identify the potential new standardization areas which ITU may need to consider.

The outcomes and all materials including presentations are available on its webpage at: <https://www.itu.int/net4/wsis/forum/2021/Agenda/Session/406>.

* **Joint ITU/MWF Webinar "Combating Counterfeit and Irregular Mobile Devices: How to address the Problem"** (virtual, 31 May 2021).

The Webinar provided an overview of ITU-T SG11 activities on combating counterfeiting, presented a geographically diverse overview of the different use cases and also discussed potential open-source solutions to address these issues. The ITU and the Mobile & Wireless Forum (MWF) invited all interested parties to discuss use cases to tackle the counterfeiting of mobile devices.

All materials are available at: [www.itu.int/go/WCC-MD](http://www.itu.int/go/WCC-MD).

* **ITU Workshop on "Protocol Enhancements for IMS to be used in LTE/IMT-2020 Networks and Beyond"** (virtual, 5 July 2021).

The aim of the Workshop was to give an overview of achieved outcomes and ongoing activities of standardization work for IMS protocols in ITU-T and other SDOs, to share the worldwide practice and perspectives on IMS over LTE/IMT-2020 and beyond networks, to identify main issues and discuss the way forward to improve the standardization work for IMS over LTE/IMT-2020 and beyond networks. This Workshop also provided a platform for participants to share their views, findings, latest research, and experience in relation to IMS and Voice over LTE/IMT-2020 technologies.

The key takeaways and all presentations are available at: [www.itu.int/go/IMS4-5GB](http://www.itu.int/go/IMS4-5GB).

1. **SG11 Regional Groups**

There were no SG11 Regional Groups meetings since January 2021.

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