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| **Keywords:** | Signalling; protocols; IMT-2020, conformance; interoperability; testing; counterfeiting; stolen; ICT devices; CASC; |
| **Abstract:** | This report contains the report of the ITU-T SG11 on lead study group activities (October 2019 – January 2020). |

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 (October 2019 – January 2020)**
	1. **Signalling and protocols, including for IMT-2020 technologies**
		1. **Approved ITU-T Recommendations and agreed Supplements and Corrigendum on signalling aspects**

The following ITU-T Recommendations have been approved since October 2019:

* New ITU-T Q.3719: Signalling requirements for the separation of control plane and user plane in vBNG (Broadband Network Gateway);
* New ITU-T Q.3055: Signalling protocol for Heterogeneous IoT gateways;
* New ITU-T Q.3056: Signaling procedures of the probes to be used for remote testing of network parameters;
* New ITU-T Q.3916: Signalling requirements and architecture for the Internet service quality monitoring system;
	+ 1. **IMT-2020, managed P2P communications and AI-related issues**

ITU-T SG11 continues activities which are aimed at developing standards on IMT-2020-related protocols. Since October 2019, under the subcategory of Q.series – Q.5000-Q.5049 “Signalling requirements and protocols for IMT-2020”, SG11 approved ITU-T Q.5002: Signalling requirement and architecture for media service entity attachment. Also, SG11 approved new ITU-T X.609.8 (ex. X.mp2p-ldmp) “Managed P2P communications: Management protocol for live data sources”. SG11 continues progressing 6 ongoing work items.

There are three new work items on 5G and AI-related protocols/signalling requirements which were initiated in October 2019:

* ITU-T Q.IMT2020-PIAS “Protocol for providing intelligent analysis services in IMT-2020 network” which specifies architecture for supporting intelligent analysis services in IMT-2020 network, and intelligent analysis services offered by Data Analysis Function (DAF) including load balancing, network functions fault location and advance warning, device on/off analysis, mobility analysis, etc. It includes signalling flows for network functions (NFs) event exposure to DAF and DAF analytics exposure to NFs, message format, and security considerations;
* ITU-T Q.WLAN5G-REQ “Signalling requirements of WLAN access network for interworking with 5G network” which describes signalling architecture, signalling requirements and signalling protocol procedures for WLAN access network to interwork with 5G network, focusing on the interworking procedures between Layer 2 and Layer 3 for providing end-to-end QoS;
* ITU-T X.HP2P-pp “Hybrid P2P communications: Peer protocol”, which describes peer protocol for tree-based overlay network in hybrid P2P architecture.
	+ 1. **SS7 issues**

SG11 organized a “[Brainstorming session on SS7 vulnerabilities and the impact on different industries including digital financial services](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/102019/Pages/default.aspx)” (Geneva, 22 October 2019). The objective of the event was to discuss the potential way forward to enhance the security mechanisms of existing protocols and its adoption rate among telecom operators in order to defend all stakeholders such as Telco operators, banks, operators of financial services, regulators and individual clients from related attacks.

SG11 achieved progress on the ongoing draft Recommendation ITU-T Q.SR-Trust “Signalling requirements and architecture for interconnection between trustable network entities” which defines the signalling architecture and requirement for interconnection between trustable network entities in support of existing and emerging networks.

Also, following SG11 Brainstorming session on SS7 vulnerabilities (22 October 2019), SG11 will consider a possibility to start new work items dealing with framework of signalling certification centres to be used for interconnection between trustable network entities based on the ongoing SG11 work item Q.SR-Trust. SG11 informed 3GPP TSG SA3, SG2, SG17 and GSMA FASG DESS respectively (SG11-LS105).

Finally, SG11 agreed the Technical report ITU-T TR-SS7-DFS “SS7 vulnerabilities and mitigation measures for digital financial services transactions”.

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

SG11 is going to determine the draft Recommendation ITU-T Q.3643 (ex. Q.DEN\_IMS) "Signalling architecture of distributed ENUM networking for IMS" next SG11 meeting in March 2020.

SG11 approved new Recommendation ITU-T Q.3644 “Requirements for signalling network analyses and optimization in VoLTE” and started the new work item ITU-T Q.VoLTE-SAO-FP “Framework and protocols for signalling network analyses and optimization in VoLTE”, which among signaling requirements specifies the AI-assisted functions.

* 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 new Recommendations: ITU-T Q.3056 “Signalling procedures of the probes to be used for remote testing of network parameters” and ITU-T Q.3916 “Signalling requirements and architecture for the Internet service quality monitoring system”.

Also, SG11 agreed the following supplement and technical report:

* ITU-T 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”;
* Supplement 71 to ITU-T Q-series of Recommendations “Testing methodologies of Internet related performance measurements including e2e bit rate within the fixed and mobile operator’s networks”.

SG11 has made progress on the following draft Recommendations:

* ITU-T Q.39\_FW\_Test\_ID\_IoT: The framework of testing of identification systems used in IoT;
* ITU-T Q.FW\_IoT/Test: Framework for IoT Testing;
* ITU-T Q.vbng-iop-reqts: Interoperability testing requirements of virtual Broadband Network Gateway.

SG11 also started a new work item on draft Recommendation ITU-T Q.vs-iop-ts “Test suite for interoperability testing of virtual switch”.

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

Following inputs received from different ITU-T SGs, ITU-T SG11 updated 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 was updated on the [ITU C&I Portal](https://www.itu.int/en/ITU-T/C-I/Pages/default.aspx) accordingly.

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

The eighth meeting of the ITU-T Conformity Assessment Steering Committee (CASC) took place during ITU-T SG11 meeting on 18 October 2019.

CASC revised the existing Guideline “ITU-T CASC procedure to appoint ITU-T technical expert” and appointed 11 technical experts proposed by ITU-T SG2, SG5 and SG16 and several individuals, who applied to be appointed as ITU-T technical experts.

It was noted that the appointed ITU-T technical experts might be included in the IECEE assessment team to assess Testing Laboratories (TLs), which demand to be recognized as TLs with the competence on particular ITU-T Recommendations. All ITU-T SGs were invited to nominate their candidates on the relevant ITU-T Recommendations (within the mandate of the particular SG).

ITU-T SG16 requested CASC to set up a joint ITU/IEC certification schemes for several ICT technologies that have strong demand of the ICT market. Among them are:

* “safe listening” driven by SG16 in close collaboration with WHO;
* “video surveillance”;
* “Accessibility features in IPTV systems”.

It was noted that there is a market need that all relevant activities on TL recognition procedure, as well as certification schemes for such technologies, need to be put in place by mid 2020. It gives a possibility for all interested stakeholders to start TL recognition procedures and certify products by the end of 2020. IECEE CMC WG33 was informed accordingly.

Additionally, further to the request from IECEE CMC WG33, CASC decided to disseminate a questionnaire (<https://www.research.net/r/SG11-ITU-IEC-TL>) on evaluation of market needs for joint ITU/IEC TL recognition procedure and certification schemes on ITU-T Recommendations. The aim of the questionnaire is to evaluate the market needs of the in-progress joint ITU/IEC work to establish a peer assessment laboratory service (testing laboratory recognition procedure) and the joint conformity assessment program (joint ITU/IEC certification schemes) on ITU-T Recommendations. Such an analysis would help ITU-T CASC and IECEE CMC WG33 to understand the volume of the ICT market for establishing such new services.

The next CASC e-meeting is scheduled to be held on 23 January 2020, the next physical CASC meeting will take place in Geneva during next SG11 meeting on 6 March 2020.

* 1. **Combating counterfeiting of ICT devices**

SG11 continues the work on draft Recommendation ITU-T TR-RLB-IMEI "Reliability of IMEI”, which describes the common concept of IMEI, including its format, allocation procedure and security issues. In addition, the report provides information about existing vulnerabilities in terms of IMEI reprogramming and proposes some preventive measures along with possible solutions to cope with the issue.

ITU-T TR-RLB-IMEI was initiated at the previous SG11 meeting as a consequence of the received contributions, ITU Council-18 decision (C18/107) and the report prepared by TSB. Since October 2019, SG11 agreed to submit a questionnaire on IMEI reliability. This survey will help to collect data on this matter to support the work item. All interested parties, including non-ITU members are invited to complete the questionnaire (<https://www.research.net/r/SG11-IMEI>) by 31 May 2020 at the latest. More details are available in TSB-Circular 207.

SG11 achieved progress on draft Technical Report ITU-T TR-BP\_CF "Guidelines on Best Practice and Solutions for Combating Counterfeit ICT Devices".

Also, SG11 decided to start several new work items, as follows:

* draft Recommendation ITU-T Q.BL-Audit “Audit interface for blacklisting IMEI” (SG11-TD1071/GEN);
* Technical Report (TR-FCM): Framework on combating counterfeit and stolen mobile devices in African region, which defines requirements for the deployment of a harmonised system to combat the circulation and use of counterfeit/stolen mobile devices in the African region. It will contain implementation guidelines;
* Technical Report (TR-GAA): Common guidelines for conformity assessment in African Region in order to assist in the combat counterfeit ICT devices, which defines the common requirements and guidelines for African Region to assess conformity of ICT devices in order to assist in the combat counterfeit ICT devices.
	1. **Combating the use of stolen ICT devices**

SG11 determined draft new Recommendation ITU-T Q.5051 (ex. Q.FW\_CSM) “Framework for Combating the use of Stolen Mobile Devices” which contains the reference framework and requirements that should be considered when deploying solutions to combat the use of stolen Mobile Devices.

SG11 intends to approve this draft Recommendation following Member States consultation (see TSB Circular 205) at the next SG11 meeting in Geneva, 4-13 March 2020.

1. **ITU-T SG11 workshops**
	1. **Third ITU-T Study Group 11 Regional Workshop for Africa on “Counterfeit ICT Devices, Conformance and Interoperability Testing Challenges in Africa”**

The third Workshop on “Counterfeit ICT Devices, Conformance and Interoperability Testing Challenges in Africa” was organized back-to-back with the SG11RG-AFR meeting.

It is a continuation of the series of SG11 Regional Workshops for Africa which aim is to identify and discuss issues related to combatting counterfeiting and Conformance and Interoperability (C&I), with a focus in the African region and ongoing activities under ITU-T SG11 and ITU-T SG11RG-AFR.

Some ideas discussed at this particular event were further discussed at the SG11RG-AFR meeting and afterwards were reflected in the contributions submitted from the ITU members of the African region to SG11.

The detailed outcomes of the workshop are available in [SG11RG-AFR-TD41R1](https://www.itu.int/md/T17-SG11RG.AFR-190930-TD-PLEN-0041/en).

* 1. **ITU Workshop on Benchmarking of emerging technologies and applications. Internet related performance measurements**

The ITU Brainstorming session on SS7 vulnerabilities took place on 22 October 2019 during SG11 meeting. The event was organized following market demand due to complains received from multiple customers of banks and Telco operators related to different attacks such as spoofing telephone numbers (i.e. annoying advertisement phone calls), hijacking bank assets via illegal usage of e-banking systems, location tracking, intercept calls and messages among others. All of these attacks are possible due to gaps in existing signalling protocols used in Telco (SS7, DIAMETER, etc.). These originate from legacy networks based on Signalling System Number 7 (SS7), which was developed by ITU 30 years ago. At that time, the SS7 stack was developed on the way to be used in the dedicated standalone network provided limit number of services. Currently, all SS7 based networks and their successors (DIAMETER, SIGTRAN, etc.) have become a platform for Digital Financial Services.

As a result, hackers have used the gaps of such protocols to take-over of banks assets. The event was based on interactive session where all participated stakeholders were able to express their views on the current issues and indicated the way forward.

During Brainstorming session, SG11 was encouraged to continue activities on security of signaling protocols in collaboration with SG17 and SG2 respectively.

Two videos of the potential attacks are made available on the event’s web page:

* [SMS One Time Password (OTP) intercept (PayPal hack)](https://youtu.be/hA8TcfJpmx8);
* [SS7 call intercept](https://youtu.be/_FfMSec5B4Q).

The detailed outcomes of the workshop are available in [SG11-TD928/GEN](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-SG11-191016-TD-GEN-0928).

1. **SG11 Regional groups**

The [SG11RG-AFR](https://www.itu.int/en/ITU-T/studygroups/2017-2020/11/sg11rgafr/Pages/default.aspx) took place in Tunis (Tunisia) from 30 September to 2 October 2019. It was preceded by the third ITU-T Study Group 11 Regional Workshop for Africa on “Counterfeit ICT Devices, Conformance and Interoperability Testing Challenges in Africa” (30 September 2019, Tunis).

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