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| **Contact:** | | Andrey Kucheryavy Russian Federation | | Tel: +7 921 3140320 E-mail: [akouch@mail.ru](mailto:akouch@mail.ru) |

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

SG11 approved new Recommendation ITU-T Q.3745 (ex. Q.QMP-TCA) “Protocol for time constraint IoT-based applications over SDN" which describes the protocol for providing requested (by IoT server) network performance requirements for IoT applications in SDN and NFV based networks (IMT2020).

In July 2020, SG11 consented the following Recommendations:

* ITU-T Q.3058 (ex. Q.NGNe-O-SA): Signalling architecture of orchestration in NGNe. It provides the signalling architecture for orchestration in NGNe. Based on the functional architecture of orchestration in NGNe, it introduces the reference points and specifies the mapping of reference points to interfaces in the signalling architecture of orchestration in NGNe. It also provides the signalling requirements of the interfaces and defines the protocols used for interfaces;
* ITU-T Q.3059 (ex. Q.SFD): Signalling requirements for service function discovery. It specifies the signalling requirements for service function discovery based on its functional architecture. The signalling is for service function path controller to discover and select the service function;
* ITU-T Q.3720 (ex. Q.BNG-PAC): Procedures for vBNG acceleration with programmable acceleration card. It specifies the framework, working modes, and procedures for vBNG acceleration with programmable acceleration card.

SG11 continues progressing 8 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 February 2020, SG11 approved new Recommendation ITU-T Q.5022 “Signalling procedure of energy efficient device-to-device communication for IMT-2020 network” which defines procedure for device-to-device (D2D) communication based on energy efficient intra-cell clustering and ability to reuse frequencies between intra-cell clusters.

With regards to managed P2P communications, SG11 achieved the following progress:

* Approved the revised Recommendation ITU-T X.609.5 which title was changed to “Managed P2P communications: Overlay management protocol”;
* Consented draft new Recommendation ITU-T X.609.9 (ex. X.mp2p-ocmp): Managed P2P communications: Overlay content management protocol. It specifies an overlay content management protocol (OCMP) that runs on an interface between an index server and a peer to carry meta-information of overlay content over managed peer-to-peer (MP2P) architecture defined in Rec. ITU-T X.609. The meta-information includes attributes of a content to be distributed and mapping information with an overlay network. This Recommendation provides message formats and protocol operations;
* Consented draft new Recommendation ITU-T X.609.10 (ex. X.mp2p-srds): Managed P2P communications: Signalling requirements for data streaming. It defines the signalling requirements for data streaming that runs on the reference points among related entities of the managed P2P network communications. This Recommendation also addresses service procedures for providing data streaming services based on managed peer-to-peer networks;
* Consented draft new Recommendation ITU-T Q.4100 (ex. Q.HP2P-Arch): Hybrid peer-to-peer (P2P) communications: Functional architecture. The hybrid P2P network can be composed of tree-based overlay network and mesh-based overlay network in order to utilize the advantages of each type of overlay network. The tree-based overlay network will be used for fast distribution of small data, and the mesh-based network will be used for distribution of relatively larger sized data. This Recommendation specifies the functional architecture and the reference points for the hybrid peer-to-peer networking with information flows.

In addition, in July 2020, SG11 decided to create a new sub-category for Q.series: “Q.4100-4139: Protocols and signalling for P2P communications”.

SG11 continues progressing 12 ongoing work items on signaling aspects for IMT-2020 and P2P communications.

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

SG11 approved new Recommendation ITU-T Q.3057 (ex. Q.SR-Trust) “Signalling requirements and architecture for interconnection between trustable network entities”, which specifies the signalling architecture and requirement for interconnection between trustable network entities in support of existing and emerging networks. Based on the architecture, it specifies the interfaces and signalling requirements between the functional entities and signalling procedures to be applied.

Following the approval of ITU-T Q.3057 “Signalling requirements and architecture for interconnection between trustable network entities”, SG11 started new work item Q.Pro-Trust “Signalling procedures and protocols for enabling interconnection between trustable network entities in support of existing and emerging networks”. It 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, as a continuation of the previous related activities, including those related to financial services, SG11 achieved progress on:

* ITU-T Q.CIDA: Signalling requirements of calling line identification authentication;
* ITU-T TR-USSD: Low resource requirement, quantum resistant, encryption of USSD messages for use in financial services.
  + 1. **VoLTE/ViLTE interconnection and VoLTE-related issues**

Further to TSB Circular 241 of 1 April 2020, and pursuant to clause 9.5 of Resolution 1 (Rev. Hammamet, 2016), ITU-T Study Group 11 (Signalling requirements, protocols, test specifications and combating counterfeit products), during its opening plenary on 22 July 2020, approved new Recommendation ITU-T Q.3643: Signalling architecture of distributed infrastructure ENUM networking for IMS. This Recommendation defines the framework and signalling architecture for distributed ENUM networking in support of IMS interconnection. Based on the signalling architecture of a distributed ENUM model, this Recommendation specifies the signalling procedures of ENUM profile management and ENUM resolution. Additionally, the signalling requirements and protocols to be applied for interfaces of distributed ENUM networking are addressed.

Moreover, SG11 consented draft new Recommendation ITU-T Q.3645 (ex. Q.Pro-DES): Protocol at interface between two distributed ENUM servers for IMS. It defines protocol at the interface between two Distributed ENUM Servers (DES) of distributed ENUM system in support of IMS interconnection. Based on the functions and signalling requirements defined in ITU T Q.3643, this Recommendation provides the reference model, procedures, protocol, and message specification for the interface between two DES.

In addition, SG11 has made progress on Q.VoLTE-SAO-FP: Framework and protocols for signalling network analyses and optimization in VoLTE.

* + 1. **Emergency telecommunications**

SG11 consented draft new Recommendation ITU-T Q.3060 (ex. Q.ETN-DS): Signalling architecture of the fast deployment emergency telecommunication network to be used in a natural disaster. It describes general framework of the fast deployment emergency telecommunication network to be used in a natural disaster.

Also, SG11 agreed one new Q.Supplement 72 (ex. Q.suppl.ETS\_Multi\_Access): Signalling requirements for IMS emergency telecommunications service in support of multiple accesses. It defines the signalling requirements for IMS emergency telecommunications service in support of multiple accesses including fixed broadband, Wi-Fi, 4G and 5G networks.

* 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 Recommendation ITU-T Q.3963 (ex. Q.SDN-OFT) “The compatibility testing of SDN-based equipment using OpenFlow protocol”, which describes compatibility testing of devices using the OpenFlow protocols. This Recommendation specifies the means and methods for testing in laboratory conditions using a model network.

In July 2020, SG11 consented six draft new Recommendations, as follows:

* ITU-T Q.4066 (ex Q.TP\_AR): Testing procedures of Augmented Reality applications. It describes the procedure for testing augmented reality (AR) applications. In particular, it contains: classification of AR applications, general architecture of the AR application testing model and test specifications for testing various AR applications;
* ITU-T Q.4062 (ex Q.FW\_IoT/Test): Framework for IoT Testing. It specifies the testing framework for IoT to accommodate the tests for such integrated domains with multiple access technologies;
* ITU-T Q.4063 (ex Q.39\_FW\_Test\_ID\_IoT): The framework of testing of identification systems used in IoT. It provides approaches of identification of devices used in Internet of Things (IoT). There are a lot of applications of IoT, the testing of their identity might be considered as it allows customer to ensure the authenticity of the IoT. The classification of IoT, in terms of testing of their identification procedures and the relevant testing procedures are also subjects of this Recommendation;
* ITU-T Q.3915 (ex Q.BNGP): Set of parameters of vBNG for monitoring. It describes the monitoring architecture and requirements of virtual Broadband Network Gateway(vBNG), and specifies a set of parameters which will be monitored during the lifecycle of a vBNG instance;
* ITU-T Q.3961 (ex Q.PWS): Parameters for evaluating bottleneck of web-browsing service. It defines parameters for evaluating bottleneck of web-browsing service, including parameters in the network layer, in the transportation layer and in the application layer, and the characteristic parameters. The relationship between these parameters is also introduced;
* ITU-T Q.4064 (ex Q.vbng-iop-reqts): Interoperability testing requirements of virtual Broadband Network Gateway. It aims to specify virtual BNG (vBNG) interoperability testing requirements.

SG11 continues progressing 7 ongoing work items on testing aspects.

* + 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 tenth meeting of the ITU-T Conformity Assessment Steering Committee (CASC), which took place during ITU-T SG11 meeting on 6 March 2020, focused on the feedback received from IECEE CMC WG33 on the SG11 LS which informs IECEE on the survey’s outcomes and recall about SG11 request on proposed technologies as candidates for joint ITU/IEC certification schemes (such as safe listening, video surveillance and accessibility features in IPTV systems).

From IECEE CMC WG33 perspective, the targeted deadline within 2020 did not seem feasible for establishing ITU/IEC joint certification schemes as the new ITU-T conformity assessment service should be approved by IECEE CMC first.

With regards to the self-declaration approach, IECEE CMC WG33 replied that CB Scheme is based on third party testing and conformity assessment. Therefore, the acceptance of self-declared test results is not possible.

The eleventh meeting of the ITU-T Conformity Assessment Steering Committee (CASC), which was held virtually during ITU-T SG11 virtual meeting on 24 July 2020, focused on contribution received from IEC titled Presentation on Requirements for Test Labs ("CBTLs") at IECEE and the incoming liaison from ILAC, which contains ILAC Survey Report issued in June 2020.

IEC specifies the roles and requirements for the Testing Laboratories and the Certification Bodies using the IECEE CB Scheme. It was also indicated that as a non-for-profit organization, there was a need to cover IECEE cost of operations and so the IECEE Operational Document (OD-2026) which specifies the requirements for TL recognition process will be implemented for the ITU. This means IECEE programme with ITU will have financial implication, as follows:

* TL shall pay around 14 000 Swiss Francs (CHF) for the TL recognition assessment;
* ITU shall also pay 45 000 Swiss Francs (CHF) annually to IEC to maintain such new scheme.

During discussion, it was highlighted that:

* CASC plan is to implement a simple and transparent procedure that allows TL to be recognized by ITU in order to populate ITU Product Conformity Database. Currently, ITU is not able to do it by its own, but WTSA-16 requested ITU to collaborate with IECEE and ILAC on this matter;
* ITU received several requests from TLs wishing to be recognized asking CASC to provide guidance on the way forward;
* In October 2019, CASC initiated a Questionnaire on TL recognition procedure and joint ITU/IEC certification scheme according to the request received from IECEE CMC WG33. The results were positive and most of replies suggests keep going on. Financial implications for TLs and ITU itself were not anticipated.

Finally, following discussion taken place at the CASC meeting, it was decided that the standalone ITU/IECEE TL recognition procedure, which comes with extra costs for TLs, is not needed, as there is no financial benefit in return for TLs who might wish to populate the ITU Product Conformity Database only.

With regards to the joint certification scheme, CASC decided to put it on hold in order to give ITU-T SGs a possibility to consider all provided financial details and provide CASC feedback whether such joint certification scheme is of interest of their members, taking into consideration financial implications. The relevant oLSs were sent to ITU-T SGs and to IECEE respectively.

During CASC meeting, ILAC presented outcomes of ILAC survey to identify Testing Laboratories accredited to perform testing in accordance with ITU-T Recommendations. The response rate was reasonable at 68%.

CASC encouraged ILAC to propose procedures on further collaboration at the next CASC meeting. It is assumed that these procedures should allow CASC to recognize TLs kindly provided by ILAC, without any additional assessment. The relevant LS was sent to ILAC respectively.

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

SG11 consented draft new Recommendation ITU-T Q.5052 (ex Q.DEV\_DUI): Addressing mobile devices with duplicate unique identifiers. It identifies challenges and proposes mechanisms to enable the detection of mobile devices with duplicate identifiers present on operator networks as well as recommending mechanisms for validating the legitimacy of such devices.

SG11 agreed the new Technical Report ITU-T QTR-RLB-IMEI (ex TR-RLB-IMEI) “Reliability of IMEI”. It contains a study on the reliability of IMEI, including information about key vulnerabilities to IMEI reprogramming on mobile devices, challenges to make the IMEI non-reprogrammable, effects of IMEI tampering on mobile users, brand owners, manufacturers, service providers, regulators, governments, law enforcement agencies and on national security. It addresses key challenges faced by a range of stakeholders that arise from cloned/tampered IMEIs, including concerns about the misuse of IMEI numbers raised by Member States at ITU Council-17 and ITU Council-18. It also proposes ways to improve IMEI reliability and preventive steps for solving the issues on a national and international level.

In March 2020, in the way to advance the work item ITU-T Q.Sup.CFS-Use-Cases, SG11 decided to dissemenate a call for use cases on the combat of counterfeit ICT and stolen mobile devices (TSB Circular 239). TSB received feedback from 5 countries. Following discussion, it was decided to send additional LS to regional organizations in order to receive more proposals on use cases on the combat of counterfeit ICT and stolen mobile devices. Then, SG11 will advance the work item at the next meeting.

Also, SG11 agreed to start a new Supplement Q.Sup.BLvsWL “Guidelines for Blacklist versus Whitelist Based System Implementation to address counterfeit, stolen and illegal mobile devices”, which provides guidelines for blacklist versus whitelist based system deployment that should be considered when deciding what approach to employ in order to address the issues of counterfeit, illegal and stolen mobile devices.

SG11 continues progressing 7 ongoing work items on this subject matter.

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

Further to TSB Circular 205 of 6 November 2019, and pursuant to clause 9.5 of Resolution 1 (Rev. Hammamet, 2016), ITU-T Study Group 11 (Signalling requirements, protocols, test specifications and combating counterfeit products), during its meeting taking place in Geneva on 4-13 March 2020, approved new Recommendation ITU-T Q.5051 “Framework for combating the use of stolen mobile devices”. This Recommendation contains the reference framework and requirements that should be considered when deploying solutions to combat the use of stolen mobile devices.

1. **ITU-T SG11 workshops**

Since February 2020, SG11 mostly focused on preparation for WTSA-20 and therefore, there were no time for organizing workshops. In this regard, it was decided that all future SG11 related workshops are postponed to 2021.

1. **SG11 Regional groups**

There were no SG11 Regional Groups meetings since February 2020.

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