Conformance assessment methods to combat counterfeit mobile phones, ITU-T Workshop

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Conformity Test Landscape

- Regulatory Requirements
- House “Standards” (e.g. operator test plans)
- Industry Requirements (e.g. Automotive)
- (National) Safety Regulations

- 3GPP Test Specs
- ITU

- LBT
- Signaling Procedures
- DFS
- Radio Resource Management
- Out-of-Band Emissions
- Duty Cycle
- Intermodulation by Transmitter

- Receiver Saturation
- Blocking
- Tx Signal Quality
- Transmitter Emission Mask
- Transmit Power Control
- Intermodulation by Receiver

- Spurious Emissions
- Adjacent Channel Selectivity
- Protocol Conformance

- Co-existence Testing
- … and more

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Basic Conformity Areas for Mobile Phones

- EMC/EMI Conformance
- Radio Transmission and Reception Conformance
- Protocol Conformance
- Radio Resource Management
- OTA (Over The Air) Performance Testing
- RF Exposure Conformance
- Power consumption requirements
- Location Based Services / Emergency call
- Application Testing
Conformity Assessment for Mobile Phones

- Regulatory Requirements / Market Introduction
  - RED (Radio Equipment Directive), EC Europe
  - MIC, Japan
  - FCC, USA
  - ...

- Industry Certification Groups
  - GCF (Global Certification Forum)
  - PTCRB

- Operator Test Plans and Network Approval
Problems with Counterfeit Mobile Phones

- Low RF performance
- Unwanted Emissions
- Poor/Wrong Antenna Design
- Faulty or outdated protocol implementation
- Heating / Battery safety
- Missing RF Exposure measures
- Wrong Cell and Parameter Reporting
- Identity (IMEI Duplication)
Main topic is the conformance assessment for Unwanted Emission
- Basic Requirements → ITU Recommendation SM.329
- National Regulation
- Radiated Requirement and Test

Focus: Disturbance of other services
- Not a metric for the service performance of a device

Often the only coverage in tests for admission to a local market
Conformance for radio transmission and reception / OTA performance

- Radio transmission and reception conformance defines the minimum RF characteristics and minimum performance requirements for mobile phones.

- Typical parameters are:
  - Maximum Transmission Power / Power dynamics
  - Unwanted Emissions
  - Modulation Quality
  - Receiver Sensitivity
  - Demodulation and Throughput Performance

- OTA performance includes the performance of the antenna of the device (Tx and Rx)
  - Total Radiated Power
  - Total Integrated Sensitivity
  - Overview in ITU-T contribution T17-SG11-C-0174
Radio Resource Management Conformance

- Testing of Timing and Signaling Characteristics, Reporting Procedures and Accuracy, Mobility Control

- RRM Testing qualifies the ability of a mobile device to efficiently use the network configuration in terms of mobility and measurement reporting.

- Essential for the general performance in mobility scenarios like cell and technology handover

- Fundamental performance requirement if mobile phone reporting parameter are used in self organizing networks
Protocol Conformance

- Protocol and signaling conformance testing checks the conformant implementation of the radio protocol.
- Usually this is designed that the different test purposes per radio layer and the relevant procedures are tested.

- Essential for correct protocol function with the network
  - Transport Format Selection
  - Priority Handling
  - Data Transfer (ARQ Function)
  - Security
  - NAS (Non Access Stratum) procedures
  - …

- Example of a LTE RRC (Radio Resource Control) procedure
  - TC 9.1.4.2 „Identification procedure, IMEI requested“ *

* as per ETSI TS136.523-1
IMEI verification

- IMEI procedure as per 3GPP air interface
  - GSM/WCDMA/TD-SCDMA/LTE
- Independent of network operator
  - Operation with Test-UICC
- Automation possible – Connection to IMEI Database
Thank you.