

LTE UE Testing

Agenda



Application areas of TTCN-3

- TTCN-3 for LTE Device Protocol Conformance
- 3 TTCN-3 for LTE Device Pre-IOT

Long Term Evolution (LTE) — A brief Introduction



About

- ✓ Latest standards in mobile network technology promoted by 3GPP
- ✓ Promises a competitive edge over other cellular technologies
- ✓ Designed to support High-speed data

Goals

- ✓ Increase Peak Data Rates (100Mbps in Downlink & 50 Mbps in Uplink)
- ✓ Improve Spectral Efficiency
- √ Increase Network Capacity
- ✓ Reduce Latency
- ✓ Better support for Mobility (up to 120 Km/hr)

Features

- ✓ Multiple Access Scheme based on OFDMA in Downlink
- ✓ MIMO technology for better data rate & performance
- ✓ Hybrid ARQ in MAC layer
- ✓ Bandwidth scalability
- √ Adaptive Modulation Techniques

LTE UE Testing Landscape



Market Segments

- Device Vendors
- Test and Measurement Vendors
 - Protocol Stack Developers



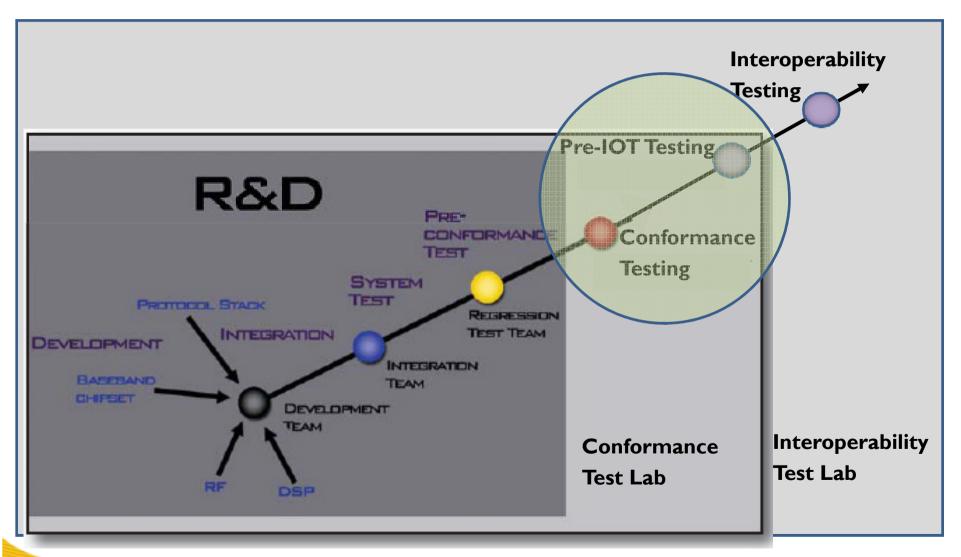
LTE Test Challenges

Constantly evolving Protocol Specifications
 Frequently Changing Conformance
 Specifications
 •Shorter Time to Market
 •Testing Complexity is Very High



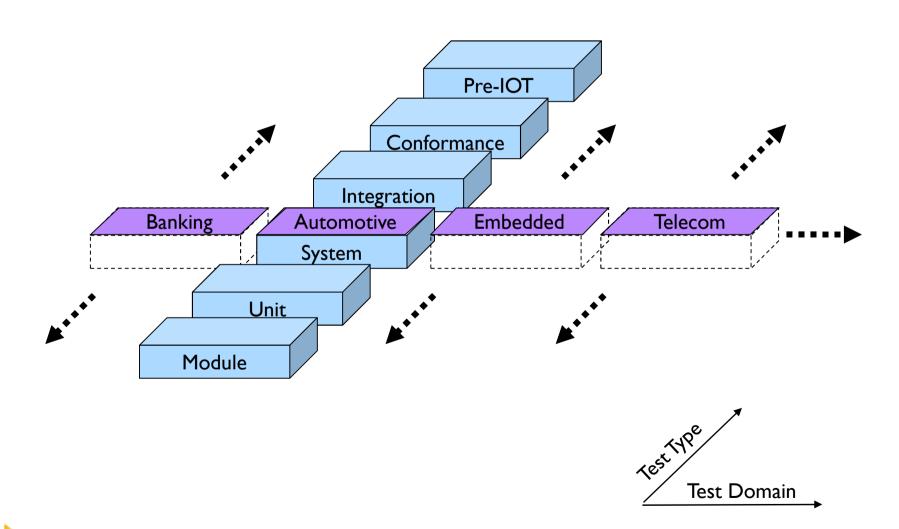
Device Testing Life Cycle





Applicability of TTCN-3





LTE Device Conformance Testing



Conformance Test
Specifications are based
on 3GPP requirements

3GPP has defined the conformance test architecture

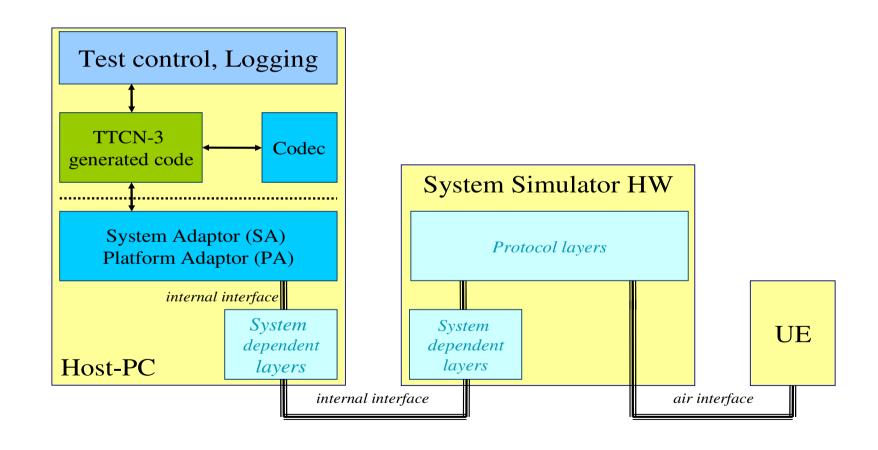


LTE UE GCF Certification is expected to start in 2010

3GPP has recommended TTCN-3 for Device Conformance Testing

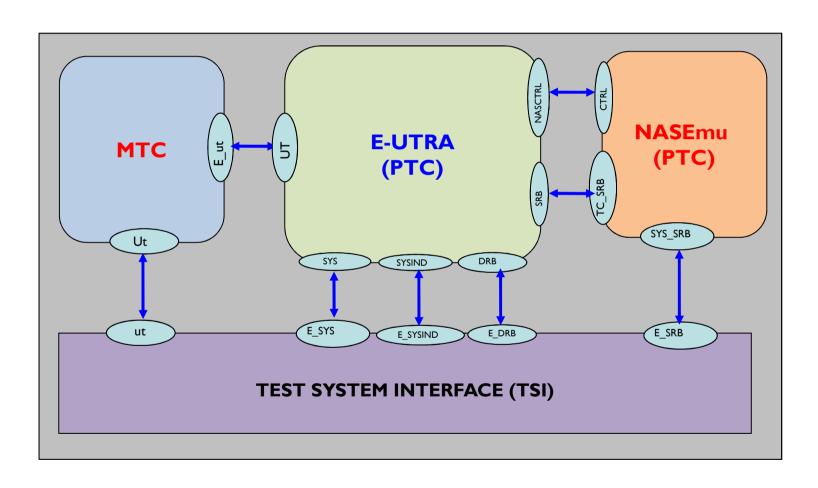
UE Conformance Test Architecture – 3GPP Proposed





TTCN-3 Port Mappings defined by 3GPP



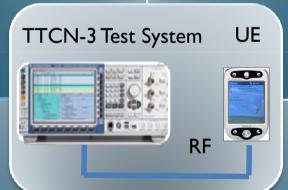


Pre-IOT Testing - Why is it Required?



IOT Test Scenarios are based on "Field Trial Guidelines" published by GSMA & 3GPP

Fixing defects found from failures in live network (IOT) are extremely expensive and time consuming



While IOT is performed in a manual test environment
Pre-IOT Testing can be completely automated

Pre-IOT Testing is carried out in a Network Simulation Environment

Applicability of TTCN-3 to Pre-IOT Testing



Test case Logging & Verdict Management Capabilities are Inherently supported By TTCN-3 based Test Systems

Procedure libraries
Can be created in
TTCN-3 to facilitate
Rapid creation of
Test Scenarios

TTCN-3 offers a standardized automation Test Bed for Pre-IOT

Benefits of using TTCN-3 for Pre-IOT Testing

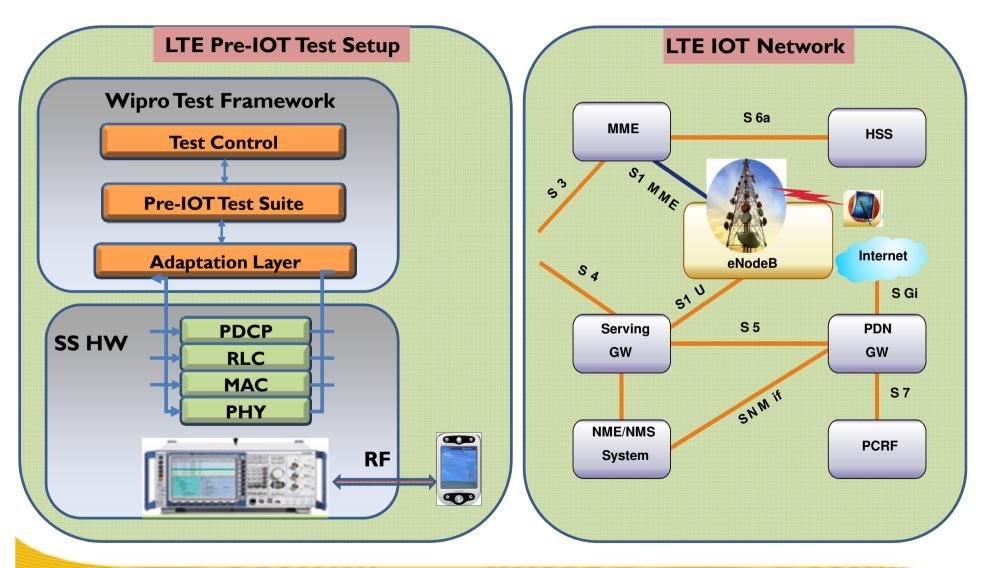
TTCN-3 supports
Easy Integration to
3rd Party
Test Management
Solution

Message Templates from 3GPP Conformance Test Suite can be Re-used

3GPP Conformance
Test Architecture
Can be re-used
to design the
Pre-IOT Test Suite

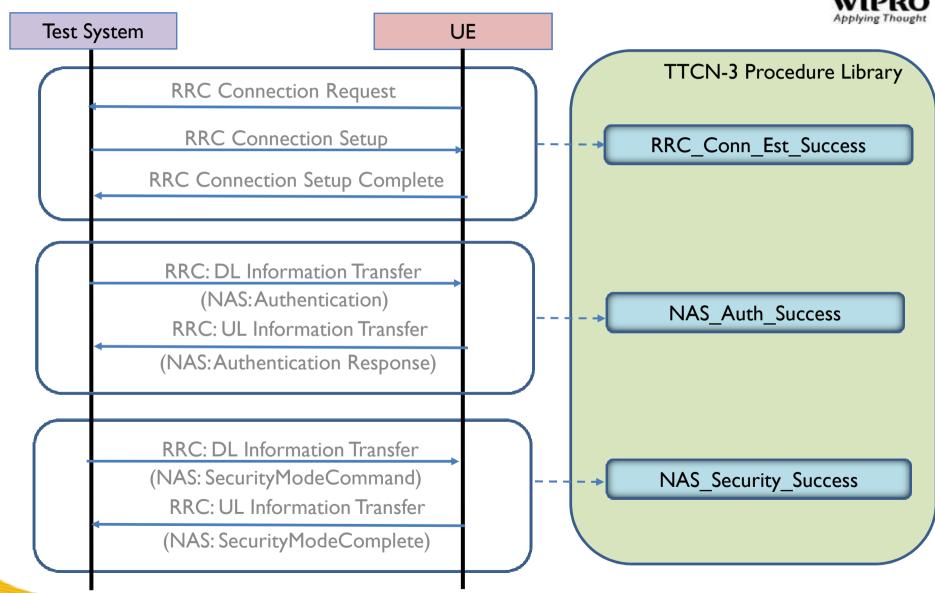
TTCN-3 for Device Pre-IOT





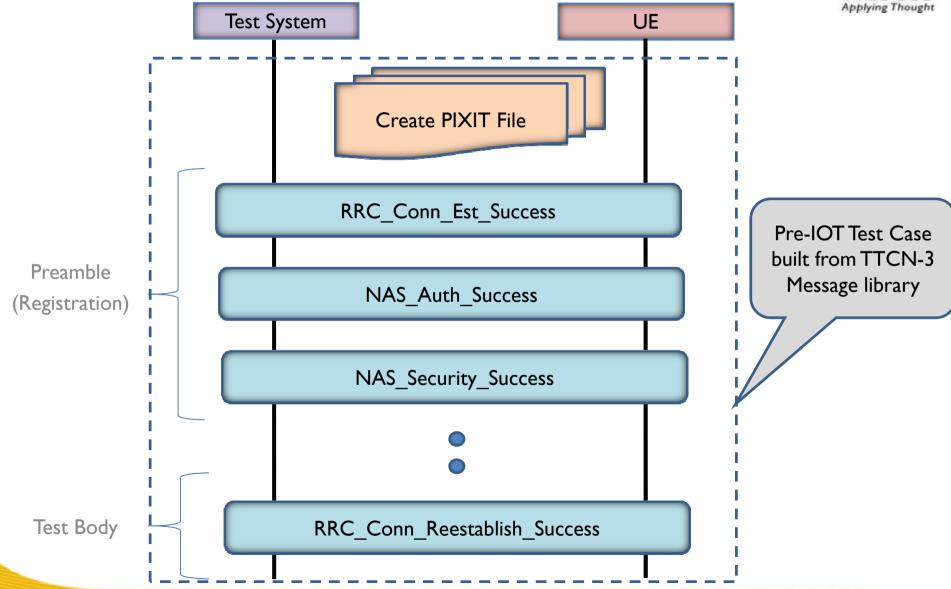
Building TTCN-3 Message Library





Building Test Case from TTCN-3 Message Library







Thank You

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