

G35 LTE Test Solution

Comprehensive LTE Test Solution for Simulation, Load Test and Analysis



Rapid and Comprehensive LTE testing with G35 for Development, Verification and Integration Labs as well as Operator Test Beds.

- Full LTE Uu, S1, X2 support based on 3GPP
- Support for all LTE RF-Probes (e.g. Aeroflex, Signalion)
- “Down to the bit” Monitoring
- Powerful analysis for PHY, MAC, RLC and all other layers
- Functional Test, Load Test & Monitoring in ONE box
- All mobile technologies in ONE box
- First real LTE solution covering all e-NodeB interfaces WW
- Working solutions for Signalion and Aeroflex today
- ALL in ONE box

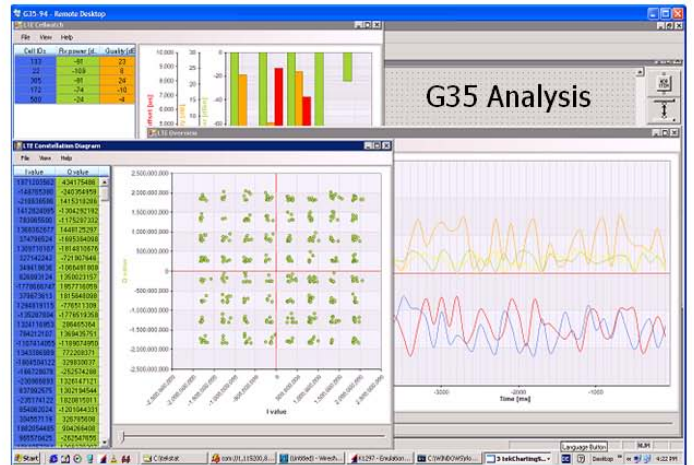
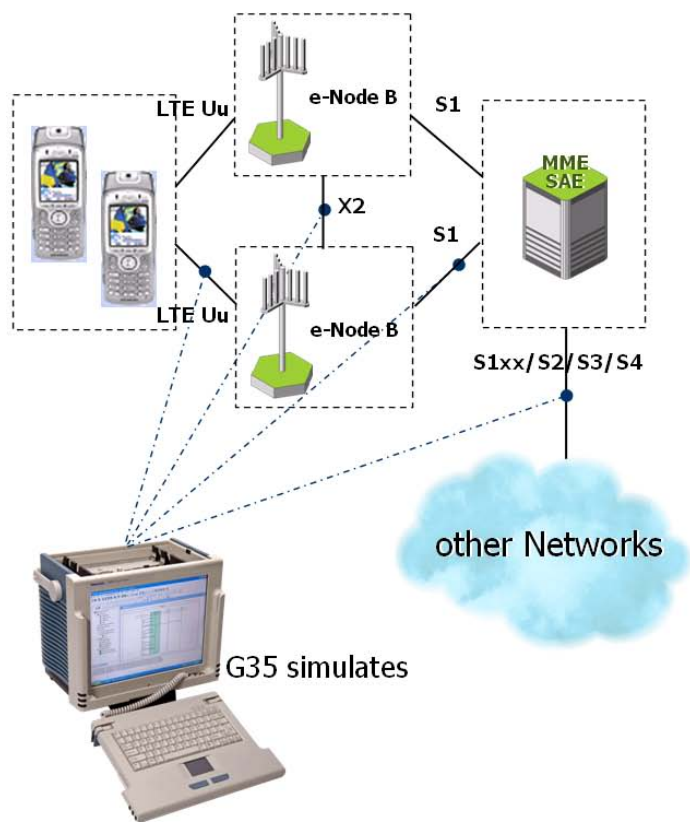
Overview

The Tektronix LTE Test Solution provides an integrated simulation, load test and analysis solution for testing the complete protocol stacks of LTE Uu, S1 and X2 interfaces. Simultaneous and correlated measurements in real time are possible between any combination of interface and protocol layers. Access to the complete functionality is provided via an interactive Graphical User Interface (GUI) as well as an open standard API. The system consists of a LTE RF Simulator for lower layers supporting CPRI as well as all major UMTS frequency bands and the G35 test platform, providing test functionality for the higher layers, the fixed line interfaces as well as powerful monitoring and analysis capabilities for all protocol layers.

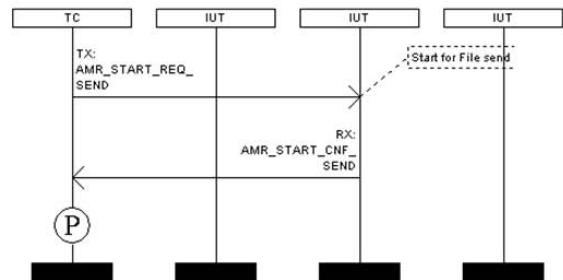
Features & Benefits	Applications
<ul style="list-style-type: none"> ■ G35 simulates LTE-terminals towards eNB <ul style="list-style-type: none"> ■ all protocol layers (Uu) ■ modular design allows to test each layer or layer sub-set independent ■ complete C-Plane and U-Plane (Uu) ■ G35 simulates LTE EPC towards eNB <ul style="list-style-type: none"> ■ MME simulation (S1) ■ S-GW simulation (S1) ■ S1 Load generation ■ Complete C-Plane and U-Plane (S1) ■ G35 simulates other eNB towards eNB under Test ■ Mobility Procedures (X2) ■ Complete C-Plane and U-Plane (X2) ■ G35 Bracket Test of LTE eNB: RF/CPRI <> S1/X2 Full 3GPP standard compliant <ul style="list-style-type: none"> ■ 3GPP Standards ■ Vendor specific implementations 	<ul style="list-style-type: none"> ■ UE Emulation, Simulation and Monitoring for Control Plane Testing ■ UE Emulation, Simulation and Monitoring for User Plane Testing ■ UE Emulation, Simulation and Monitoring for combined Control & User Plane Testing ■ Evolved Packet Core Simulation for combined Control and User Plane Testing ■ eNB Simulation on X2 and EPC testing ■ e-NodeB Bracket Test and Monitoring on RF and S1 for combined Control & User Plane Testing

The modular software and hardware architecture provides full flexibility to the user allowing among others to:

- simulate and decode all LTE interfaces
- modify and change the simulation flows and the message content down to the bit-level on the fly
- interface to the LTE stack simulations at any protocol layer
- test user and control plane incl Voice and Video over IP as well as IMS
- do load testing
- do conformance testing based on TTCN-3
- do “down to the bit monitoring” for all interfaces at the same time
- verify powerful full statistics for the physical layer, MAC and RLC



Detailed Flow Charts - free programmable





Characteristics

RF-Bandwidth

Tx: up to 20MHz

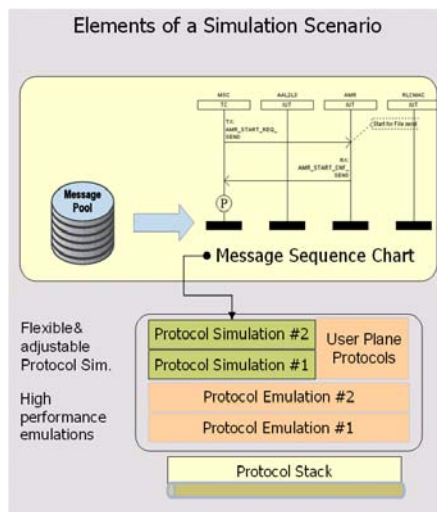
Rx: up to 20MHz

RF frequency (only one option per hardware setup)

	Downlink Frequencies	Uplink Frequencies	
Band I	2110-2170 MHz	1920-1980 MHz	
Band II	1930-1990 MHz	1850-1910 MHz	
Band III	1805-1880 MHz	1710-1785 MHz	
Band IV	2110-2155 MHz	1710-1755 MHz	
Band V	869-894 MHz	824-849 MHz	(available on request)
Band VI	875-885 MHz	830-840 MHz	(available on request)
Band VII	2620-2690 MHz	2500-2570 MHz	
Band VIII	925-960 MHz	880-915 MHz	
Band IX	1844.9-1879.9 MHz	1749.9-1784.9 MHz	
Band X	2110-2170 MHz	1710-1770 MHz	

Multi-Antenna Modes

SISO	UL Single Antenna, DL Single Antenna
1x2 MIMO	UL Single Antenna (SU-MIMO), DL Two Antennas (2x2 MIMO)
2x2 MIMO	UL Two Antenna (TX-Diversity), DL Two Antennas (2x2 MIMO)
4x4 MIMO	UL four Antenna , DL four Antennas (available on request)



Remote Radio Head Interface Support

CIPRI

General Characteristics

Duplex scheme: FDD

Multiple access scheme: OFDMA

Maximum MAC throughput: 150

Mbps (Downlink) and 50Mbps (Uplink)

Specifications

3GPP Rel.8

TS 24.301

TS 29.274

TS 36.201

TS 36.211

TS 36.212

TS 36.213

TS 36.321

TS 36.322

TS 36.323

TS 36.331

TS 36.412

TS 36.413

TS 36.414

TS 36.423

Test cases of e-NodeB functions

Radio Resource Management

Radio Bearer Control

Connection Mobility Control

Radio Admission

e-NodeB Measurement Configuration & Provision

Dynamic Resource Allocation (Scheduler)

Ciphering

Scheduling ARQ and HARQ

Test of MME and SAE-GW functions

Authentication

Idle State Mobility Handling

Idle State Paging Origination

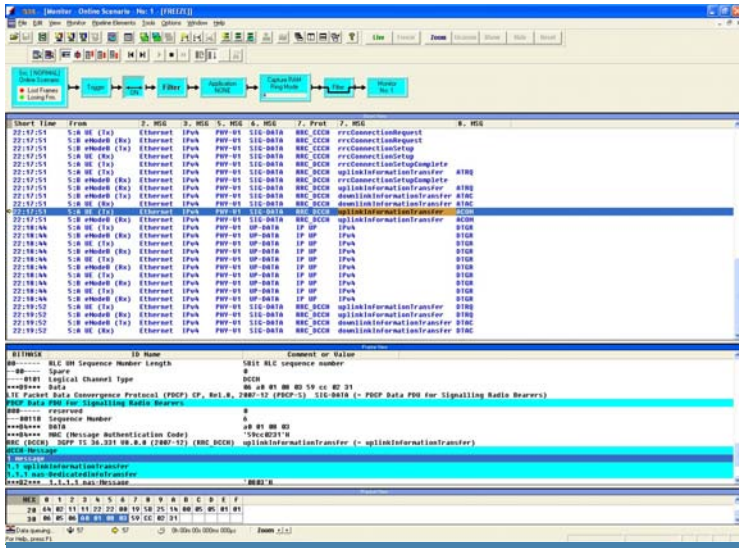
SAE Bearer Control

UP-Termination in SAE

UP-Forwarding to ext. IP-Network such as IMS

QoS / Policy Control

Tektronix meets the challenges – LTE Standards



Multi-Interface and Multi-Protocol decoding

About Tektronix:

Tektronix Communications provides network operators and equipment manufacturers around the world an unparalleled suite of network diagnostics and management solutions for fixed, mobile, IP and converged multi-service networks.

This comprehensive set of solutions support a range of architectures and applications such as LTE, fixed mobile convergence, IMS, broadband wireless access, WiMAX, VoIP and triple play, including IPTV.

For Further Information:

Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology.

Please visit www.tektronix.com/communications

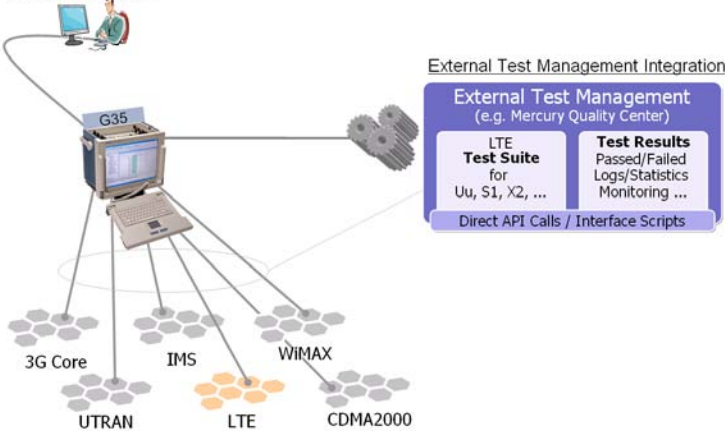
Contact Tektronix:

Please visit www.tektronix.com/communications

Phone:
1-800-833-9200 option 1
+1-469-330-4000

Locate your nearest Tektronix representative at:
www.tektronix.com/contactus

Multi Technology Interworking & Remote Access



Tektronix meets the challenges – Multi Technology & Interworking

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