Tektronix G35 Functional and Load Tester

G35PT200 / G35RT200 Base Unit

All-in-one Mobile Protocol Test Tool.

- Multi-technology support in one single platform
- Address key phases of the test cycle with the same product
- Avoid invests in real network infrastructure for end-to-end testing
- More than 3000 protocols for mobile network interfaces
- Perform functional & load testing for 2G, 3G, WiMAX, LTE & IMS
- Address key test applications with the same tool

Multi-Technology Testing with the G35

With the advent of new wireless standards like WiMAX and LTE, mobile networks are evolving towards complex heterogeneous systems consisting of a multitude of different technologies. As a consequence, thorough testing of protocol implementations and complete mobile network elements is becoming more important than ever before. Related test tools must be able to address all necessary technologies as well as all phases of the test cycle to be cost-efficient for the user.

Features & Benefits	Applications
▪ Protocol Simulation, Emulation, Load Traffic Generation and Monitoring ▪ Cost savings through emulation of complete network elements / network subsystems ▪ Support for remote control and test automation ▪ Multi-layer, multi-interface testing, in cluding bracket testing ▪ 4G Multi-technology testing (2G, 3G, CDMA, WiMAX, LTE) with a single unit ▪ High-performance user plane traffic generation ▪ Test scenario scalability from functional to load testing	▪ Functional, Interoperability, Conformance, Load and Automated Testing ▪ 3G Iu-CS / Iu-PS Core Network Emulation ▪ WiMAX simulation and load testing for all key interfaces ▪ LTE functional and load testing ▪ UTRAN Iub testing ▪ Media Gateway testing ▪ 2.5G/3G SGSN Functional and Capacity Test ▪ Sigtran testing ▪ IMS testing

Tektronix® Communications

With its more than 3000 supported protocols and more than 100 protocol layer emulations, the G35 protocol test platform can address a wide range of test applications, including e.g.

- Emulation of a complete 3G core network over the Iu-CS / Iu-PS interfaces to e.g. support end-to-end system testing of femto-cells
- Load testing of a WiMAX ASN-GW by simulating a large number of Subscriber Stations and Base Stations
- LTE protocol layer testing
- Multi-technology handover testing
- Functional and Load Testing of Media Gateways over Iu-CS(IP) interfaces

The G35's high-performance scalable hardware platform as well as its advanced test tool chain allows you to address all key phases of the test cycle, such as:

- Unit and Integration Testing of specific protocol layer implementations
- End-to-end System Testing through the emulation of complete network elements or network subsystems
- Capacity, Load and Stress Testing
- Interoperability and conformance testing based on TTCN-3

G35 Protocol Tester - Rackmount Unit

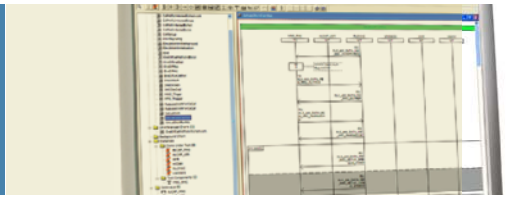
G35 Functional and Load Tester

Flexible High-Performance Hardware Platform

The G35 Protocol Tester provides you with a modular high-performance hardware platform that allows you to address the needs of multi-technology / multi-interface testing. The online measurement functions like protocol encoding/decoding are separated from 'offline' functions such as test case development by running on dedicated boards with their own processing units. This separation ensures maximum performance for load traffic generation.

Measurement boards are available for E1/T1, ATM and Gigabit Ethernet interfaces. Line Interface cards supporting E1/T1 or STM-1/OC3 are available for ATM-based interfaces.

The G35 utilizes both in a portable and rackmount version a Compact PCI (cPCI) bus system with five, respectively 13 free slots available to host measurement boards. A dedicated PC host board, which supports the user interface for test case development and execution, provides a multitude of interfaces for peripheral devices or external networks, including 4 × USB 2.0, a DVI-I connector and 4 Gigabit Ethernet Interfaces.



Characteristics

Physical Characteristics

Base unit	Portable		Rackmount	
Dimensions	**mm**	**inch**	**mm**	**inch**
Height without cover	340 3055	13.38 12	400 n/a	15.74 n/a
Width	365	14.37	482	18.97
Depth	227	8.93	300	11.81
Weight	**kg**	**lbs.**	**kg**	**lbs.**
Net (approx., without inter-fce boards)	12	26.46	19	41.88

Power Supply

Base unit	Portable	Rackmount
Type	350 W plug-in module	2x 350W plug-in supplies for the boards 1x 100W open frame supplying the fans
AC Input	460 VA, 100-240 VAC (±10%), 50/60 Hz	900 VA, 100-240 VAC (±10%), 50/60 Hz
DC Output	50 W per application slot DC output for cPCI boards: +5 V / 35 A +3.3V / 30 A +12 V / 7 A -12 V / 2.5 A	50 W per application slot DC output for cPCI boards: +5 V / 75 A +3.3V / 60 A +12 V / 24 A -12 V / 4 A
Fuse Data	6.3 A time-delayed, 230/240 V	6.3 A time-delayed, 230/240V

Regulatory

Safety:
- UL and cUL to UL61010B-1 [reference: PO61];
- CE mark: EN61010-1

EMC:
- FCC Part 15, Class A; CE mark: EN61326, Class A

Environmental Characteristics

Temperature:
- Operating: +5 °C to +40 ©°C
- Non-operating: –20 °C to +65 °C

Relative Humidity:
- Operating: up to 80% below 30 °C, de-rate to 45% at 40 °C, non-condensing
- Non-operating: up to 90% below 30 °C, de-rate to 60% at 20 °C, non-condensing

Altitude:
- Operating: 10,000 ft. (3,000 m)
- Non-operating: 40,000 ft. (12,000 m)

Shock:
- Operating half-sine: 11 ms, 2g.
- Non-operating half-sine: 11 ms, 20g.

Random vibration:
- Operating: 0.31 gRMS (portable) | 0.22 gRMS (rack)
- Non-operating: 2.28 gRMS (portable) | 2.18 gRMS (rack)

Acoustic noise:
- ETSI 300 753 for business area (≤ 63 dBa)

Measurement Boards

PCE-4 Board for ATM-based interfaces
- Supports 1 or 2 LIFs (Line Interface cards)
- STM-1/SONET OC-3 LIF:
  - 155 Mbps, optical, LC duplex slim line interface
  - ITU G.957-S1.1 optical ITU G.708 SDH (SONET) section
  - Two Rx, 1200 to 1600 nm (single-mode and multi-mode)
  - Two Tx, single-mode, 1310 nm, typical
- ATM E1/T1 LIF:
  - E1/T1 switchable
  - Four Rx, four Tx

PWL-2 Board for E1/T1 PCM Interfaces
- 2x 15-pin DB-15 connectors
- 2 Rx / Tx ports per DB-15 connector

Gigabit Ethernet (GbE) Board
- 2 Rx/Tx ports
- Compliant with IEEE 802.3 1000-Base-T
- Backward compatible with 10/100 Base-T

Test Tool Chain

Emulation Scenario Editor for creating protocol layer / network element / network subsystem emulation scenarios

Message Building System for creating user-defined messages, primitives and variables

Message Sequence Chart for creating protocol-layer specific user-defined simulation scenarios

Realchart application for representation / export of statistics

Monitor application for deep-level decoding of message transactions between protocol tester and DUT

Remote Operation support based on CORBA

Tektronix Workbench for TTCN-3 based functional and conformance testing

Offline PC software version

Supported Interfaces (Samples)

UTRAN:
- Iub / Iur Interface

2G/3G Core Network:
- A, C, D, E, H, Gb(IP), Gb(FR), Gn, Gi, Gs, Iu-CS (ATM/IP), Iu-PS (ATM/IP), Nb, Nc, Mc

CDMA, CDMA2000:
- A1, A3, A7, A8, A9, A11, A13

IMS:
- Gm, Go, Gq, Cx, Dx, Mb, Mg, Mm, Mr, Mw, Mn, Ut

WiMAX:
- R1, R3, R4, R6, R8

LTE:
- Uu, S1, X2

Addressing Key Test Challenges with the G35's Versatile Test Tool Chain

The G35 base software provides a wide range of powerful test scenario development, execution and analysis tools.

Any test case development requires the definition of an emulation scenario which identifies individual required protocol layers as well as their inter-relationships. An emulation scenario, which is created using the Emulation Scenario Editor, may consist of one or several of the more than 100 pre-defined protocol emulations available. These emulations contain pre-defined state machines which automatically simulate the behavior of a particular protocol layer.

You can also create your own protocol layer emulation to address specialized test scenarios using the Message Building System (MBS) and Message Sequence Chart (MSC) tools. The MBS allows you to define required messages and Information Elements. These messages can build upon the more than 3000 available protocols. The MSC allows you then to specify in an easy-to-use graphical format required message interactions between the test tool and the Implementation under Test.

Detailed protocol-layer analysis can be performed using the industry-leading Tektronix Monitoring Application which allows deep-level decoding of trafficand representation of decodes in a variety of different formats (e.g. human-readable, Hex). Statistics can be collected and viewed in various graphical formats using the embedded Realchart application and can be exported to support test reports and further offline analysis.

The G35 protocol tester supports also Test Automation by providing an interface based on CORBA , which allows the protocol tester to be remote-controlled by a customer-specific external Test Management System.

TTCN-3 based Functional & Conformance Testing can be implemented using the Tektronix Workbench application.

An offline PC development environment is also available which allows you to develop test scenarios without using the actual test hardware. It supports all the necessary test case development tools, including ESE, MBS and MSC.

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

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