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E5162A 3G Protocol Emulator

Agilent Technologies 3G Test System

New Product Flyer



Advanced protocol and connection testing

Key Features and Benefits

Enables the following capabilities when combined with the E5160 UMTS W-CDMA software

- Powerful Iu and Iub emulation test
- Single and multiple connection test
- Diversity Handover test
- Traffic test

The success of 3G networks will largely depend on the quality of service perceived by the end-users. The great challenge for Network Equipment Manufacturers (NEMs) is to deliver 3G networks to the high standards expected by regulators, Service Providers (SPs), and end-users. While at the same time, 3G specifications develop to be far more complex and extensive than previous generations.

Those NEMs and SPs who have performed rigorous and comprehensive testing will be differentiated as networks are deployed. Cutting corners during testing will not benefit anyone in the medium to long term.

Testing 3G networks has proven to require significant amounts of processing power. Agilent has addressed this issue with the introduction of the E5162A 3G Protocol Emulator (3GPE). When combined with the Agilent 3G Test System, the E5162A offers a platform enabling dramatic increases in functional testing performance and capabilities. For more information on 3G Test System applications to UTRAN testing, see the technical datasheet (p/n 5980-0823E).

After basic Iu, Iub and Iur protocol layer testing is complete (nodeB and RNC are correctly encoding/decoding messages and handling unexpected values to specification) the focus shifts to verifying timers and state-machines at each protocol layer. These advanced protocol tests, refered to as emulation tests, require the test system to recreate the behaviour of the network elements at each Iu, Iub, and Iur protocol layer.

Each 3G test port requiring protocol emulation will be equiped with a E5162A 3GPE to deliver additional processing power close to the line interface.

After advanced protocol tests have established that the UTRAN equipment is signalling correctly, the next challenge is to verify that the nodeB/RNC/MSC implemented protocol layers can interact together to establish various types of connections (User Plane bearers) between network equipment. During this Connection testing phase, the E5162A enables 3GTS features allowing testing of single and simultaneous connections, Diversity Handover, and Traffic tests.

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Key Features

Dedicated Emulation Power for Advanced Protocol tests

As 3GPP specifications develop in complexity, high levels of processing power are required to perform the complicated task of protocol emulation. The E5162A 3G Protocol Emulator offers a dedicated processing resource specifically designed to perform Iu, Iub and Iur protocol emulation.

The Iu UP, FP, MAC and RLC, protocol emulations are performed on the E5162A, when used in combination with 3GTS software version E5160B or higher. This processing configuration enables

- highly responsive protocol emulation
- emulation of multiple connections
- fewer time-critical processing tasks for the Unix controller of the E4200B/E4210B Chassis

The 3GPE can help you verify that protocol stacks implemented on your UTRAN network elements

- have correct implementations for protocol state machines and timers for the sending and reception of messages
- handle unexpected states according to the relevant specification
- operate reliably for the applications and services above them

When combined with the Agilent 3G Test System, the E5162A 3GPE will enable you to create protocol states that go beyond what is defined in the relevant specifications to test the robustness of your network equipment. This is important now when 3G specifications are relatively unstable and equipment needs to be proven beyond what is currently specified.

Enabling New Connection Test Features

With 3GTS software version E5160B or higher, the 3GPE will enable new features for connection testing.

With connection tests, you will be able to verify that your UTRAN network elements can

- establish single and multiple connections for the transport of user voice and data across the Iu, Iub and Iur User Plane
- support complex and critical network features such as Diversity Handover

The ability for the test system to establish multiple simultaneous connections is especially important to verify that your network equipment is correctly managing its resources.

With connection tests, you will be able to further stretch your implementations of protocol state machines, thus providing additional levels of confidence in your network equipment.

E5162A will enable new Traffic tests thatl allow data to be sent and received over the User Plane of the Iu and Iub. This feature will form the basis of establishing the overall quality of service delivered by your UTRAN.

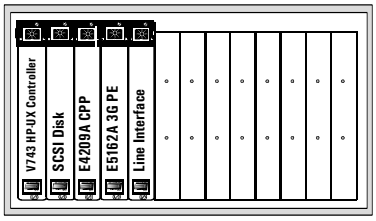
For more information on these features, please see the Agilent 3G Test System specifications for software version E5160B or higher (p/n 5980-0823E).

More Options for the Frame Protocol Transmission Time Interval (TTI)

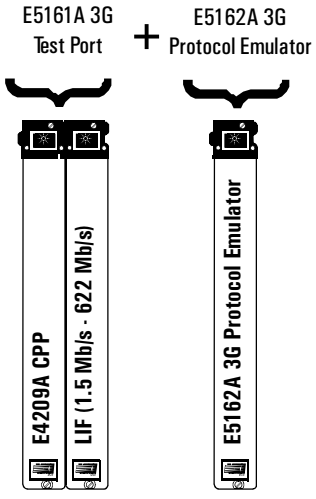
The transmission frequency of radio frames can be one frame every 10, 20, 40, or 80ms, otherwise known as the Transmission Time Interval (TTI). Combine the 3GProtocol Emulator with 3GTS software version E5160B or higher, and Frame Protocol TTI's of 10, 20, 40 and 80ms are all possible. This feature is important to ensure

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The E5162A runs on the Agilent E4210B Form-13 mainframe chassis. The minimum configuration required for 3G emulation is three slots, plus the V743 controller and the SCSI disk. Up to 3 sets of CPP/LIF/3GPEs can be housed in one form-13 chassis



A single E5162A 3G Protocol Emulator is added to each 3GTS test port

that the RNC will deliver frames to the nodeB at intervals compatible with the capabilities UE and Uu.

Online Help

The E5162A 3GPE includes extensive online help integrated into the 3G Test System help system. The 3G Test System help covers two broad areas:

- The Users help explains how to use the Graphical User Interface to perform tasks such as configuring the system, and using the Capture system to capture and decode data.
- The Programmers help explains how to use the 3GTS User Program Environment (UPE). You use the UPE to develop the C programs that perform 3G tests. The Programmers help includes general information and examples on using the UPE environment, as well as information on performing 3G-specific tasks, such as running Frame Protocol emulation.

The Programmers help includes comprehensive data structure and function references, in Acrobat® PDF format, for all the available C libraries.

Configuration

The E5162A works with the following existing 3GTS products to form the complete 3G protocol emulation solution:

- Agilent E4210B Form-13 Mainframe Chassis
- Agilent E5160B UMTS W-CDMA Software
- Agilent E4209B Cell Protocol Processor (CPP)
- Any existing ATM Line Interface from 1.5 Mb/s to 622 Mb/s

A single E5162A Protocol Emulator is added to each 3GTS test port, as shown in figure X. The E5162A is compatible with the E4210B Chassis. It can be freely combined with Agilent's E4209B Cell Protocol Processor (CPP) and any E5160A ATM line interfaces from 1.5 Mb/s to 622Mb/s.

Upgrading with E5162A 3GPE

After upgrading with the E5162A 3GPE (and combined with the 3GTS software, release E5160B or higher) you will be able to operate Frame Protocol Transmission Time Intervals from 80ms down to 10ms.

Protocol emulation previously performed on the 3GTS E4210B Chassis Controller, has been moved to the E5162A PE, allowing an architecture supporting multiple connection emulation's for 3GTS software release E5160C onwards.

The Agilent 3G Test System is the industries first solution for performing encode/decodes and monitoring of the Iu, Iub and Iur interfaces. The addition of the E5162A 3G Protocol Emulator brings powerful emulation capabilities to the 3G Test System. This addition will simplify sharing of the system between development teams and reduce configuration management. The E5162A 3G Protocol Emulator completes a powerful 3GTS architecture capable of adapting to your testing needs as 3G standards develop and evolve in the years ahead.

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Warranty and Support

Hardware

All 3GTS hardware components are warranted for a period of 3 years. Products must be returned to an authorized Agilent service center for service.

Software

Agilent 3G Test System software and firmware products are supplied on transportable media such as disk, CD-ROM or integrated circuits. The warranty covers physical defects in the media, and defective media is replaced at no charge during the warranty period. When installed in an Agilent 3G Test System, the software/firmware media has the same warranty period as the product.

Product Numbers

E5162A	3G Protocol Emulator
E4210B	Form-13 Mainframe Chassis
E5160B	UMTS W-CDMA Software
E4209B	Cell Protocol Processor

Ordering Information

To order and configure the test system consult your local Agilent field engineer, through one of the Agilent sales offices listed on the last page of this technical specification.

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Specifications

Mechanical Specifications

Size and Weight

Size	• 1 slot C-size VXI card
Weight	• 1.3 kg (2.9 lb) nominal

Front Panel LED Indicators

Tx	• On for 50 ms each time an ATM cell on an enabled connection is transmitted (forwarded to the LIF module)
Rx	• On for 50 ms each time an ATM cell on an enabled connection is received (forwarded from the LIF module)

Environmental Operation Conditions

Operating Temperature	• 0^0C to 55^0C
Storage Temperature	• -40^0C to 70^0C
Humidity	• 0% to 95% relative humidity from 25^0C to 40^0C

Applicable Standards

3GPP TS 25.402	• Synchronisation in UTRAN Stage 2
3GPP TS 25.427	• UTRAN Iur and Iub interface user plane protocols for DCH data streams
3GPP TS 25.435	• UTRAN Iub interface user plane protocols for CCH data streams

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Acronyms

3G	3rd Generation
3GPP	3rd Generation Partnership Project
3GTS	3G Test System
BSTS	Broadband Series Test Systems
CN	Core Network
FP	Frame Protocol
Iu	Interface between RNC and CN
Iub	Interface between nodeB and RNC
Iur	Interface between RNC and RNC
Iu UP	Iu User Plane protocol
MAC	Medium Access Control protocol
NEM	Network Equipment Manufacturer
PE	Protocol Emulator
RLC	Radio Link Control protocol
RNC	Radio Network Controller
SP	Service Provider
TTI	Transmission Time Interval
UMTS	Universal Mobile Telephone Service
UTRAN	UMTS Terrestrial Radio Access Network

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Agilent Technologies 3G Test System

The 3GTS is the most powerful solution for testing UMTS W-CDMA Radio Access Networks, and the only tester able to provide comprehensive coverage of all layers of the protocol stack, from physical to application.

www.agilent.com/comms/3GTS

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