Agilent N5978A
IFT Automation for TD-LTE IOT Test Plan

Technical Overview

Accelerate testing and reporting to TD-LTE Terminal IOT test specification

Simplify Your Compliance Test Process

- Leading TD-LTE IOT test coverage with ready-to-use test plans and reporting

- Unattended test with fully-automated execution and UE control

- Builds on Agilent IFT software and is expandable to other test plans

TD devices with four technologies, GSM, TD-SCDMA, LTE FDD and LTE TDD, will co-exist for the foreseeable feature. For a positive end-user experience, this type of UE needs to transition smoothly between these technologies while maintaining acceptable performance for different applications. While conformance test is necessary, it is not sufficient to determine the user experience under different circumstances. As a result, developers and operators are increasing their focus on testing the real-world performance of UE before deploying them on live networks.

The new Agilent Technologies N5978A automation scripts implement TD-LTE IOT test plan in Agilent's interactive functional test (IFT) software. Used in conjunction with Agilent PXT wireless communications test set, the solution brings real-world network test scenarios into the lab environment.

Agilent Technologies

Anticipate increasing UE performance demands

Network operators are motivated to ensure that performance of UE on their network results in a positive end-user experience. While signaling conformance test addresses certain aspects of functionality, operators typically want to conduct more representative performance testing under different network conditions. Examples include verifying the mobility, data throughput performance, and power consumption of the UE. These real-world use scenarios supplement traditional conformance tests and are commonly formalized into operator-specific test plans, requiring UE be subjected to demanding compliance testing before being approved for use on an operator's network.

Mobility

Today, most TD-LTE devices support four modes (GSM, TD-SCDMA, LTE FDD, and LTE TDD) or five modes: (GSM, W-CDMA, TD-SCDMA, LTE FDD, and LTE TDD). Mobility test is required to verify the UE behaves as expected when transitioning between different radio access technologies. Mobility test includes cell selection/reselection, intra-LTE mobility, inter-RAT mobility, and roaming test.

The Agilent Technology E5515C wireless test set is required when 2G or 3G cells are involved during the mobility test.

Data throughput

Customers have higher expectations and are more aware of the data performance of their wireless devices in the LTE era. Data throughput test verifies the actual end-user experience under different channel configurations and radio conditions, helping to address the data performance early in UE development.

The Agilent Technologies N9020A MXA signal analyzer, N5182A MXG signal source, and N5106A PXB baseband generator and channel emulator are required to emulate the real-world impairments. Alternatively, an RF fader can be used in place of these three test instruments.
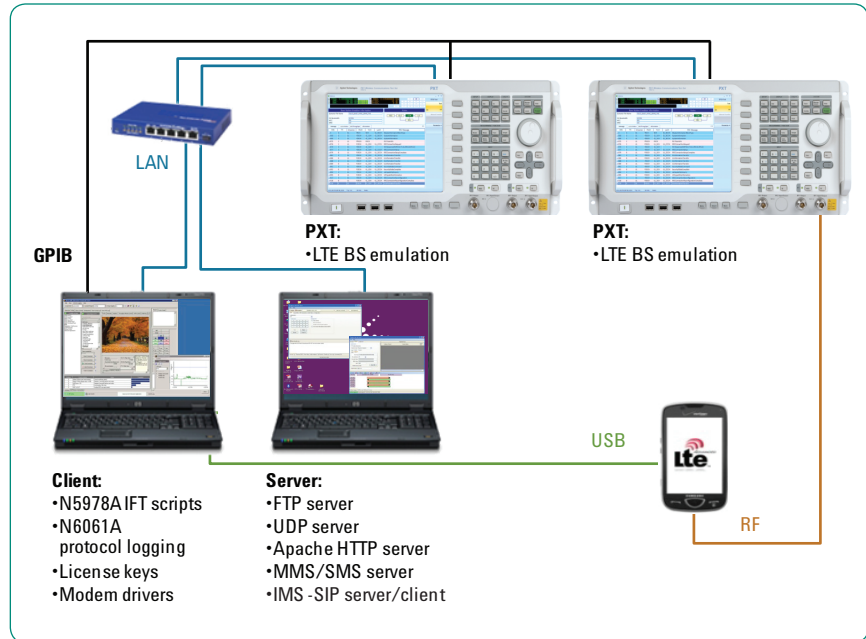

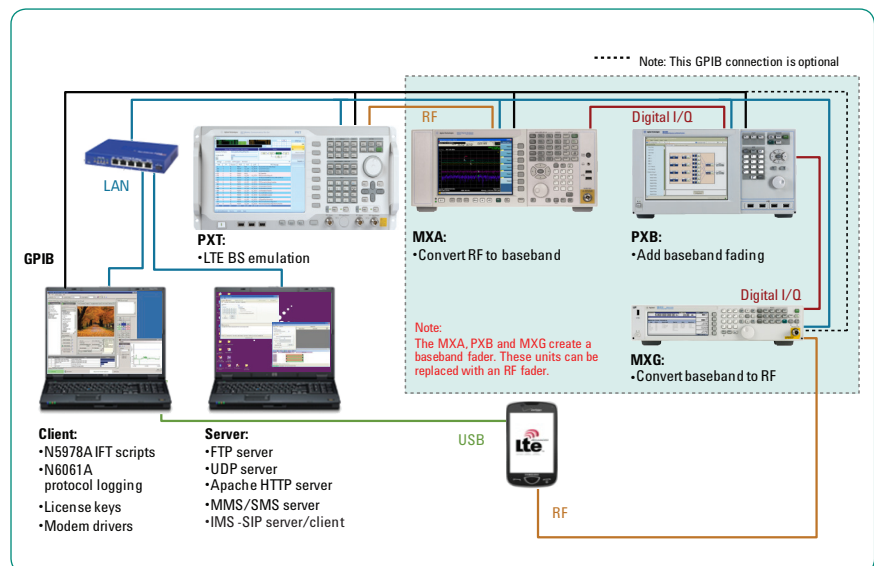Figure 1. Schematic of Agilent's test implementation of mobility test plan

Figure 2. Schematic showing Agilent's test implementation of data throughput test plan, single in single out (SISO)

Anticipate increasing UE performance demands

Power consumption

End-users are frustrated with the short battery life of their smartphones and wireless data devices during real-world operation, making battery drain a top issue for wireless device designers and service providers. Operators are pushing for extended battery life not only for consumer satisfaction, but also so users can consume more pay-for-use data services—a critical revenue stream. Power consumption test verifies the power consumption of the UE under different channel configurations and application types.

The Agilent Technologies N6705B DC power analyzer is required to measure the power consumption of the UE.

Accelerate design and verification test cycles

Agilent has developed a number of test scripts based on TD-LTE IOT test requirements; including mobility, data throughput, and power consumption tests. Our measurement knowledge and experience of testing is built in to the pre-defined test cases, so you do not have to deal with the complexity associated with test development, instrument control, and data management.

Our test environment allows you to create your own test plans in a drag-and-drop environment, making it easy run tests unattended and progress rapidly to deployment. Agilent's test solution provides reliable, repeatable measurements and automatically generates measurement reports to an easy-to-read format.
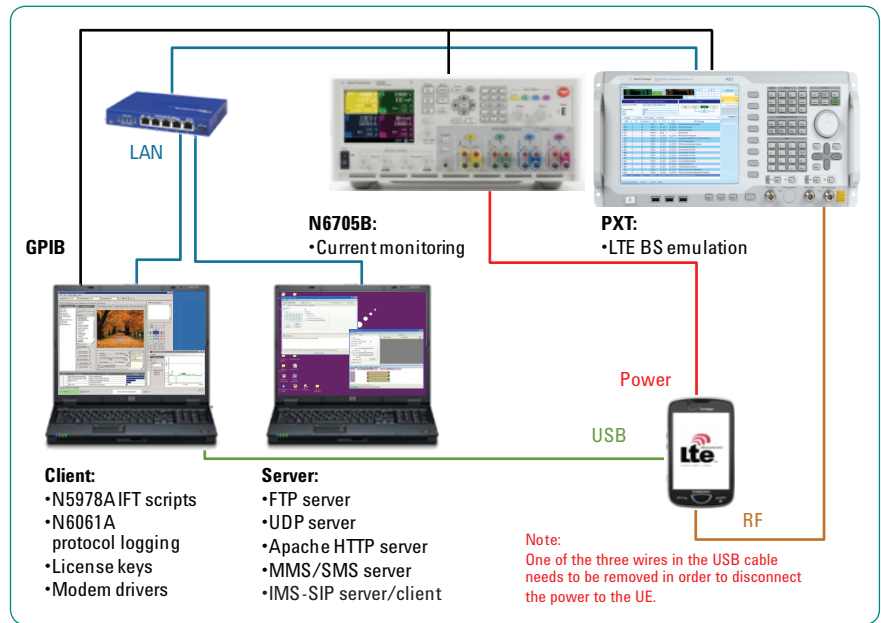

Figure 3. Schematic showing Agilent's test implementation of power consumption test plan

Diagram labels:
LAN
GPIB
N6705B:
•Current monitoring
PXT:
•LTE BS emulation
Client:
•N5978A IFT scripts
•N6061A protocol logging
•License keys
•Modem drivers
Server:
•FTP server
•UDP server
•Apache HTTP server
•MMS/SMS server
•IMS-SIP server/client
Power
USB
RF
Note:
One of the three wires in the USB cable needs to be removed in order to disconnect the power to the UE.

Achieve compliance testing to operator's test plan

The Agilent N5978A-1FP IFT scripts for TD-LTE IOT test operations allow you to focus on testing the TD-LTE terminal performance without having to create complex code or program test equipment. Developed specifically for engineers engaged in design verification of TD-LTE UE for use on operator networks, this solution supplements your TD-LTE IOT testing expertise with Agilent experience and measurement knowledge, providing automated test scripts based on the operator test plan.

Efficiently test and report results

•   Drag-and-drop environment for sequencing pre-defined test cases into test plans
•   Customizable UE control
•   Generated results reported to an easy-to-read format

Support for Agilent's established 8960 and PXT test sets

TD-LTE base station emulation is achieved using an Agilent PXT wireless communication test set. Already established in the world of 4G performance and conformance test, this leading test set now supports both IPv4 and IPv6 addressing, neighbor cell advertisement, and the required security configuration to implement the TD-LTE IOT test plan. The PXT includes an emulation of the evolved packet core (EPC)—an all-IP mobile core network required by 3GPP in Release 8 of the standards for LTE.

Get ahead faster

Agilent provides start-up assistance services to help you learn and harness the power of the N5978A software scripts. One day of start-up assistance is mandatory with the first-time purchase of the N5978A. Additional days of start-up assistance or productivity assistance can be ordered if desired.

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Keep your test plans productive and current

Software and technical support contracts (STSCs) entitle you to software updates and feature enhancements, as well as direct access to technical experts. These contracts are designed to increase your productivity by delivering software updates and providing a formal technical support channel for any operational difficulties you may encounter.

Our technical support engineers are experts on the N5978A test plans and related hardware. They have instant access to software and test sets enabling them to resolve your issues quickly. Agilent will investigate all software defects and operational problems reported through the technical support channel. Upon completion of the investigation, we will advise you of possible solutions, functional alternatives, or other options. Where possible, Agilent will provide software releases to address identified issues that necessitate software changes.

The N5978AS STSC covers all automation scripts you have purchased for the N5978A and also provides you with updates to the related IFT and IMS-SIP software. Contracts run for a fixed period, usually one year. An STSC will be required for each PC on which you are running N5978A automation scripts.

Get protocol logs for verification and debug

Software tools available for the PXT and 8960 wireless communications test sets provide logging of protocol exchanges between the test set and the UE. The logs are invaluable for verifying correct operation of UE against the test plan and providing designers with powerful debugging capability when test outcomes deviate from the expected results.

Configuration information

Interactive functional test software

- N5978A-1FP IFT scripts for TD-LTE Priority 1 IOT test operations: fixed, perpetual license
- N5978AS software and technical support contract
- PS-S20 startup assistance
- PS-S10 remote scheduled productivity assistance (optional)

LTE cell (including EPC emulator)

- E6621A PXT wireless communications test set with Options 2D2, and 503 or 506
- N6050AS LTE mobile test software: software and technical support contract
- N6050A-8FP LTE TDD base station emulation
- N6052A-1FP LTE-enhanced BSE and IP data test
- N6061A LTE protocol logging and analysis
- N6062A LTE message editor

GSM cell (for future use)

- E5515C/E 8960 wireless communications test set
- E6701I GSM/GPRS/EGPRS lab application
- E6720A-001 annual contract for GSM/GPRS/EGPRS
- E6584A wireless protocol adviser

TD-SCDMA cell (for future use)

- E5515C/E 8960 wireless communications test set with Option 003
- E1969A-201 TD-SCDMA signaling mode
- E1969A-403 TD-HSDPA
- E1699A-413 TD-HSUPA
- E1969A-407 TD-SCDMA protocol log

DC Power Analyzer

- N6705B DC power analyzer

Fader

- N9020A MXA signal analyzer with Option 503
- N9020A-B25 analysis bandwidth
- N9020A-P03 preamplifier
- N9020A-PFR precision frequency reference
- N5182A MXG RF vector signal generator with Option 503
- N5106A PXB baseband generator and channel emulator with Options 614 and 634
- N5106A-JFP calibrated AWGN
- N5106A-QFP fading with SISO channel models
- N5106A-TFP LTE channel models

Note: You can also choose an RF fader with LTE profile.

PC requirements for running IFT, protocol logging

Hardware/Operating system
- 1.8 GHz Pentium dual core processor or better
- Windows 7 Professional or Windows 7 Enterprise or Windows XP SP3 (32 bit version)
- 2 GB RAM
- 2 GB of available hard disk space
- LAN port
- 2 available USB ports
- Port for controlling UE (e.g. additional USB)
- One installed, configured, and tested Agilent Technologies or National Instruments IEEE 488.2 GPIB interface

Software

- Microsoft Internet Explorer version 6.0 or later
- Microsoft Excel version 2007 or later
- The latest version of VISA (virtual instrument software architecture) from the manufacturer of your GPIB interface
- Optional: Visual Studio 2010 is required for changing UE interface project and for script modification

PC requirements for running IMS-SIP server

Hardware/Operating system
- 1.8 GHz Pentium dual core processor or better
- Microsoft Windows XP Professional Service Pack 3 or Windows 7 Professional
- 2 GB RAM
- 2 GB of available hard disk space
- LAN port

Miscellaneous items

- Test UICC compliant with carrier-specific test specification
- Agilent 82357B (or similar) USB/GPIB interface
- 8-way GB LAN switch/hub, LAN cables
- Three 6-dB RF splitters/combiners
- RF cables

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