Agilent
N7625B Signal Studio for 3GPP LTE TDD

Technical Overview

Free Trial License

Create 3GPP LTE TDD Test Waveforms with Ease

The N7625B Signal Studio for 3GPP LTE TDD software simplifies creation of standards-compliant LTE and LTE-Advanced waveforms by providing quick access to parameters in its easily mastered tree-style navigation of the signal structure. The waveform playback mode of the software creates physical layer and transport channel coded arbitrary waveform files. These waveforms are used for measuring EVM, ACLR, and CCDF for power amplifier testing and for measuring HARQ functionality and block error rate (BLER) for receiver testing.

Signal Studio for 3GPP LTE TDD provides a cost effective, scalable test solution that enables thorough characterization and validation of your LTE TDD devices at an excellent price/performance ratio. For multi-format devices, or as your test needs evolve, you get more out of your test equipment by using high performance general purpose signal generator platforms that support a wide range of applications, including cellular and wireless formats. Use the N7625B software to download your LTE TDD waveform files to a variety of Agilent baseband, RF, and microwave signal generators, and DigRF test solutions.

Key Features

- Compliant to June 2010 3GPP LTE and December 2010 3GPP LTE-Advanced specifications
- Basic mode with physical layer coded signals for eNB- or UE-component modulation and power testing, including LTE-Advanced support
- Advanced mode with transport-channel coded signals for eNB or UE Rx testing
- Predefined setups for E-UTRA test models (E-TM) and fixed reference channels (FRC)

Agilent Technologies

Summary of Features

- Compliant to June 2010 3GPP LTE and December 2010 3GPP LTE-Advanced specifications

- Basic mode with physical layer coded signals for eNB- or UE-component modulation and power testing, including LTE-Advanced support

- Advanced mode with transport-channel coded signals for eNB or UE Rx testing

- Predefined setups for E-UTRA test models (E-TM) and fixed reference channels (FRC)

- All uplink/downlink and special subframe configurations

- Supports all bandwidths, modulation types, signals, and channels, including UE-specific RS

- Supports port5, port7 and port8 (dual layer beamforming)

- Add AWGN to evaluate performance in real-world conditions

Downlink features

- Automatic downlink control information (DCI) coding based on PDSCH allocation, UE scheduling and random access, and UL power control

- LTE-Advanced DL carrier aggregation per Release 10 LTE standard

- Up to 4x4 MIMO (spatial multiplexing or Tx diversity) with embedded fading, or real-time MIMO channel emulation with the Agilent PXB baseband generator and channel emulator

- Unique configuration for each code word, including data type, payload size, modulation type, and RV index

- HARQ testing with up to 15 simulated retransmissions

- UE-specific reference signal support

- PBCH encoded with master information block (MIB)

Uplink features

- Predefined configurations for all uplink Fixed Reference Channels (FRC), including multi-user PUCCH and PRACH

- LTE-Advanced UL carrier aggregation and SC-FDMA with clustering per Release 10 LTE standard

- Demodulation reference signal (DMRS) with group and sequence hopping

- Sounding Reference Signal (SRS) with frequency hopping, PUCCH with all formats, and multiple PRACH preambles

- PUSCH frequency hopping and UL control information multiplexing with PUSCH

Basic Capabilities for Component and Transmitter Test

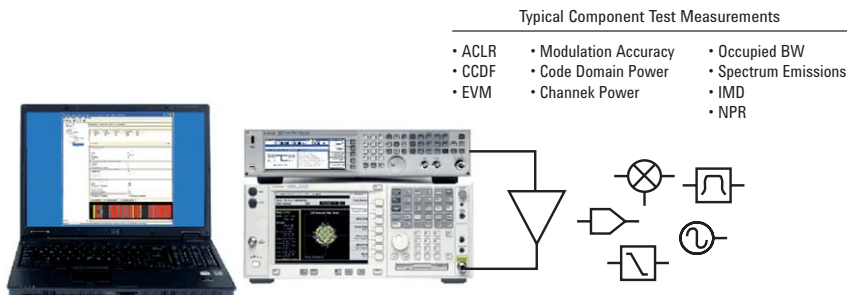| Typical Component Test Measurements		
• ACLR	• Modulation Accuracy	• Occupied BW
• CCDF	• Code Domain Power	• Spectrum Emissions
• EVM	• Channek Power	• IMD
		• NPR

Figure 1. Basic Component Test

The basic options for N7625B Signal Studio for 3GPP LTE TDD enables component and transmitter design and validation engineers to characterize modulation and power behavior and performance through metrics such as EVM, ACLR, and PAPR/CCDF under a wide variety of test conditions. Signal Studio for 3GPP LTE TDD also can be used for physical layer verification tests in RF receivers.

The easy-to-use Signal Studio graphical user interface provides quick access to LTE waveform parameters, including transmission bandwidth, cyclic prefix, and modulation type, enabling you to efficiently configure complex waveforms for testing LTE components.

For investigation of power and modulation characteristics under multiple test conditions, Signal Studio enables:

• Creation of spectrally-correct signals for ACLR, channel power, spectral mask, and spurious testing

• Settable parameters such as channel power and data channel modulation type (BPSK, QPSK, 16QAM, 64QAM), for modulation verification and analysis such as EVM testing

• Quickly configure parameters for component tests with built-in E-UTRA test models (for DL) and reference measurement channels (for UL)

• Multi-carrier signal generation, each with modulation type and bandwidth, oversampling ratio, frequency offsets, timing offsets, power, symbol roll-off length, baseband filter, and cell ID

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Signal Studio also provides CCDF, spectrum and time domain graphs to investigate the effects of power ramps, modulation formats, power changes, clipping, and other effects on device performance.
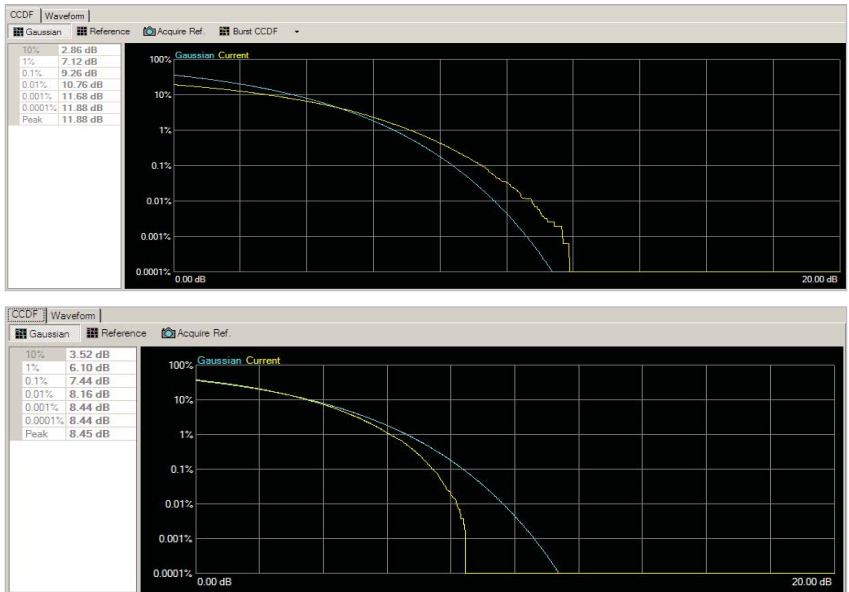

Figure 2. CCDF curves for custom-configured signals

LTE-Advanced Signal Generation

LTE-Advanced downlink and uplink signals compliant to the 3GPP release 10 (December 2010) standard can be generated to test power and modulation characteristics of components and transmitters.

Carrier aggregation is easily created through pre-defined scenario setups and configured through the intuitive user interface. Component carriers can be placed anywhere within the modulation bandwidth of the signal generator in contiguous or non-contiguous arrangements.

Power characteristics and spectral investigation for uplink signals are critical to LTE-Advanced. Enhanced uplink is supported through clustered SC-FDMA and simultaneous PUCCH/PUSCH transmission, enabling test of spurious emissions, CCDF, PAR, and other metrics.
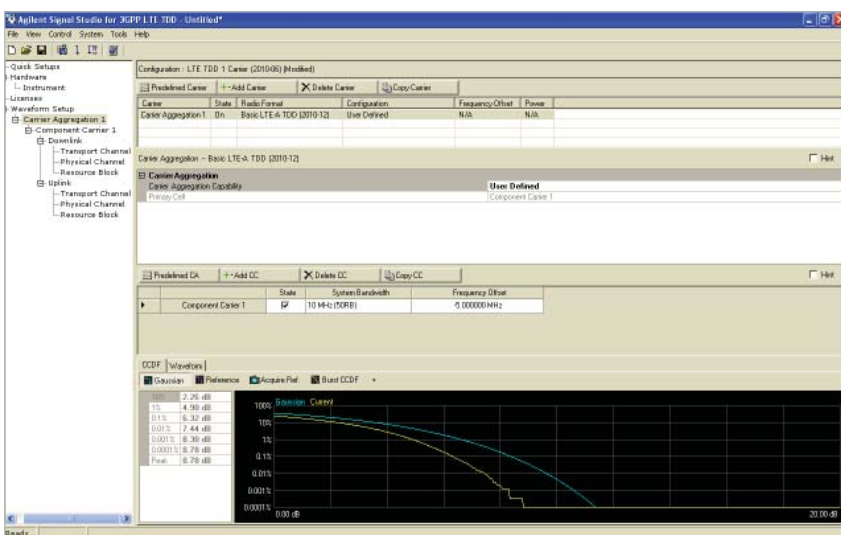
Figure 3a. CCDF plot of 10 MHz enhancement uplink LTE-Advanced carrier
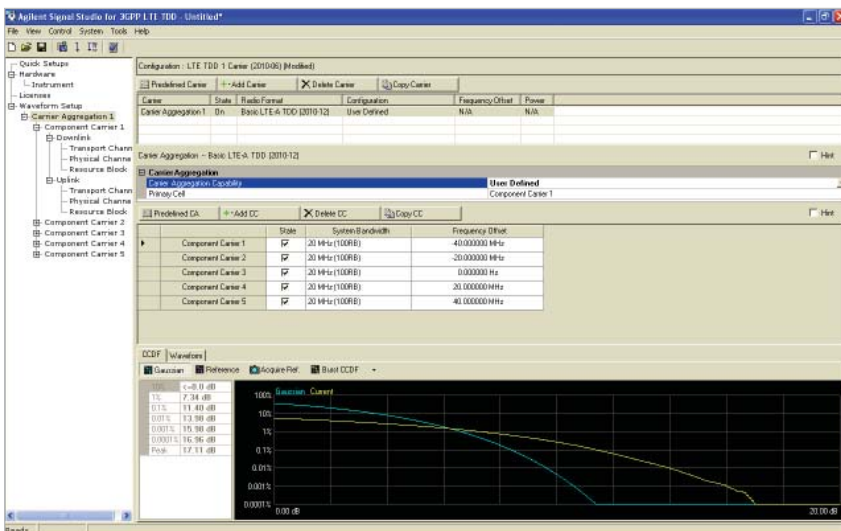
Figure 3b. CCDF plot of downlink carrier aggregation with five component carriers (20 MHz bandwidth each)

Advanced Capabilities for Receiver Test

Typical Receiver Measurements

- Sensitivity
- Maximum input level
- Selectivity
- Blocking
- Intermodulation
- Spurious emissions
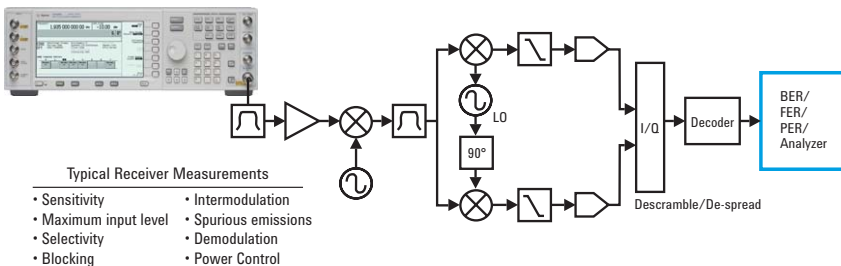- Demodulation
- Power Control

Figure 4. Advanced capabilities test

For receiver design and verification, Signal Studio for 3GPP LTE TDD delivers signals to address applications in the design process, such as during Rx chipset design and verification, or module integration and verification.

The advanced Option QFP enables engineers working on evolved universal terrestrial radio access network base stations (eNBs), to validate uplink receiver characteristics and performance based on the 3GPP TS 36.141 conformance test document. Signal Studio accelerates and simplifies receiver conformance testing by generating uplink signals, including transport-channel coding. Pre-defined configurations include:

- FRC configurations for receiver characteristics testing
- FRC configurations for performance requirements testing

The advanced carrier in Signal Studio uses a process- and incremental redundancy-based approach to payload data and its associated HARQ. Transport channel data is assigned to one or more processes, each with an initial redundancy variable (RV) index. For each ACK response sent to the eNB for a given process, RV index "0" is associated to that process. If a NACK response is sent to the eNB, the RV index is incremented based on a user-definable sequence.

The simulated ACK/NACK sequence and associated process retransmissions can be predefined in Signal Studio. When used in conjunction with the Agilent PXB, HARQ feedback (such as from an eNB) can be input from external CMOS 3.3V into the PXB.

Testing of UE receivers is simplified through Signal Studio, from SISO to MIMO. Downlink signals, including test models and FRC configurations are available as pre-defined configurations. Multiple signal generators are easily connected to Signal Studio, generating spatial multiplexing MIMO signals through a single user interface and configuration window. Signal Studio takes care of applying the correct parameters to each Tx antenna signal, eliminating the pain and uncertainty of trying to duplicate and setup each Tx antenna manually. Rx performance under different MIMO precoding matrix indices is easily configured, and static channel fading conditions can be generated within the arbitrary waveform. For dynamic signal manipulation and channel emulation, Signal Studio connects to the Agilent PXB for real-time MIMO fading.

Supported Standards

N7625B Signal Studio for 3GPP LTE TDD supports the following 3GPP standard revisions:

3GPP functional freeze date	3GPP technical specification	Version
December 2010	36.211	10.0.0
	36.212	10.0.0
	36.213	10.0.0
June 2010	36.141	9.4.0
	36.211	9.1.0
	36.212	9.2.0
	36.213	9.2.0
	36.321	9.3.0
	36.331	9.3.0
	36.521-1	9.1.0

Older versions of the 3GPP LTE specification are also supported. See software for details.
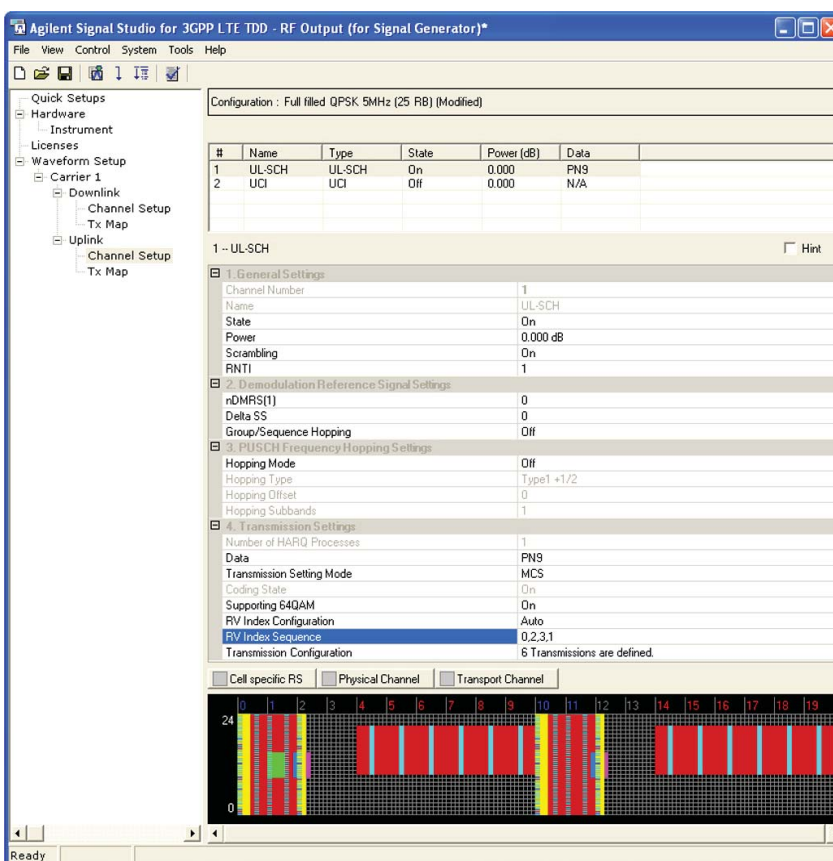

Figure 5. UL signal configuration shows user-defined RV index sequence

3GPP LTE eNB Conformance Tests

Receiver characteristics

Receiver characteristics	Wanted signal	Interfering signal	Dynamic range (between wanted and interferer)	Solution
7.2 Reference sensitivity level	FRC A1-1, 1-2, 1-3 QPSK Mod	None required for this test		Signal Studio
7.3 Dynamic range	FRC A2-1, 2-2, 2-3 16QAM Mod	AWGN	Up to 12.7 dB	Signal Studio
7.4 In-channel selectivity	FRC 1-2, 1-3, 1-4, 1-5 QPSK Mod	E-UTRA with all BW	Up to 20.1 dB	Signal Studio
7.5 Adjacent channel selectivity	FRC A1-1, 1-2, 1-3 QPSK Mod	E-UTRA offsets up to 2.5 MHz[1]	48.1 dB	Signal Studio
7.5 Narrowband blocking	FRC A1-1, 1-2, 1-3 QPSK Mod	E-UTRA offsets up to 4.66 MHz[1]	51.1 dB	Signal Studio
7.6 Blocking (in-band)	FRC A1-1, 1-2, 1-3 QPSK Mod	Offsets up to 7.5 MHz[1]	57.1 dB	Signal Studio
7.6 Blocking (out-of-band)	FRC A1-1, 1-2, 1-3 QPSK Mod	CW offset up to 12.75 GHz	85.1 dB	Signal Studio with additional CW source
7.7 Receiver spurious emissions	NA	NA	NA	Spectrum analyzer
7.8 Receiver intermodulation	FRC A1-1, 1-2, 1-3 QPSK Mod	CW offset up to 7.5 MHz[1] and E-UTRA offset up to 18.2 MHz[1]	48.1 dB	Signal Studio (with PXB)
7.8 Receiver intermodulation (Narrow band intermodulation)	FRC A1-1, 1-2, 1-3 QPSK Mod	CW offset up to 415 kHz[1] and E-UTRA offset up to 1780 kHz[1]	48.1 dB	Signal Studio (with PXB)

1. *From channel edge of wanted signal.*
   - *Either ARB or real-time Signal Studio can be used*
   - *Tests do not require channel emulation*
   - *Test are performed open loop, i.e. no HARQ feedback required*

Performance requirements

Performance requirements	Wanted signal	Notes	Feedback	Solution
8.2.1 PUSCH in multipath fading propagation conditions	FRC A3, A4, A5 QPSK, 16QAM, 64QAM	Multiple propagation profiles, interfering signal is AWGN	HARQ	Signal Studio with PXB
8.2.2. UL timing adjustment	FRC A7, A8 QPSK, 16QAM	Requires simulation of stationary UE and moving UE with moving propagation with ETU200 profile	HARQ and timing adjustment	Signal Studio with PXB
8.2.3 HARQ-ACK multiplexed on PUSCH	FRC A3-1, A4-3 to A4-8 QPSK, 16QAM	Requires ETU70 profile	HARQ	Signal Studio with PXB
8.2.4 high speed train conditions	FRC A3-2 to A3-7 QPSK	Requires high speed train channel emulation	HARQ	Signal Studio with PXB
8.3.1 ACK missed detection for single user PUCCH format 1a	PUCCH ACK	Multiple propagation profiles; interfering signal is AWGN		Signal Studio with PXB
8.3.2 CQI missed detection for PUCCH format 2	PUCCH CQI	Interfering signal is AWGN		Signal Studio with PXB
8.3.3 ACK missed detection for multi user PUCCH format 1a	PUCCH ACK	Requires 3 interferers		Signal Studio with PXB
8.4.1 PRACH false alarm probability and missed detection	PRACH preamble	Requires 1x4 Rx diversity		Signal Studio with PXB

- *All tests require channel emulation and AWGN*
- *All tests require 1x2 Rx diversity*
- *Real-time LTE Signal Studio is required for 8.2 tests*
- *ARB-based Signal Studio or real-time LTE Signal Studio is required for 8.3 and 8.4 tests*

Basic and Advanced Capabilities Summary

Feature/Parameter	Basic	Advanced
LTE TDD support	●	●
LTE-Advanced TDD support	●	
Calibrated AWGN (requires instrument option)	●	●
Real-time modulation filter (ESG/MXG only)		●
Code domain and CCDF graphs	●	●
Multi-carrier timing, and clipping	●	●
Downlink		
Downlink MIMO configurations (up to 4x4)		●
Automatic DCI generation		●
ETM Setting Wizard for E-UTRA to match transmission tests	●	●
Preconfigured support for FRC signals		●
Dual Layer Beamforming support		●
HARQ processing for DL-SCH		●
PDSCH selectable modulation: QPSK, 16QAM, 64QAM	●	●
DL-SCH selectable MCS		●
Uplink		
Preconfigured support for FRC signals with transport channel coding		●
HARQ processing for UL-SCH (bundling of ACK/NACK)		●
PRACH signal generation, all formats	●	
User-definable HARQ and RV index transmission pattern		●

Performance Characteristics

Agilent N5162A/N5182A MXG signal generator with Option UNV

Signal Studio for 3GPP LTE TDD (2009-12) distortion performance

Radio format: 1-carrier basic LTE TDD downlink
Frequencies measured : 1880, 1900, 1910, 1920, 1960, 2017.5, 2350, and 2595 MHz
Power: −10 dBm

Bandwidth	E-UTRA test model/ modulation	Offset E-UTRA	E-UTRA (dBc)	Offset UTRA	UTRA (dBc)
5 MHz	E-TM1.1/QPSK	Adjacent (5 MHz)	−71.5[1]	Adjacent (5 MHz)	−71.8[4]
5 MHz	E-TM1.1/QPSK	Adjacent (10 MHz)	−72.7[1]	Adjacent (10 MHz)	−72.4[4]
5 MHz	E-TM1.2/QPSK	Adjacent (5 MHz)	−70.9[1]	Adjacent (5 MHz)	−71.5[4]
5 MHz	E-TM1.2/QPSK	Adjacent (10 MHz)	−72.8[1]	Adjacent (10 MHz)	−72.4[4]
10 MHz	E-TM1.1/QPSK	Adjacent (10 MHz)	−69.3[2]	Adjacent (7.5 MHz)	−71.9[4]
10 MHz	E-TM1.1/QPSK	Adjacent (20 MHz)	−70.3[2]	Adjacent (12.5 MHz)	−71.8[4]
10 MHz	E-TM1.2/QPSK	Adjacent (10 MHz)	−69.2[2]	Adjacent (7.5 MHz)	−71.9[4]
10 MHz	E-TM1.2/QPSK	Adjacent (20 MHz)	−70.5[2]	Alternate (12.5 MHz)	−71.7[4]
20 MHz	E-TM1.1/QPSK	Adjacent (20 MHz)	−66.5[3]	Alternate (12.5 MHz)	−71.7[4]
20 MHz	E-TM1.1/QPSK	Adjacent (40 MHz)	−66.7[3]	Alternate (17.5 MHz)	−71.9[4]
20 MHz	E-TM1.2/QPSK	Adjacent (20 MHz)	−66.5[3]	Alternate (12.5 MHz)	−71.4[4]
20 MHz	E-TM1.2/QPSK	Adjacent (40 MHz)	−66.8[3]	Alternate (17.5 MHz)	−71.8[4]

1. *4.5 MHz integration bandwidth used.*

2. *9.0 MHz integration bandwidth used.*

3. *18.0 MHz integration bandwidth used.*

4. *3.84 MHz integration bandwidth used.*

Agilent N5162A/N5182A MXG signal generator with Option UNV (Continued)

Signal Studio for 3GPP LTE TDD (2009-12) EVM[1] performance

Radio format: 1-carrier basic LTE TDD downlink
Frequencies measured : 1880, 1900, 1910, 1920, 1960, 2017.5, 2350, and 2595 MHz
Power: −10 dBm

Bandwidth	Modulation	E-UTRA test model	Measurement	Measured EVM
5 MHz	64QAM - 1RB	E-TM2	64QAM EVM	< 0.7%
	64QAM - Full RB	E-TM3.1	64QAM EVM	
	16QAM	E-TM3.2 (de-boosted)	16QAM EVM	
	QPSK	E-TM3.2 (boosted)	QPSK EVM	
	QPSK	E-TM3.3 (de-boosted)	QPSK EVM	
	16QAM	E-TM3.3 (boosted)	16QAM EVM	
10 MHz	64QAM - 1RB	E-TM2	64QAM EVM	< 0.7%
	64QAM - Full RB	E-TM3.1	64QAM EVM	
	16QAM	E-TM3.2 (de-boosted)	16QAM EVM	
	QPSK	E-TM3.2 (boosted)	QPSK EVM	
	QPSK	E-TM3.3 (de-boosted)	QPSK EVM	
	16QAM	E-TM3.3 (boosted)	16QAM EVM	
20 MHz	64QAM - 1RB	E-TM2	64QAM EVM	< 0.7%
	64QAM - Full RB	E-TM3.1	64QAM EVM	
	16QAM	E-TM3.2 (de-boosted)	16QAM EVM	
	QPSK	E-TM3.2 (boosted)	QPSK EVM	
	QPSK	E-TM3.3 (de-boosted)	QPSK EVM	
	16QAM	E-TM3.3 (boosted)	16QAM EVM	

1.   *Symbol timing adjust: max of EVM window start/end.*

Recommended Configuration

N5162A MXG ATE vector signal generator

N7625B Signal Studio software with the following options[1]:

N7625B-EFP	Basic LTE TDD Release 9, fixed, perpetual license
N7625B-JFP	Basic LTE-Advanced TDD Release 10, fixed, perpetual license
N7625B-QFP	Advanced LTE TDD Release 9, fixed, perpetual license
N7625B-3FP	Connect to N5162A/N5182A signal generator, fixed, perpetual license

N5162A MXG ATE with the following options:

N5162A	MXG ATE vector signal generator
N5162A-503	Frequency range from 100 kHz to 3 GHz
N5162A-652[2]	Internal baseband generator (60 MSa/s, 8 Msa)
N5162A-019	Upgrade baseband generator memory to 64 MSa

Other N5162A[3] MXG ATE options to consider:

N5162A-403[4]	Calibrated AWGN
N5162A-506	Frequency range from 100 kHz to 6 GHz
N5162A-654[2]	Internal baseband generator (125 MSa/s, 8 Msa)
N5162A-UNV[5]	Enhanced dynamic range
N5162A-1EA	High output power
N5162-1EQ	Low output power (less than –110 dBm)
N5162A-UNZ	Fast switching

1. *Recommended options are for a fixed, perpetual license; transportable and time-based license options are also available.*
2. *Options 652 and 654 are not required if are using the PXB to play your waveforms.*
3. *Firmware version A.01.60 with internal channel corrections is recommended for multicarrier configurations.*
4. *Option 403 is not required if you are using the PXB to play your waveforms. The PXB has a separate AWGN option that is included in the N5106A-2B2 bundle. To use AWGN on the ESG or MXG without the PXB, Option 403 is required.*
5. *For improved ACP performance.*

N5182A MXG vector signal generator

N7625B Signal Studio software with the following options[1]:

N7625B-EFP	Basic LTE TDD Release 9, fixed, perpetual license
N7625B-JFP	Basic LTE-Advanced TDD Release 10, fixed, perpetual license
N7625B-QFP	Advanced LTE TDD Release 9, fixed, perpetual license
N7625B-3FP	Connect to N5162A/N5182A signal generator, fixed, perpetual license

N5182A MXG with the following options:

N5182A	MXG vector signal generator
N5182A-503	Frequency range from 100 kHz to 3 GHz
N5182A-652[2]	Internal baseband generator (60 MSa/s, 8 Msa)
N5182A-019	Upgrade baseband generator memory to 64 MSa

Other N5182A[3] MXG options to consider:

N5182A-403[4]	Calibrated AWGN
N5182A-506	Frequency range from 100 kHz to 6 GHz
N5182A-654[2]	Internal baseband generator (125 MSa/s, 8 Msa)
N5182A-UNV[5]	Enhanced dynamic range
N5182A-1EA	High output power
N5182A-1EQ	Low output power (less than –110 dBm)
N5182A-UNZ	Fast switching

1. *Recommended options are for a fixed, perpetual license; transportable and time-based license options are also available.*
2. *Options 652 and 654 are not required if are using the PXB to play your waveforms.*
3. *Firmware version A.01.60 with internal channel corrections is recommended for multicarrier configurations.*
4. *Option 403 is not required if you are using the PXB to play your waveforms. The PXB has a separate AWGN option that is included in the N5106A-2B2 bundle. To use AWGN on the ESG or MXG without the PXB, Option 403 is required.*
5. *For improved ACP performance.*

Agilent E4438C ESG vector signal generator

N7625B Signal Studio software with the following options[1]:

N7625B-EFP   Basic LTE TDD Release 9, fixed, perpetual license
N7625B-JFP   Basic LTE-Advanced TDD Release 10, fixed, perpetual license
N7625B-QFP   Advanced LTE TDD Release 9, fixed, perpetual license
N7625B-1FP   Connect to E4438C signal generator, fixed, perpetual license

E4438C ESG with the following options:

E4438C   ESG vector signal generator
E4438C-503   Frequency range, 250 kHz to 3 GHz
E4438C-601   Internal baseband generator, 8 Msa memory with digital bus capability

Other N5182A MXG options to consider:

E4438C-403[2]   Calibrated noise personalities
E4438C-602   Internal baseband generator, 64 Msa memory with digital bus capability

1. *Recommended options are for a fixed, perpetual license; transportable and time-based license options are also available.*
2. *Option 403 is not required if you are using the PXB to play your waveforms. The PXB has a separate AWGN option that is included in the N5106A-2B2 bundle. To use AWGN on the ESG or MXG without the PXB, Option 403 is required.*

Agilent 16800/16900 logic analyzer and Agilent N5343A/N5344A DigRF exerciser

Use the N7625B Signal Studio application to generate and download custom waveforms to your Agilent 16800/16900 series logic analyzer or N5343A/N5344A DigRF exerciser. The integration of DigRF logic analysis tools with Agilent N7625B Signal Studio for 3GPP LTE TDD provides a cross-domain solution to help you rapidly deploy your DigRF based designs.

N7625B Signal Studio software with the following options[1]:

N7625B-R7L   Connect to 16800/16900/N5343A/N5344A, fixed, perpetual license
N7625B-R80   Basic LTE TDD Release 9 for 16800/16900/N5343A/N5344A, fixed, perpetual license
N7625B-R89   Advanced LTE TDD Release 9 for 16800/16900/N5343A/N5344A, fixed, perpetual license

1. *Recommended options are for a fixed, perpetual license; transportable and time-based license options are not available for 16800/16900 logic analyzers or N5343A/N5344A DigRF exerciser.*

Agilent N5106A PXB baseband generator and channel emulator

Download standards-based 3GPP LTE TDD waveforms from the N7625B Signal Studio for 3GPP LTE TDD software to the Agilent N5106A PXB baseband generator and channel emulator and apply these waveforms to simulate real-world channel conditions for your DUT with single channel and multiple channel coexistence configurations.

N7625B Signal Studio software with the following options:

N7625B-6FP   Connect to N5106A PXB, fixed, perpetual license
N7625B-EFP   Basic LTE TDD Release 9, fixed, perpetual license
N7625B-JFP   Basic LTE-Advanced TDD Release 10, fixed, perpetual license
N7625B-QFP   Advanced LTE TDD Release 9, fixed, perpetual license
N7625B-WFP   Advanced TDD real time Release 9, fixed, perpetual license

N5106A PXB with the following options
(both of the following bundles are required for verifying MIMO performance)

N5106A-2B2   2x2 MIMO baseband generation and channel emulation bundle
N5106A-TFP   LTE channel models

This bundle includes:
N5106A-616   6 DSP blocks on 3 baseband cards
N5106A-634   4 I/O channels - 4 analog I/Q out and 4 digital I/O on 2 I/O cards
N5106A-EFP   Baseband generation
N5106A-JFP   Calibrated AWGN
N5106A-QFP   Fading and SISO channel models

MIMO considerations

For MIMO testing with the PXB, refer to the PXB online documentation.

The recommended configurations listed above can be used for MIMO test setups using multiple signal generators with synchronized waveform playback. For some applications such as beamforming or long-term tests, it may be desirable to have more precise baseband timing alignment (error of less than one cycle of the baseband generator clock) and/or RF phase coherency between the signal generators. The E4438C ESG signal generator has special options available to provide these capabilities. The N5182A MXG and N5162A MXG ATE provide precise baseband timing alignment as a standard feature, and Option 012 provides LO IN/OUT for RF phase coherency. For more information about the performance of various hardware configurations for MIMO testing, see the MIMO Characteristic Performance Analysis in the online documentation. This topic includes links to detailed descriptions of the following hardware configurations:

- Multiple antennas solution without baseband timing or phase coherence for MxN MIMO

- Multiple antennas solution with baseband timing alignment without phase coherence for MxN MIMO

- Multiple antennas solution with baseband timing alignment and RF phase coherence for MxN MIMO

Free Trials

Try the software today. Evaluate the user interface and generate signals for 14-days prior to purchase.

To evaluate the user interface

- Every Signal Studio software package can be installed on your PC
- No license is required

To generate signals[1]

- One-time, 14-day free trial license
- Enables signal generation on MXG, ESG, or PSG vector signal generators
- 14-day clock starts upon license redemption
- Enables the playback of waveforms on a specific signal generator
- Enables all optional capabilities in the software
- Can be redeemed for multiple signal generators, one per instrument serial number

To redeem a trial license[2]

- Method 1: Go to **www.agilent.com/find/signalstudio**, select a Signal Studio product, and then select "Free Trial License"
- Method 2: Install the Signal Studio software and select "Get a Free Trial" in the Online Documentation main menu

Upon trial license expiration

- The trial license will expire 14 days after it is redeemed
- Upon expiration, the signal generator no longer generates signals created by the Signal Studio software
- To continue generating signals, a right-to-use license must be purchased

1. *Most Signal Studio software products offer a free trial license. The product summary table indicates which Signal Studio products offer a free 14-day trial.*
2. *Internet access is required. You will be navigated to the Agilent Software Licensing Website.*

Flexible Right-to-Use Licenses

Signal Studio software can be installed on multiple users' PCs to create signals for use with Agilent instruments equipped with right-to-use licenses. Flexible right-to-use licensing options are available to meet your specific test needs, schedules, and budget requirements.[1]

Transportable, perpetual license

- Enables generation of the signals created by a specific Signal Studio product on a specific instrument, at any one time
- License is transportable from one instrument to another up to 10 times per month
- Permanent ownership of license
- Ideal for cost-effective single/multi-user, multi-instrument use cases
- Transportable licenses are priced at only a 30% premium relative to fixed, perpetual license

Floating, perpetual license[2]

- Enables generation of the signals created by a specific Signal Studio product on a specific instrument at any one time
- License is transportable from one instrument (or PC) to another
- Permanent ownership of license
- Ideal for cost-effective single/multi-user, multi-instrument use cases
- Floating licenses are priced at only a 30% premium relative to fixed, perpetual license

Fixed, time-based license

- Enables generation of the signals created by a specific Signal Studio product on a specific instrument
- License is fixed to a single instrument (not transportable)
- Time-perishable lease of license (1 month)
- Ideal for cost-effective single/multi-user, single-instrument short term and project based use cases
- 1-month time-based licenses are priced at 10% of the fixed, perpetual license

Fixed, perpetual license

- Enables generation of the signals created by a specific Signal Studio product on a specific instrument
- License is fixed to a single instrument (not transportable)
- Permanent ownership of license
- Ideal for single/multi-user, single-instrument use cases

Waveform license[4]

- Enables generation of up to 545 user-configured Signal Studio I/Q waveform files
- License I/Q waveform files from any N76xxB Signal Studio software product on a specific instrument
- License is fixed to a single instrument (not transportable)
- Permanent ownership of license
- Ideal for cost-effective deployment of Signal Studio test signals in manufacturing
- Available in packs of 5 or 50 waveform licenses
- Evaluate each of the waveforms for up to 48 hours before assigning individual licenses

1. *Each Signal Studio software license enables signal generation on a specific signal generator (i.e. model number and serial number) at any one time. The product summary table lists the right-to-use licenses available for each Signal Studio software product.*

2. *Only available on Agilent 16800/16900 Series logic analyzers or N5343A/N5344A DigRF exerciser.*

3. *Upon license expiration, the instrument stops generating signals created by the specific Signal Studio software product. To continue generating signals on the instrument, a new right-to-use license must be purchased. Time-based licenses cannot be upgraded to enable additional capability after initial purchase.*

4. *Only available on N5182A MXG, N5162A MXG ATE, or E4438C ESG vector signal generators; up to 9 waveform 5-packs (MXG/ESG Options 221-229); up to 10 waveform 50-packs (MXG/ESG Options 250-259).*

Additional Information

Explore the online documentation

For more information about this Signal Studio software, explore the online documentation (Help), which includes this technical overview, release notes, user interface descriptions, tutorials, installation information, and an easy-to-use configuration assistant to help you determine the right option combination for your test needs. Access the online documentation at:
www.agilent.com/find/n7625b

Related Websites

Signal creation software
www.agilent.com/find/signalstudio

Agilent's LTE design and test solutions
www.agilent.com/find/lte

Related Literature

Move Forward to What's Possible in TD-LTE, Brochure, 5990-4245EN
http://cp.literature.agilent.com/litweb/pdf/5990-4245EN.pdf

Move Forward to What's Possible in LTE, Brochure, 5989-7817EN
http://cp.literature.agilent.com/litweb/pdf/5989-7817EN.pdf

Agilent 3GPP Long Term Evolution, Application Note, 5989-8139EN
http://cp.literature.agilent.com/litweb/pdf/5989-8139EN.pdf

Signal Studio Software, Brochure, 5989-6448EN
http://cp.literature.agilent.com/litweb/pdf/5989-6448EN.pdf