



# PathWave Signal Generation

Accelerate your test and design workflows

BROCHURE

 KEYSIGHT

PATHWAVE

# Simplify Signal Creation

## Reduce the time you spend on signal simulation

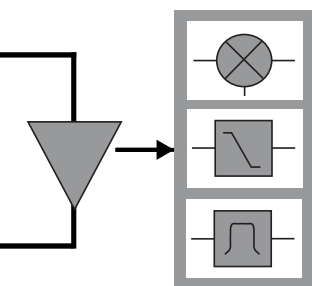
Signal Studio comes with performance-optimized signals validated by Keysight. You can easily modify these signals to meet your needs. Or you may quickly create custom reference signals for testing devices. Its fast and simple user interface features tree-style navigation and graphical, parameterized signal configuration.

### What is Signal Studio?

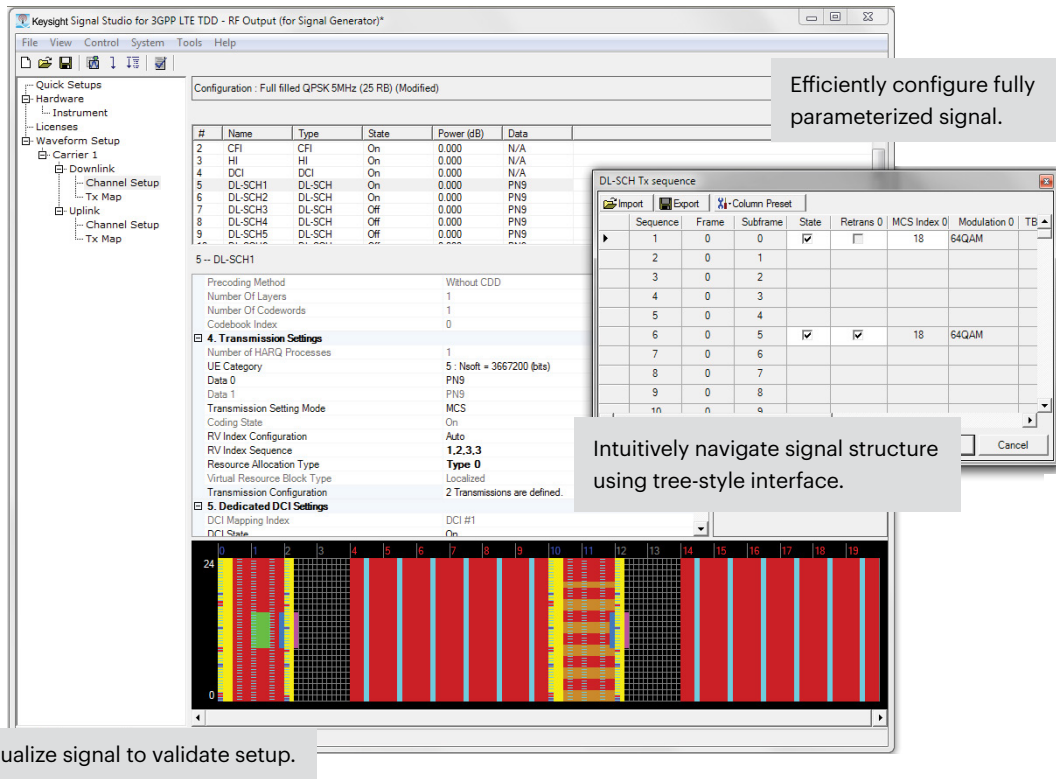
Signal Studio is signal creation software that runs on a PC. It enables the creation of application specific test signals at baseband, RF and microwave frequencies.



Enhance component testing with virtually distortion-free stimulus signals.



Evaluate receiver tolerance by creating calibrated additive signal impairments.



## Typical measurements

Test components and transmitters:

- CCDF
- EVM
- channel power
- occupied bandwidth
- spectrum

Test receivers:

- component test along receiver chain
- receiver sensitivity
- BER

# Next-Generation Signal Creation

## PathWave Signal Generation Desktop or Embedded

PathWave Signal Generation has two types of applications: Desktop and Embedded. PathWave Signal Generation Desktop runs on a PC like Signal Studio and can create and download generated waveforms into various signal generators. PathWave Signal Generation Embedded is a fully integrated application in Keysight VXG or Next Generation MXG signal generator's firmware. PathWave Signal Generation Embedded uses the same measurement technology as PathWave Signal Generation Desktop and includes a graphical user interface (GUI) optimized for touch-based operations.

### PathWave Signal Generation is an integrated application

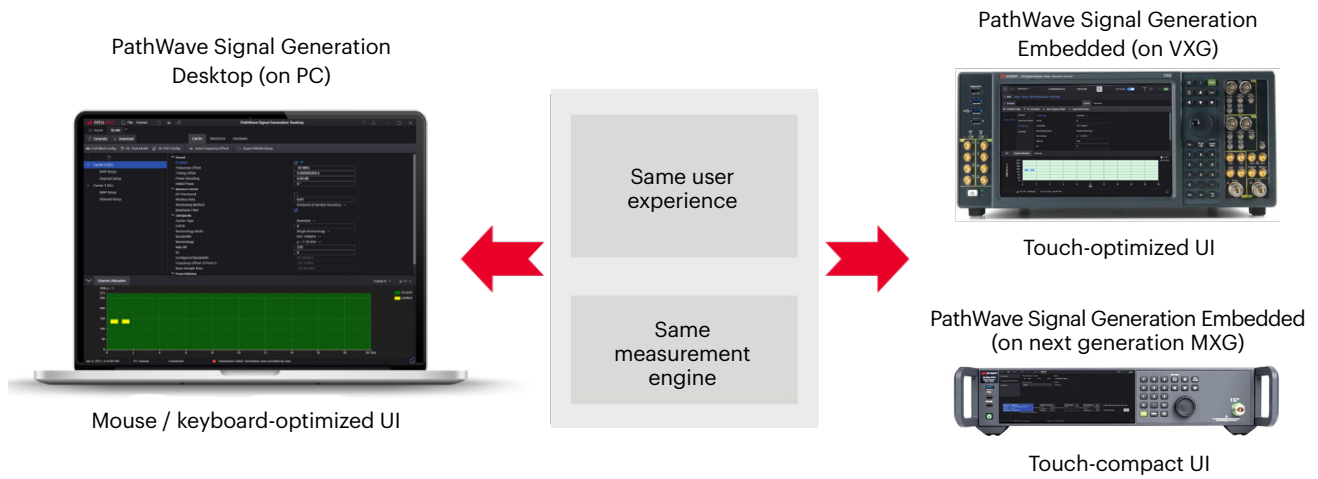
- Supports multiple radio formats in a single application.
- Provides the same user experience and measurement engines across Desktop and Embedded versions.
- Generates encrypted waveforms (\*.wfm) for downloading or playback.
- Includes a hardware driver that performs waveform download and setup for play back.
- Provides a high-DPI display with scaling support.

### PathWave Signal Generation provides different licensing scheme for use scenarios

- N76xxAPPC can run as PathWave Signal Generation Desktop PC application license.
- N76xxAPPC can run as PathWave Signal Generation Embedded higher tiered licenses on all supported platforms including VXG (M9383B, M9384B, M9484C) and next generation MXG N5186A.
- E76xxAPPC can run as PathWave Signal Generation Embedded middle tiered licenses on the next generation MXG N5186A as cost effective licenses compared with N76xxAPPC which can run on all platforms.
- N76xxEMBC can run as waveform playback license installed in all of the signal generators supported.

## What is PathWave Signal Generation?

Keysight PathWave Signal Generation is Keysight's next-generation signal-generation software. It unifies various signal-generation applications together with Waveform Utility and toolkit. It provides a consistent and optimized user experience from R&D through manufacturing to enable smoother collaboration.



# Easily Create Signals for Your Bench or Production Line

Whether you need test stimuli in R&D or manufacturing, Signal Studio simplifies creation of the signals you need for characterization, verification, and pass / fail testing of components, devices, receivers, and more.

## Simplify signal creation on the bench

Create your own signal-creation workstation in R&D by connecting Signal Studio to a Keysight instrument through the LAN or GPIB port of a PC. A built-in configuration tool makes it fast and simple, and the Signal Studio user interface includes a window that enables direct control of a connected instrument.

For advanced automation and control, the available application programming interface (API) exposes the signal creation and generation parameters of the software. This capability also enables creation of a custom user interface for signal creation.

## Accelerate testing on the production line

To save time during automated testing, waveforms created in Signal Studio can be downloaded to an instrument and stored in memory. Recall and playback can be initiated programmatically with SCPI commands or through the front panel.

When you need to use custom signals with multiple test systems, flexible right-to-use licenses can meet your specific needs, schedules and budget requirements. For example, waveform licensing is ideal for cost-effective deployment of Signal Studio test signals in a manufacturing environment. Each of these licenses is fixed to a single instrument but is available in packs of 5 or 50 waveform licenses that can be used for different signal formats. Please see the licensing section for more information about other licensing options.

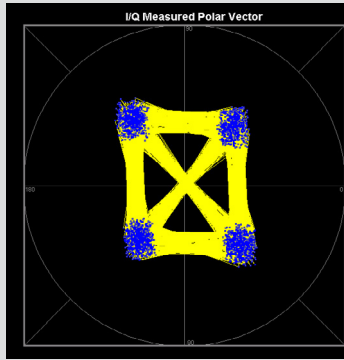
### Key features and attributes

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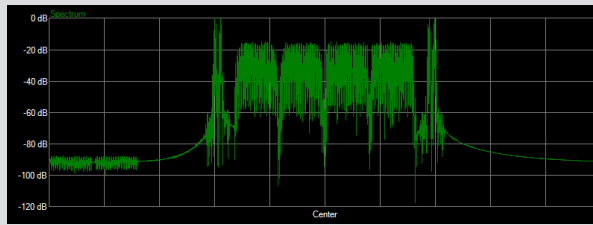
Signal generation	<ul style="list-style-type: none"><li>• Custom, standards-based, and presets for common test signals</li><li>• Arbitrary IQ waveform and real-time IQ generation</li></ul>
Additive impairments	<ul style="list-style-type: none"><li>• I/Q impairments</li><li>• AWGN</li><li>• Real-time fading</li></ul>
Graphs	<ul style="list-style-type: none"><li>• I(t), Q(t), I(t) + Q(t), P(t)</li><li>• Spectrum, CCDF, CDP</li><li>• Frame structure</li><li>• Power envelope</li></ul>

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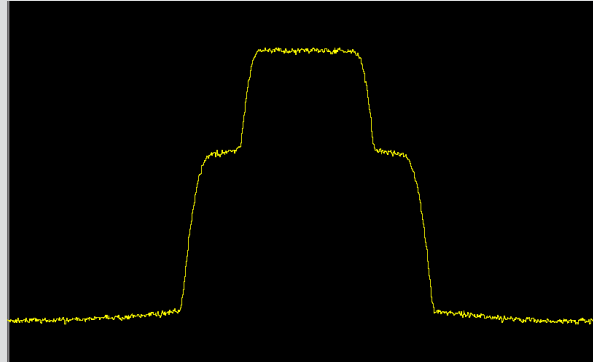
Easy-to-use graphical display for signal visualization and verification



Calibrated AWGN to simulate a noisy environment



IQ polar vector display with added IQ impairments



**KEYSIGHT TECHNOLOGIES** Search

**Contents**

- Welcome
- System Requirements
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- AWU
- NR-V2X

**SCPI List**

This topic is a comprehensive listing of all SCPI commands available for the PWSG Desktop software. Each command links to a description. In most cases, the description applies to both the SCPI command and its equivalent GUI function.

**NOTE** If you are using remote commands for a particular application, each time you restart the PWSG Desktop software, you must first send the `RADio:SElect` command to load the application's associated SCPI. Otherwise, an error is generated. Additionally, running this command for an unlicensed application generates the error +627, "Licensing Error; The mode is not licensed."

Application	SCPI command to send after a PWSG Desktop restart
5G NR	<code>[[:SOURCE]:RADio:SElect NR5G</code>
AWU	<code>[[:SOURCE]:RADio:SElect AWU</code>
NR V2X	<code>[[:SOURCE]:RADio:SElect NV2X</code>

**\***

- \*CLS
- \*IDN?
- \*OPC
- \*OPC?
- \*RST

**S**

- `[[:SOURCE]:RADio:<app>:MEMory:STATe:RECall`
- `[[:SOURCE]:RADio:<app>:MEMory:STATe:SAVE`
- `[[:SOURCE]:RADio:<app>:PLAYback:DUCA:CHANnel:COUNT`
- `[[:SOURCE]:RADio:<app>:PLAYback:DUCA:CHANnel:COUNT?`
- `[[:SOURCE]:RADio:<app>:PLAYback:DUCA:CONNect`
- `[[:SOURCE]:RADio:<app>:PLAYback:DUCA:CONNect:STATe?`
- `[[:SOURCE]:RADio:<app>:PLAYback:DUCA:INSTrument:ADDRess`
- `[[:SOURCE]:RADio:<app>:PLAYback:DUCA:INSTrument:ADDRess?`

Automate test with SCPI commands (online help)







## Benchtop vector signal generators

**Keysight E8267D PSG:** Create reference signals for aerospace, defense, radar, and broadband wireless applications up to 44 GHz.

**Keysight N5182B and Next Generation N5186A MXG X-Series:** Design and verify receivers for cellular base stations, wireless connectivity, digital video, and more.

**Keysight N5172B EXG X-Series:** Maintain tight tolerances in component and module manufacturing.

**Keysight N5166B CXG X-Series:** Perform basic parametric with this low-cost signal generator for general-purpose, IoT, and educational applications.

## Wireless test set

**Keysight E6640A / E6680A / E6681A EXM** wireless test sets are scalable to meet your production needs and in sync with the latest cellular and WLAN chipsets. The EXM delivers the speed, accuracy, and port density you need to ramp up rapidly and optimize full-volume manufacturing.



## VXG microwave vector signal generator

The **Keysight M9484C VXG** is the industry's first dual-channel microwave vector signal generator capable of up to 110 GHz signals and 2.5 GHz signal bandwidth. **Keysight M9384B VXG** microwave signal generators are dual-channel 1 MHz to 44 GHz VSG with up to 2 GHz bandwidth.

# Configure a Suite That Meets Your Needs

Signal Studio software is scalable to meet a wide range of component and receiver testing requirements. It starts with a choice of two operating modes: waveform playback mode and real-time mode. Waveform playback mode supports two levels of functionality: basic and advanced. Real-time mode provides advanced capabilities such as closed-loop control during signal generation.

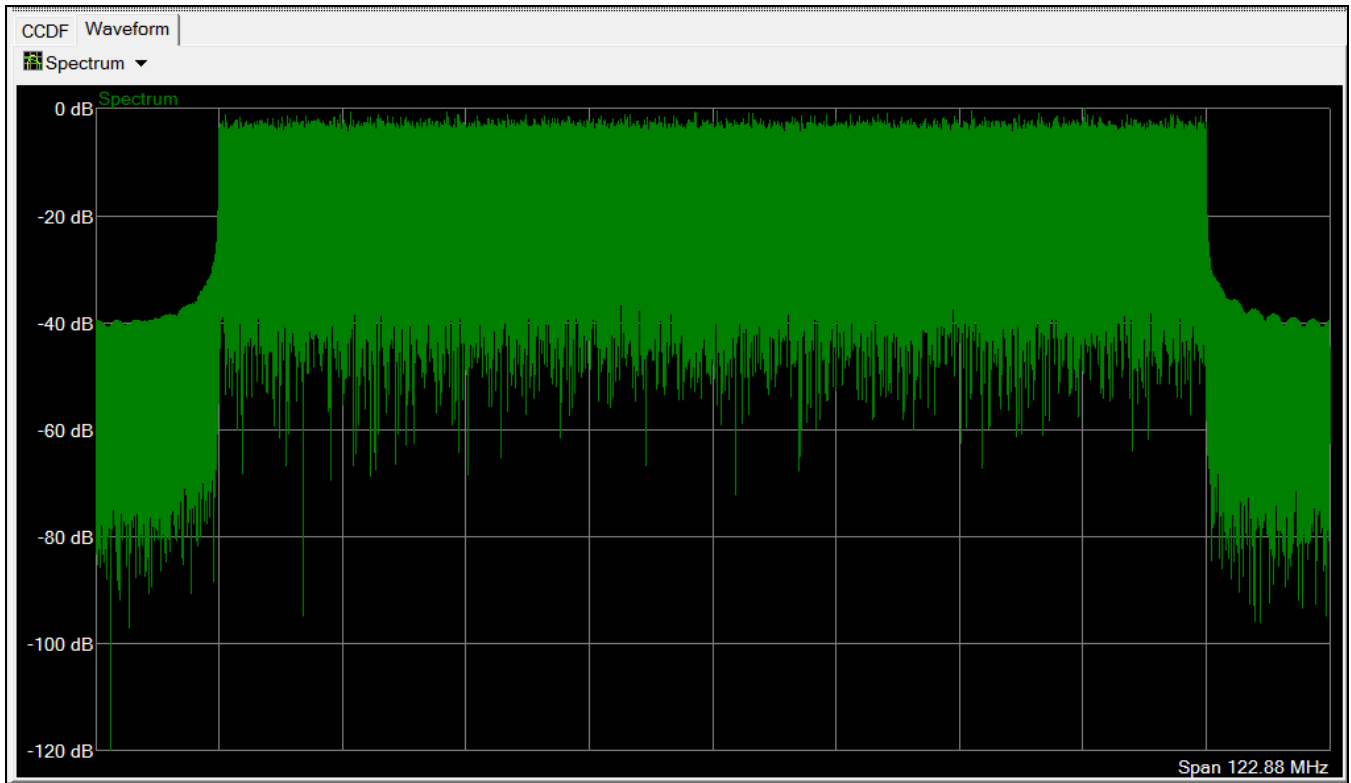


A typical component test configuration using Signal Studio with an X-Series signal generator and analyzer

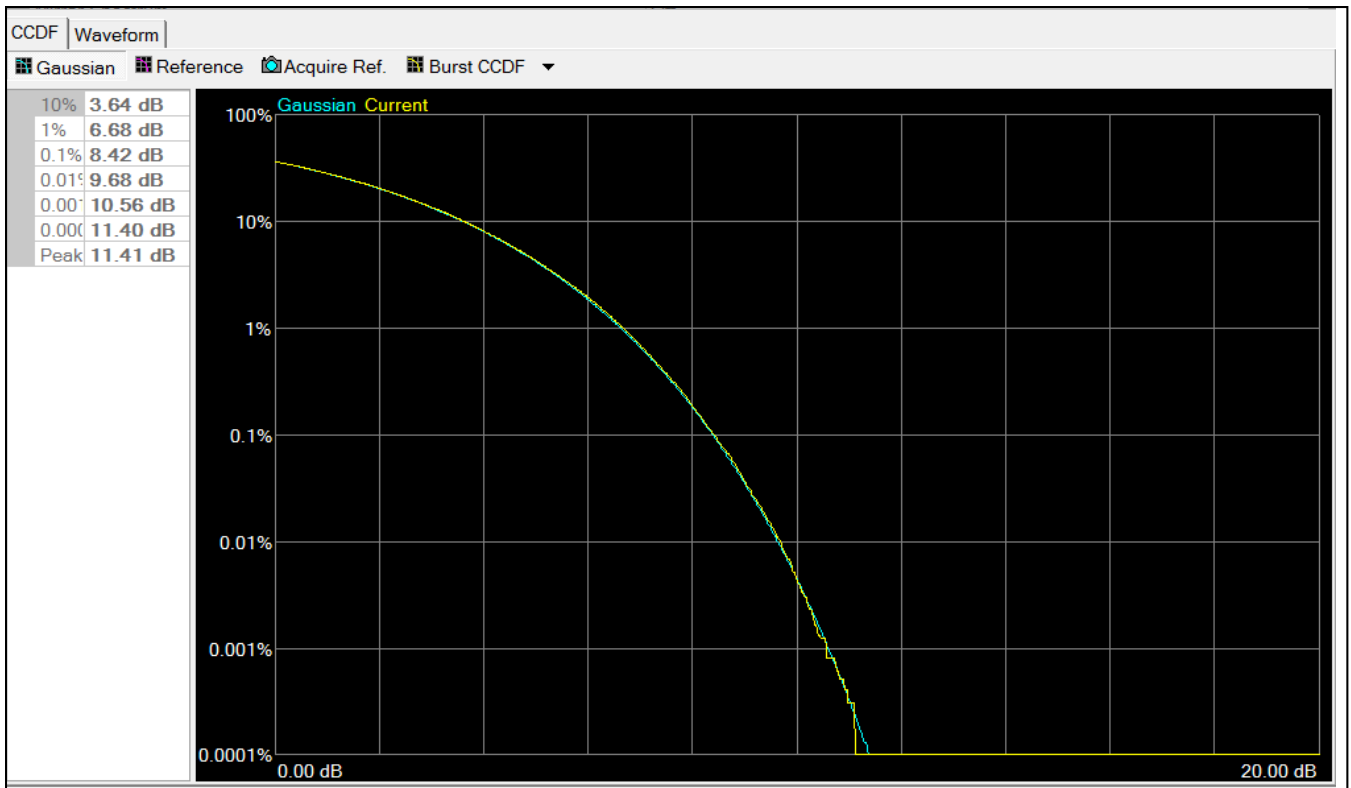
## Enhance component and receiver testing with waveform playback

Signal Studio's basic waveform playback capabilities enable you to create and customize waveform files to test components and transmitters. Its user-friendly interface lets you manipulate various signal parameters, calculate the resulting waveforms, and download files for playback with a Keysight instrument.

- Create spectrally correct signals for channel power, spectral mask, and spurious testing.
- View CCDF, spectrum, time domain, and power envelope graphs to investigate the effects of power ramps, modulation formats, power changes, clipping, and other effects on device performance.
- Adjust peak-to-average ratio with the crest factor reduction technology.
- Save Keysight PathWave Vector Signal Analysis (89600 VSA) or X-Series measurement application setup files using selected Signal Studio software products for further analysis. See the appropriate technical overview for product-specific information.



Integrated spectrum view of Signal Studio



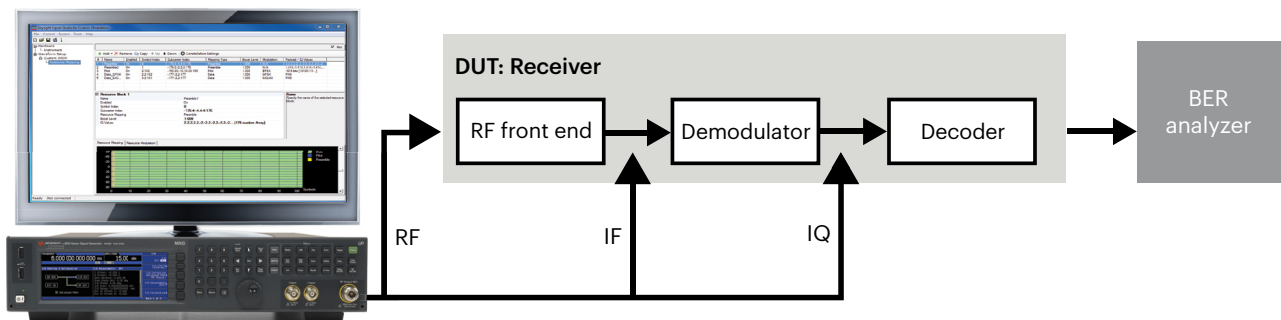
Integrated CCDF view of Signal Studio

# Receiver Test with Advanced and Real-Time Capabilities

Signal Studio can generate standards-compliant or custom signals for early testing of receiver system and component hardware with channel coding and multi-antenna port. Evaluate receiver performance at various stages of the receiver chain (RF, IF, and IQ) on signal analyzers and oscilloscopes together with PathWave 89600 VSA software or X Series measurement applications.

Use selected Signal Studio software to support the following:

- Standards-compliant signals for receiver testing with channel coding.
- Enabling or disabling channel coding, scrambling, and interleaving.
- Uplink and downlink configurations.
- Multi-antenna port transmitters, including spatial multiplexing and transmit diversity.
- Multiuser channel generation.
- Single carrier and multiple carriers.
- Customized data: PN9, PN15, custom bit pattern, or user-defined file with coded bits for bit error ratio (BER) testing.
- Addition of real-time additive white Gaussian noise (AWGN) to signal generators to set the carrier-to-noise ratio, carrier bandwidth, and noise bandwidth.



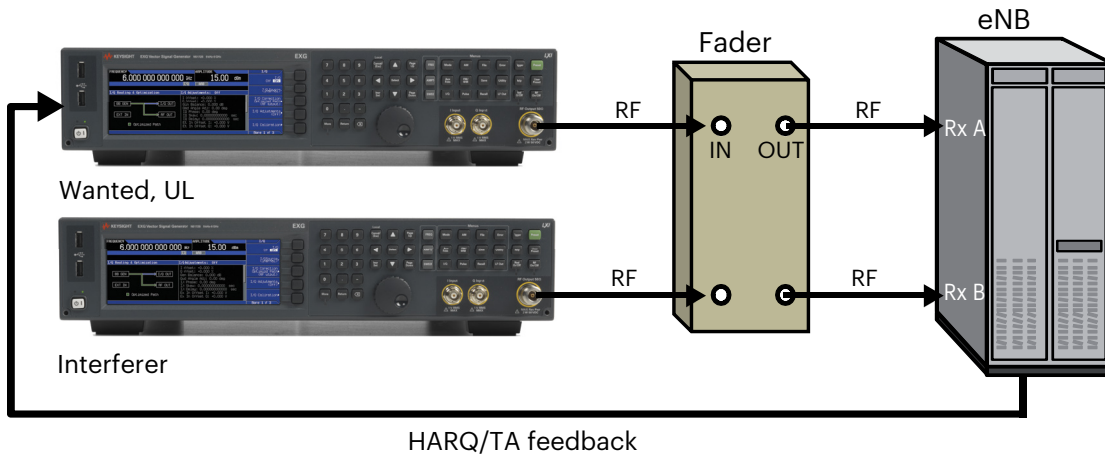
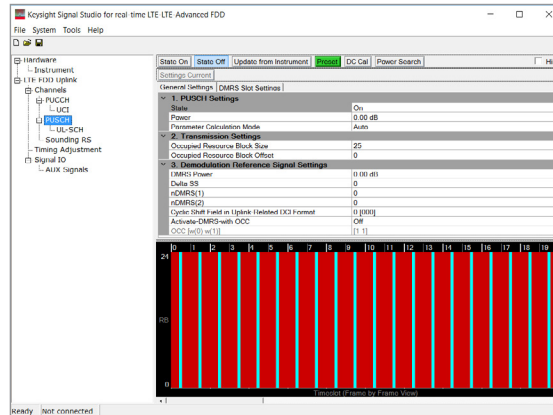
Note: Payload data should be coded bits

Generate receiver test signals for early testing of your receiver with Keysight X-Series signal generators and Signal Studio

Real-time capabilities available with selected Signal Studio software provide additional features to help you create signals for testing receiver designs in all stages of development. Advanced options enable you to create fully channel-coded signals for analysis of receiver BER, FER, BLER, and PER so you can verify baseband subsystem coding in ASICs, DSPs, and more. You can also check receiver performance and functionality during RF / baseband integration, system-level test, and beyond.

Signal Studio's real-time capabilities include the following:

- GSM / EDGE signal creation
- WCDMA / HSPA+ signal creation
- LTE and LTE-Advanced FDD signal creation
- GNSS signal creation for GPS, Beidou, Galileo, and GLONASS
- digital video signal creation for DVB-T / H / T2 / C / S / S2 and ISDB-T
- broadcast audio signal creation for XM
- fading signal creation
- 5G NR PUSCH signal creation and phase compensation



LTE receiver performance test with real-time signal generation

# Signal Studio, PathWave Signal Generation Software, and Compatible Instruments

Below is a list of Signal Studio, PathWave Signal Generation Desktop, and Embedded software products and supported instruments. Click the hyperlinked product number in the left column for product-specific information.

## Cellular communications

Current model <sup>1</sup>	Communications standard	Real-time capability <sup>1</sup>	Benchtop			PXI				AXIe	Test set
			N5166B CXG N5172B EXG N5182B MXG N5186A MXG	E8267D PSG	M9384B M9484C MW VXG	M9381A PXIe VSG	M9383A PXIe MW VSG	M941xA M9421A PXIe VXT	M9336A PXIe AWG P9336A USB AWG	M819xA AXIe AWG	E6640A E6680A E6681A EXM
<a href="#">N7600C</a>	W-CDMA / HSPA+	•	• <sup>7</sup>	•	• <sup>2</sup>	•	• <sup>2</sup>	• <sup>3</sup>	• <sup>2</sup>		•
<a href="#">N7601C</a>	cdma2000® / 1xEV-DO	•	• <sup>7</sup>	•	• <sup>2</sup>	•	• <sup>2</sup>	• <sup>2</sup>	• <sup>2</sup>		•
<a href="#">N7602C</a>	GSM / EDGE / Evo	•	• <sup>7</sup>	•	• <sup>2</sup>	•	• <sup>2</sup>	• <sup>3</sup>	• <sup>2</sup>		•
<a href="#">N7612C</a>	TD-SCDMA / HSPA		• <sup>7</sup>	•	• <sup>2</sup>	•	• <sup>2</sup>	• <sup>3</sup>	• <sup>2</sup>		•
<a href="#">N7624C</a>	LTE / LTE-A FDD	•	•	• <sup>4</sup>	•	•	•	• <sup>3</sup>	• <sup>2</sup>	• <sup>2</sup>	•
<a href="#">N7625C</a>	LTE / LTE-A TDD	•	•	• <sup>4</sup>	•	•	•	• <sup>3</sup>	• <sup>2</sup>	• <sup>2</sup>	•
<a href="#">N7626C</a>	LTE V2X		•	•	•	•	•	• <sup>3</sup>	• <sup>2</sup>	• <sup>2</sup>	• <sup>2</sup>
<a href="#">N7630C</a>	5GTF (pre-5G)		• <sup>7</sup>	•	• <sup>2</sup>	•	•	• <sup>3</sup>	• <sup>2</sup>	•	• <sup>2</sup>
<a href="#">N7631C</a>	5G NR (New Radio)		•	•	•	•	•	• <sup>3</sup>	• <sup>2</sup>	•	• <sup>2</sup>

## Wireless connectivity

Current model <sup>1</sup>	Communications standard	Real-time capability <sup>1</sup>	Benchtop			PXI				AXIe	Test set
			N5166B <sup>2</sup> CXG N5172B EXG N5182B MXG N5186A MXG	E8267D M9484C PSG	M9384B M9484C MW VXG	M9381A PXIe VSG	M9383A PXIe MW VSG	M941xA M9421A PXIe VXT	M819xA AXIe AWG	E6640A E6680A EXM	
<a href="#">N7606C</a>	Bluetooth® (BR, EDR, 4.0 / 4.2, BT5, BT5.1 (AoA and AoD) , BT5.3		•	•	• <sup>2</sup>	•			• <sup>2</sup>		•
<a href="#">N7607C</a>	DFS radar profiles		•	•	•				•		•
<a href="#">N7610C</a>	IoT (Internet of Things) (Wi-SUN, ZigBee®, Z-Wave, LoRa, and HRP UWB)		•	•	• <sup>2</sup>	•			•		• <sup>2</sup>
<a href="#">N7615C</a>	Mobile WiMAX™		•		• <sup>2</sup>	• <sup>2</sup>			• <sup>2</sup>		
<a href="#">N7617C</a>	WLAN 802.11 a / b / g / j / p / n / ac / ah / af / ax / be		•	•	• <sup>2</sup>	•	•	•	•	• <sup>2</sup>	•
<a href="#">N7637C</a>	mmWave WLAN 802.11ad / ay									•	

## Video, audio, and radio test

Current model <sup>8</sup>	Communications standard	Real-time capability <sup>1</sup>	Benchtop			PXI			AXIe	Test set
			N5172B EXG N5182B MXG N5186A MXG	E8267D PSG	M9384B MW VXG	M9381A PXIe VSG	M9383A PXIe MW VSG	M9421A PXIe VXT	M819xA AXIe AWG	E6640A EXM
N7611C	Broadcast radio (FM Stereo/RDS, DAB, T-DMB)	•	•	• <sup>2</sup>	• <sup>2</sup>					
N7623C	Digital video (w / DOCSIS3.1)	•	•	•	• <sup>2</sup>	• <sup>2</sup>		•		
N7640C	Land-mobile radio		•		• <sup>2</sup>	• <sup>2</sup>				

## Detection, positioning, tracking, and navigation

Current model <sup>8</sup>	Description	Real-time capability <sup>1</sup>	Benchtop			PXI			AXIe	Test set
			N5172B EXG N5182B MXG N5186A MXG	E8267D PSG	N519xA UXG	M9384B MW VXG	M9381A PXIe VSG	M9421A PXIe VXT	M819xA AXIe AWG	E6640A EXM
N7609C	Global navigation satellite systems (GNSS)	•	•	• <sup>2</sup>		• <sup>2</sup>	• <sup>2</sup>	• <sup>2</sup>	• <sup>2</sup>	
N7620B	Pulse building		•	•	•	•		•		

1. Supports selected standards. Please refer to specific product technical overviews for more information.
2. Supports only file export-based waveform playback.
3. M9420A / 21A supports live connectivity, but M9410A / 11A and M9415A only supports the “file export” based waveform playback.
4. The amplitude accuracy is not guaranteed with ALN turning off which need manual power search.
5. For information regarding Signal Studio products and their supported hardware, please visit [www.keysight.com/find/signalstudio\\_platforms](http://www.keysight.com/find/signalstudio_platforms).
6. Signal Studio 2019 update 1.0 or above does not support MXG-A N5182A and ESG-C E4438C. Signal Studio Pro software N76xxC with N76xxAPPC as PC license can support N5182A and E4438C.
7. CXG N5166B only supports “file export” based waveform playback with this Signal Studio software.
8. For information regarding legacy Signal Studio or PathWave Signal Generation products (N76xxB) and their supported hardware, please visit [www.keysight.com/find/signalstudio\\_platforms](http://www.keysight.com/find/signalstudio_platforms).

## General purpose

Current model <sup>P</sup>	Description	Real-time capability <sup>1</sup>	Benchtop			PXI				AXIe	Test set
			N5172B EXG N5182B MXG N5186A MXG	E8267D PSG	M9384B MW VXG	M9381A PXIe VSG	M9383A PXIe MW VSG	M941xA M9421A PXIe VXT	M9336A PXIe AWG P9336A USB AWG	M619xA AXIe AWG	E6640A EXM
N7605C	Real-time fading	•	•								
N7608C	Custom modulation (Custom IQ and OFDM)		•	•	•	•	• <sup>2</sup>	•	• <sup>2</sup>	•	
N7614C	Power amplifier test	•	•	• <sup>5</sup>	•	•	•	•		•	
N7621B	Multitone distortion		•	•						•	
N7622C	IQ toolkit		•	•		•		•		•	•

## PathWave Signal Generation — Embedded (on M9383B / M9384B or M9484C VXG)

Current model <sup>P</sup>	Description	Signal Generator	
		M9384B VXG microwave signal generator M9383B VXG-m microwave signal generator	M9484C vector signal generator
N7631APPC	5G NR	• <sup>4</sup>	• <sup>4</sup>
N7621APPC	Multitone	• <sup>4</sup>	• <sup>4</sup>
N7642APPC	IQ-based AM, FM, PM	• <sup>4</sup>	• <sup>4</sup>
N7653APPC	Automatic channel response correction and S-parameter de-embedding	• <sup>4</sup>	• <sup>4</sup>
N7605APOC	3GPP MIMO fading	• <sup>4</sup>	• <sup>4</sup>

## PathWave Signal Generation – Embedded (on N5186A MXG)

Current model	Description	N5186A MXG
E7608APPC	Custom Modulation (Custom IQ only)	• <sup>4</sup>
E7621APPC	Multi-tone	• <sup>4</sup>
E7642APPC	IQ-based AM, FM, PM	• <sup>4</sup>
E7653APPC	Automatic channel response correction and S-parameter de-embedding	• <sup>4</sup>



# PathWave Signal Generation — Desktop

Model	Description	Benchtop	Benchtop	PXI	AWG
		N5166B CXG N5172B EXG N5182B MXG N5186A MXG	M9384B VXG M9484C VXG M9484C+VDI CCU (Beta)	M941xA PXI VXT	M819xA M819xA DUC
N7631APPC	5G NR, PC application <sup>6,7</sup>	•	•	•	•
N7631EMBC	5G NR, waveform playback	•	•	•	•
N7618APPC	Advanced Waveform Utility, PC application <sup>6,7,8</sup>	•	•	•	•
N7632EMBC	NR V2X, waveform playback	•	•	•	•

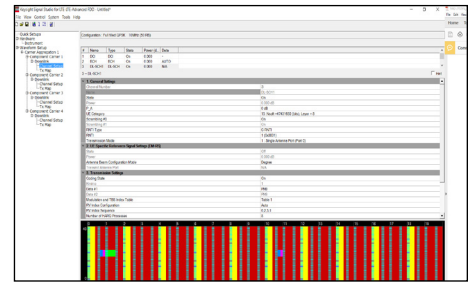
1. Supports selected standards. Please refer to specific product technical overviews for more information.
2. Supports only file export-based waveform playback
3. For information regarding legacy Signal Studio or PathWave Signal Generation products (N76xxB) and their supported hardware, please visit [www.keysight.com/find/signalstudio\\_platforms](http://www.keysight.com/find/signalstudio_platforms).
4. Those are embedded applications with touch-optimized GUI.
5. For power amplifier test, E8267D supports only DPD and CFR. It can also be used as upconverted with M8190A for wideband DPD solution.
6. PC application allows you to download the generated waveforms into different signal generators which doesn't require a waveform playback license installed but the waveform can't be saved by this method. You will need N76xxEMBC license installed inside signal generator to save and offline playback the saved waveforms.
7. PathWave Signal Generation Desktop doesn't require a license if you only need create and export the waveforms.
8. AWU utility provides some essential features which are free to use like importing waveforms, re-sampling, exporting, or downloading into supported signal generators.

# Cellular Communications

Signal Studio provides a comprehensive suite of standards-compliant solutions that address 2G to 5G and other emerging standards. As cellular technology advances, Signal Studio will help you sync up with the latest technology, streamline validation, and ensure interoperability. Here are a few examples of Signal Studio for cellular communications:

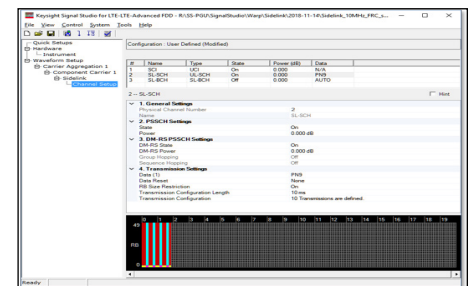
## LTE / LTE-Advanced FDD / TDD

- Create Keysight-validated and performance-optimized reference signals in compliance with 3GPP LTE, LTE-Advanced, and LTE-Advanced Pro (with NB-IoT / eMTC) specifications.
- Support LTE co-existence signals with 5G NR for dynamic spectrum sharing (DSS).
- Use predefined setups for E-UTRA test models (E-TM) and fixed reference channels (FRC).
- Perform closed loop HARQ and timing adjustment testing with real-time signal generation.
- Perform arb-based multi-UE simulation for eNB capacity testing.
- Perform multi-carrier, multiformat tests with multi-standard radio signal generation.



## LTE V2X

- Supports 3GPP Release 14 defined C-V2X sidelink carrier (using PC5 interface) with transmission mode 4.
- Supports fully coded PSSS, SSSS, PSBCH, PSCCH, and PSSCH signals and channels.
- Supports multi-UE scheduling.
- Provides FRC wizard.



To learn more about other Signal Studio products for cellular communications, click below:

- [W-CDMA / HSPA+](#)
- [cdma2000 / 1xEV-DO](#)
- [GSM / EDGE / Evo](#)
- [TD-SCDMA / HSPA](#)
- [NB-IoT / eMTC](#)
- [LTE/LTE-A/LTE-A Pro FDD](#)
- [LTE/LTE-A TDD](#)
- [LTE V2X](#)

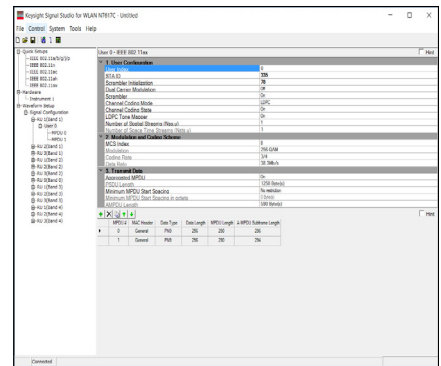


# Wireless Connectivity

Wireless connectivity formats, such as WLAN, *Bluetooth*®, ZigBee, and Z-Wave, continue to evolve to address the growing need for faster data services and larger coverage. Whether you are working on long- or short-range wireless connectivity, Keysight strives to help you stay ahead of the pack with signal-creation solutions early in the life cycle of new standards and technologies. Here are a few examples of our wireless connectivity solutions:

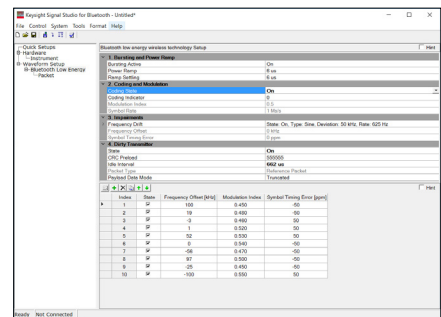
## WLAN 802.11a / b / g / j / p / n / ac / af / ah / ax / be

- Enables creation of Keysight-validated and performance-optimized reference signals compliant with the IEEE 802.11a / b / g / j / p / n / ac / ah / ax / be standards.
- Enables use of partially coded signals for testing components such as power amplifiers. Use full channel coding, flexible configuration of MAC headers, spatial stream mapping, and application of channel models for testing receivers.
- Supports bandwidth from 20 MHz to 160 MHz, and 320 MHz (802.11be).
- Supports modulation up to 1 024 QAM and 4 096 QAM (802.11be)
- Supports MIMO testing with up to 16 streams / antennas.
- Enables creation of FCC, ETSI, Japan MIC, Korean, or Chinese radar test signals using N7607C Signal Studio for DFS radar profiles.



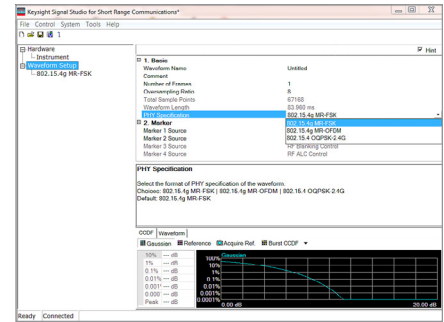
## Bluetooth®

- Enables creation of Keysight-validated and performance-optimized reference signals compliant with *Bluetooth*® BR, EDR, LE 4.0, LE 4.2, *Bluetooth*® 5, and *Bluetooth*® 5.1 / 5.2 / 5.3 (AoA / AoD).
- Supports Qualcomm *Bluetooth*® High Speed Link format with mode as QHS-P2 / P3 / P4 / P5 / P6.
- Uses fully-coded *Bluetooth*® packets and modulated data streams for basic and enhanced data rates.
- Supports data length extension to 255 bytes for *Bluetooth*® LE 4.2.
- Supports 2 Ms/s symbol rate for higher data rate and channel coding for long range *Bluetooth*® 5.
- Uses dirty transmitter test setup for receiver sensitivity tests with DHx, 2-DHx, 2-EVx, 3-DHx, and 3-EVx packet types.



## IoT (Internet of Things)

- Create signals for IEEE 802.15.4g SUN FSK and SUN OFDM and IEEE 802.15.4 O-QPSK / BPSK ZigBee specifications.
- Create signals for ITU-T G.9959 FSK / GFSK Z-Wave specification.
- Create signals for LoRa CSS specification.
- Create signals for IEEE 802.15.4 / 4z HRP UWB.
- Receive support for fully coded signal creation for receiver tests.
- Achieve signals with full-channel coding, flexible configuration of MAC headers, and data types for receiver testing.

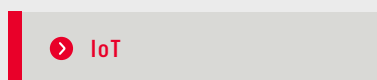
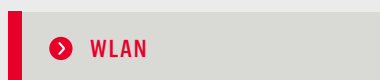


To learn more about other Signal Studio products for wireless connectivity click below:

- [DFS radar profiles](#)
- [Mobile WiMAX™](#)
- [mmWave WLAN 802.11ad/ay](#)

## Want to learn more?

Click on the buttons below to download a technical overview for the following Signal Studio products:

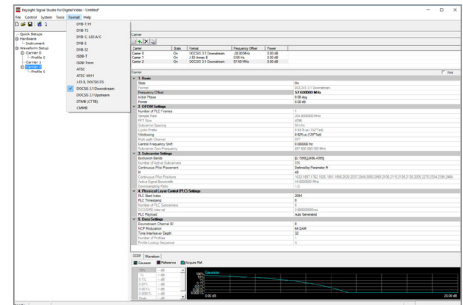


# Video, Audio, and Radio Test

The push for better-quality mobile services is driving new technologies in broadcasting video, audio, and radio systems and handheld devices. Whether you are working on satellite, terrestrial, mobile or cable digital video, broadcasting audio, or radio test systems, count on Signal Studio to provide the tools to help you address the challenges of mobile device and set-to-box product design and manufacturing test. Here are some examples of our solutions:

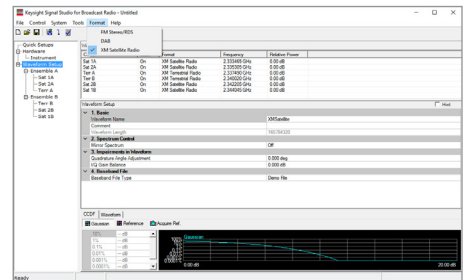
## Digital video

- Create standards-compliant single- or multi-carrier digital video waveforms for component or receiver test. Supported standards include DVB-T / H / T2 / C / S / S2 / S2X, ISDB-T / T<sub>B</sub> / T<sub>SB</sub> / Tmm, J.83 Annex A / B / C, and DOCSIS 3.1 upstream and downstream.
- Create real-time signal generation for DVB-T / H / T2 / C / S / S2 and ISDB-T.
- Select from multiple payload types: MPEG2-TS file or color bar for subjective evaluation or data pattern for BER test.
- Create fully coded signals with AWGN, IQ impairments, and multipaths for component or receiver test.



## Broadcast radio

- Create standards-compliant waveforms for component or receiver test to FM stereo / RDS / RBDS, DAB / DAB+, T-DMB, and DMB-Audio.
- Use arb waveforms or real-time signals for XM.
- Select from multiple payload types: WAV, MP2 or AAC+ audio file, ETI or STI stream file, or data pattern.
- Use audio sample files and ETI demo stream files for subjective tests.
- Configure multi-carriers / multi-channels for up to 12 carriers independently.
- Add real-time fading, AWGN, and interferers for performance tests.





# Detection, Positioning, Tracking, and Navigation

During receiver verification, advanced signal-creation tools provide highly realistic simulations of the operating environment facing detection, positioning, tracking, and navigation systems. What once required racks of test equipment can now be accomplished with cost-effective instruments and Signal Studio. Here are examples of detection, positioning, tracking, and navigation applications:

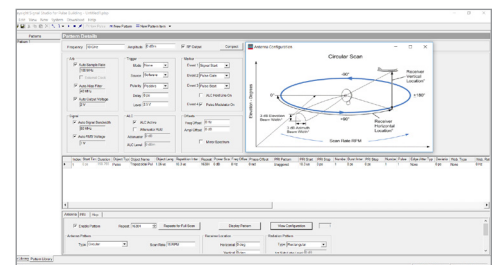
## Global Navigation Satellite System (GNSS)

- Enables creation of real-time multi-satellite signals for the Global Positioning System (GPS), Russian Global Navigation Satellite System (GLONASS), European navigation system (Galileo), Chinese navigation satellite system (Beidou, also known as Compass), and SBAS / QZSS.
- Enables GPS support for single band as L1 C/A, L5I, and L5Q or dual band as L1 C/A plus L5I and L5Q.
- Supports static scenarios for stationary receivers or dynamic scenarios for moving receivers.
- Supports up to 24-hour simulation using saved scenario files or longer simulations using continuous scenario generation mode.
- Controls satellite visibility, power, multipath, and pseudo-range error in real time.
- Enables creation and editing of custom scenarios and supports receiver-antenna pattern modeling.
- Provides trajectory generator utility for moving receiver scenarios.
- Provides waveform files that simulate a single satellite for GPS, GLONASS, Galileo, Beidou (Compass), SBAS, and QZSS for manufacturing test in basic mode.

Channel	Group	SV ID	Enabled	Frequency	Power (dBm)	Pseudo-Range (m)	Pseudo-Range Error (m)	Carrier S/N (dB)	Multipath	
1	L1	001	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
2	L1	002	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
3	L1	003	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
4	L1	004	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
5	L1	005	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
6	L1	006	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
7	L1	007	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
8	L1	008	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
9	L1	009	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
10	L1	010	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
11	L1	011	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
12	L1	012	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
13	L1	013	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
14	L1	014	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
15	L1	015	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
16	L1	016	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
17	L1	017	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
18	L1	018	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
19	L1	019	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
20	L1	020	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
21	L1	021	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
22	L1	022	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
23	L1	023	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
24	L1	024	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
25	L1	025	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
26	L1	026	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
27	L1	027	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
28	L1	028	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
29	L1	029	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps
30	L1	030	SP	L1	0.00	-100.00	2462024.11	0.00	1847.731	0 Taps

## Pulse building

- Create waveforms that support custom formats and a variety of standard intra-pulse modulation formats: linear and non-linear FM chirp, FM step, AM step, BPSK, QPSK, Barker codes, Frank codes, and polyphase codes.
- Create, store, and recall complex pulse patterns that maximize instrument memory to play long scenarios.
- Set repetition interval, number of repetitions, and frequency, phase, and power offsets on a pulse-by-pulse basis.





## Want to learn more?

Click on the buttons below to download a technical overview for the following Signal Studio products:

➤ GNSS

➤ Pulse building

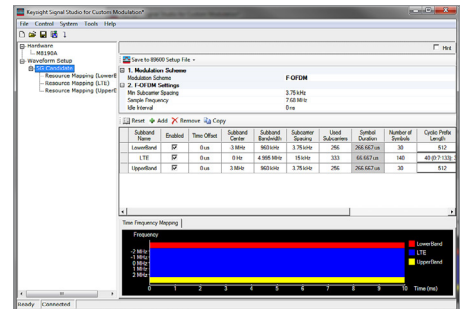


# General Purpose

Across a wide range of RF and microwave test applications, Signal Studio shortens development time by simplifying test setups and lowering the overall cost of test. Our innovative signal-creation and performance-optimization tools can accelerate the development and manufacturing of receivers and the components that comprise them. You can apply real-time fading to the signals, apply the CFR / ET / DPD power amplifier technologies to your signals, or create custom-defined modulation signals. Here are some examples:

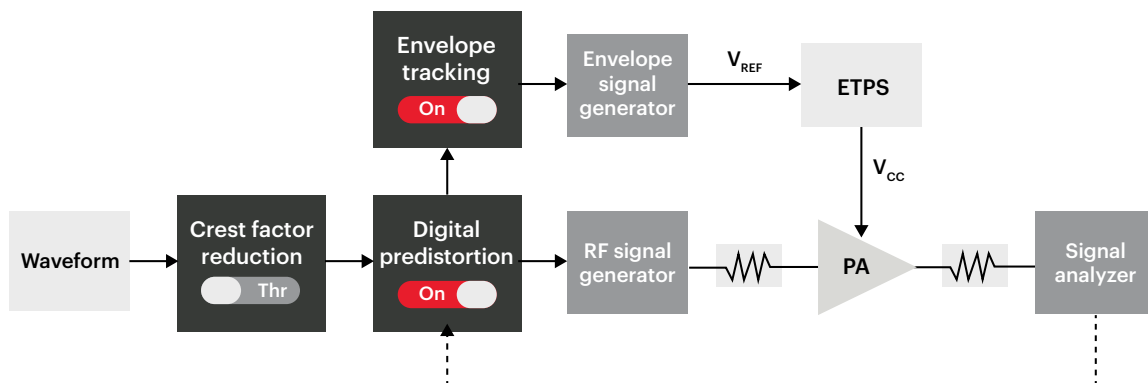
## Custom modulation (Custom IQ and Custom OFDM)

- Create 5G candidate waveforms, including FBMC, UFMC, GFDM, and F-OFDM, along with SCMA and NOMA multiple access.
- Create custom OFDM and IQ waveforms for analog modulation, automotive radar, wireless connectivity, land-mobile radio, digital video, broadcast audio, emerging wireless, 5G, and aerospace / defense custom / proprietary applications.
- Customize OFDM and IQ quick setups for applications such as LTE, WLAN 802.11a, 802.15.4, 802.15.4g, ITU G.9959, DVB-T / H, ISDB-T, DVB-S2X, DOCSIS 3.1, APCO25, TETRA, NXDN, dPMR, DECT, DMR, ARIB, DAB, and CDR DMR.
- Receive support for single-carrier or multi-carrier signal generation.
- Save to PathWave 89600 VSA setup file or X-series measurement application setup file for modulation analysis and MIMO setups.



## Power amplifier test

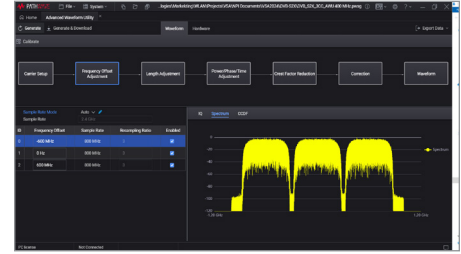
- Perform power amplifier (PA) test flow with crest factor reduction (CFR), envelope tracking (ET), and digital pre-distortion (DPD); Support wideband DPD, dual-band ET / DPD, and customer-provided IP DPD.
- Waveform block can import user-defined IQ waveforms, Signal Studio waveforms, and preloaded free waveforms.
- PA measurement result displays include CCDF, AM-AM, AM-PM, ACPR, Raw EVM, Demod EVM, Dynamic EVM, EVM vs. Power, PAE vs. Time, and PAE vs. PA output power.
- Align the envelope signal (you can export it as IQ waveform) and RF signal automatically or adjust them manually.



# PathWave Signal Generation Advanced Waveform Utility

## AWU Essential Features (Free to use)

- Import Keysight encrypted waveforms (\*.wfm) or user defined waveforms (\*.bin, \*.txt/.csv/.dat, \*mat, \*wv)
- Users can make resampling or specify time scale factor
- Support SCPI command
- Download waveforms with correction to specified signal generator (X-series SG, PXU VXT, VXG)
- View waveform graph (Spectrum, Time Domain, CCDF)
- Export waveform files (\*.wfm)



## AWU Premium Features (required N7618APPC license)

- Support three kinds of guided calibration methods (Channel Equalization, IQ Calibration, Multi-tone Calibration)
- Traditional channel equalization using the modulated reference signal (requires 89601200C/89601AYAC)
- IQ calibration using reference sequence mainly for external IQ modulator (requires 89601200C)
- Multi-tone calibration using multi-tone signals which won't be limited by signal generator and signal analyzer's bandwidth (requires 89601200C)
- Users can directly import 89600 VSA's EQ frequency response trace as correction file (csv file)
- Support waveform segments summing in time domain
- Support multi-carrier summing in frequency domain
- Support crest factor reduction (CFR)
- Export bin file when all imported waveforms are unencrypted

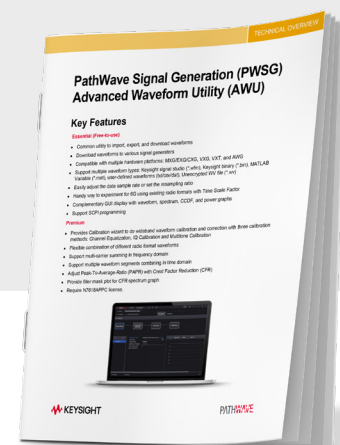
## Want to learn more?

Click on the buttons below to download a technical overview for the following Signal Studio products:

▶ Custom modulation

▶ Advanced Waveform Utility

▶ Power amplifier



# Signal Studio Pro or PathWave Signal Generation Desktop PC License and Waveform Playback Licenses

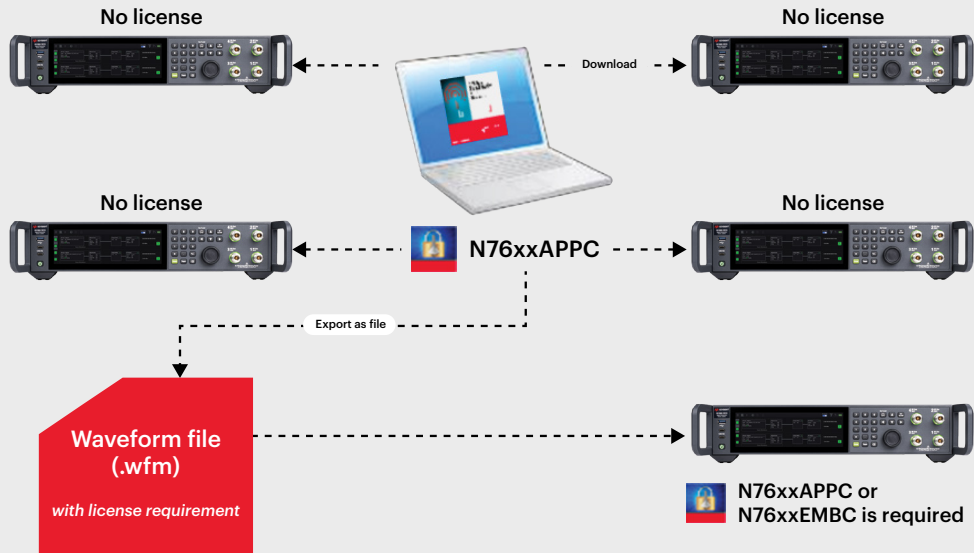
PathWave Signal Generation Desktop or Signal Studio Pro software (N7608C, N7624C, N7625C, N7626C, N7630C, N7631C, and N7637C) offers two types of licenses: a PC license (N76xxAPPC) and a waveform playback license (N76xxEMBC). For licensing information for a specific Signal Studio product, please refer to the product's technical overview.

- N76xxAPPC is a PC-based license that enables N76xxC software or PathWave Signal Generation Desktop application operating in full capabilities mode to generate and make a live connection to download signal waveforms into the signal generators, VSG, VXG, VXT, or AWGs. N76xxAPPC is typically recommended for R&D teams.
- N76xxEMBC is an embedded license that runs on a signal generator, VSG, VXG, VXT, or AWGs. It lets you generate, make a live connection to download, and play back signal waveforms offline. N76xxEMBC is recommended for design verification, manufacturing teams, or pre-generated waveforms.

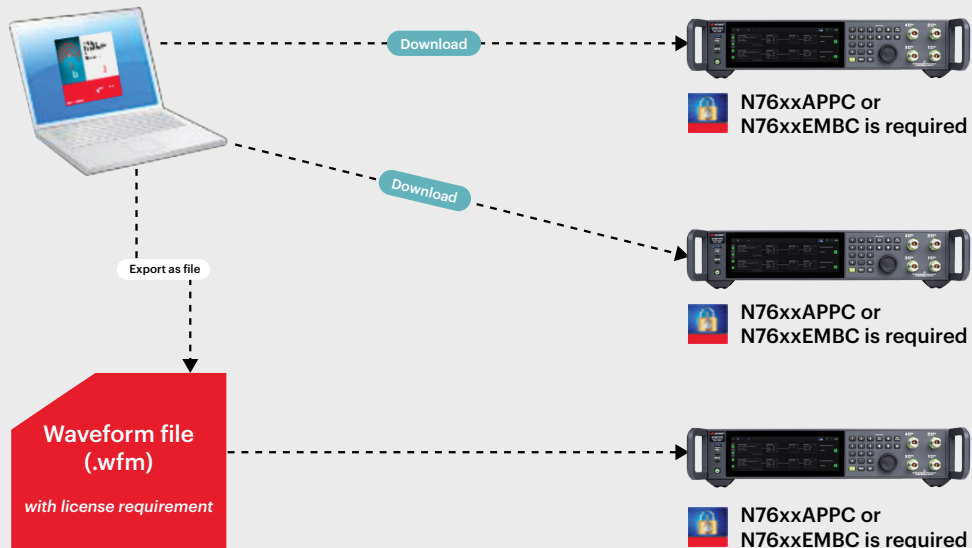
N76xxC software	With N76xxAPPC license	With N76xxEMBC license
<b>Operation mode</b>	PC license mode <sup>1</sup> or instrument mode <sup>2</sup>	Instrument mode <sup>2</sup>
<b>Live connection</b>	Yes <sup>1,2</sup>	Yes
<b>Programming API</b>	Yes	Yes
<b>Export VSA .setx or X-Series measurement application required setup files (if available)</b>	Yes	Yes
<b>Waveform export</b>	Yes <sup>3</sup>	Yes <sup>3</sup>
<b>Offline playback</b>	No / yes <sup>4</sup>	Yes <sup>4</sup>
<b>License type</b>	Node-locked, transportable, USB portable, floating (single site, single region, worldwide)	Node-locked, transportable

1. PC license mode: When an N76xxAPPC license is installed in a standalone PC, the N76xxC software is working in PC license mode. No license is required inside the instrument if the generated waveform is downloaded but the downloaded waveform can't be saved or renamed.
2. Instrument license mode: The instrument requires a valid license (N76xxAPPC or N76xxEMBC) to play back waveforms. Users can save waveforms in a signal generator for offline playback.
3. A waveform exported as a waveform file (\*.wfm) requires a waveform playback license in the instrument (N76xxAPPC, N76xxEMBC, or 5- / 50-pack).
4. Offline playback requires an embedded waveform playback license (N76xxAPPC, N76xxEMBC, or 5- / 50-pack license) on the signal generator, VSG, VXG, VXT, or AWG.

## PC license mode



## Instrument license mode

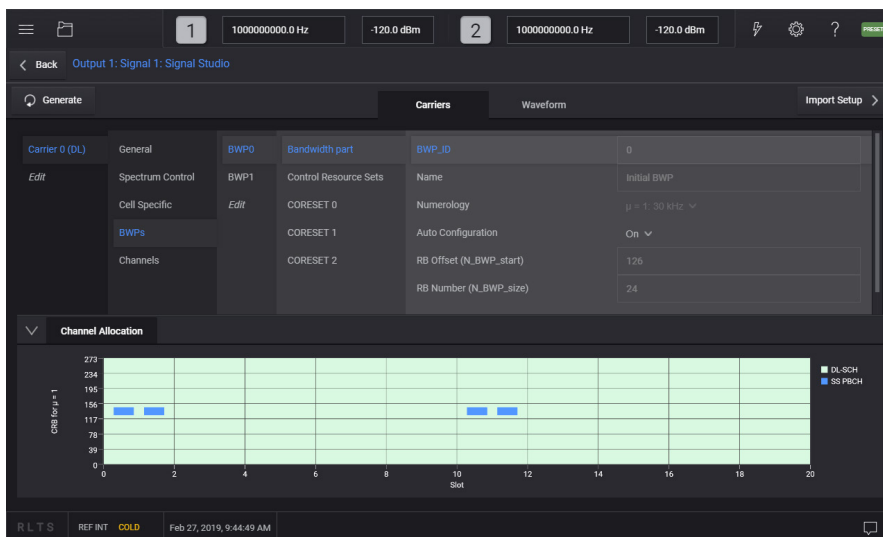


# PathWave Signal Generation Embedded

PathWave Signal Generation is an embedded signal-generation application inside newly launched Keysight M9383B VXG-m, M9384B VXG, and M9484C VXG microwave signal generators, or next generation MXG N5186A. M9383B and M9384B VXG are dual-channel 1 MHz to 44 GHz VXG with up to 2 GHz signal bandwidth. M9484C is the first dual-channel microwave vector signal generator capable of up to 110 GHz signals and 2.5 GHz signal bandwidth. N5186A MXG is the compact, four-channel vector signal generator up to 8.5 GHz and 960MHz modulation bandwidth per channel.

M9384B and M9484C VXG microwave signal generators are integrated boxes with touch-front panels, and M9383B is the PXIe modular without a front panel. There are several embedded PathWave Signal Generation software applications developed with a touch-optimized GUI (see table, right). Furthermore, M9383B / M9384B VXG, M9484C VXG, and M9484C VXG support other Signal Studio-generated waveforms for offline playback enabled by licenses such as N76xxEMBC.

PathWave Signal Generation	Description	Key features
<b>N7621APPC (for VXG and MXG)</b> <b>E7621APPC (for MXG only)</b>	Multitone	Provides multitone functionality.
<b>N7631APPC (for VXG only)</b>	5G NR	Provides the 5G NR signal creation like N7631C, which supports dual channels: one for wanted signal and one for interference or configured as MIMO. It can import *.setx setup file from N7631C or export the PathWave 89600 VSA*.setx file for easy demodulation.
<b>N7642APPC (for VXG and MXG)</b> <b>E7642APPC (for MXG only)</b>	Based AM, FM, phase modulation	Provides basic analog modulation function for AM / FM / PM with waveform, rate, AM depth and FM / PM deviation settings.
<b>N7653APPC (for VXG and MXG)</b> <b>E7653APPC (for MXG only)</b>	Automatic channel response correction and S-parameter de-embedding	Provides correction that you can add from supported file formats (.s2p, .csv, uflat) or by direct measurement using one of the supported power sensors (power meter, spectrum analyzer, network analyzer).
<b>N7608APPC (for VXG and MXG)</b> <b>E7608APPC (for MXG only)</b>	Custom modulation (Custom IQ only as Beta)	Provides custom modulation settings.
<b>N7605APPC (for VXG only)</b>	3GPP MIMO fading (only with M9484C)	Provides fading profiles for 3GPP 5G NR FR1, FR2, and LTE.



M9484C VXG with touch front-panel



M9384B VXG with touch front-panel



N5186A MXG with front-panel

# Flexible Licensing Terms

Each of the following license types is available as a perpetual or subscription license, as shown in the table below. The pricing for subscription licenses includes a valid support contract. Perpetual license holders need a separate support contract to access Keysight technical support and software updates.

License type	Description	Pricing formula
<b>Node-locked</b>	Allows you to use the license on one specified instrument / computer.	
<b>Transportable<sup>1</sup></b>	Allows you to use the license on one instrument or computer at a time. You may transfer this license to another instrument or computer using Keysight's online tool.	130% of node-locked
<b>USB portable<sup>1</sup></b>	Allows you to move the license from one instrument / computer to another by end-user only with a certified USB dongle, which you can purchase separately.	130% of node-locked
<b>Floating</b>	Allows you to access the license on networked instruments / computers from a server, one at a time. For concurrent access, you may purchase multiple licenses.	140% of node-locked (floating single site)
		200% of node-locked (floating single region)
		250% of node-locked (floating worldwide)
<b>Perpetual</b>	Software license for use in perpetuity.	
<b>Subscription</b>	Software license is limited to a defined period, such as 12 months.	38% of perpetual for a 12-month license
<b>Support contract for perpetual licenses</b>	Allows license holder access to Keysight technical support and all software upgrades.	15% of perpetual for 12 months of support
<b>Waveform pack</b>	License and play back individual waveforms created using the Keysight Signal Studio software. Available in 5- and 50-waveform packs.	

1. Currently N5186A MXG doesn't support transportable and USB portable license types

# Signal Studio and PathWave Signal Generation Ordering Information

## PC-based licenses or PathWave Signal Generation Embedded licenses (N76xxAPPC)

Software license	Description	Support subscription
R-Y5B-001-A <sup>2</sup> R-Y4B-001-z <sup>1</sup>	Node-locked perpetual Node-locked 12-month	R-Y6B-001-y <sup>2</sup> Included
R-Y5B-004-D <sup>2</sup> R-Y4B-004-z <sup>1</sup>	Transportable perpetual Transportable 12-month	R-Y6B-004-y <sup>2</sup> Included
R-Y5B-002-B <sup>2</sup> R-Y4B-002-z <sup>1</sup>	Floating perpetual (single site) Floating 12-month (single site)	R-Y6B-002-y <sup>2</sup> Included
R-Y5B-005-E <sup>2</sup> R-Y4B-005-z <sup>1</sup>	USB portable perpetual USB portable 12-month	R-Y6B-005-y <sup>2</sup> Included
R-Y5B-006-F <sup>2</sup> R-Y4B-006-z <sup>1</sup>	Floating perpetual (single region) Floating 12-month (single region)	R-Y6B-006-y <sup>2</sup> Included
R-Y5B-010-J <sup>2</sup> R-Y4B-010-z <sup>1</sup>	Floating perpetual (worldwide) Floating 12-month (worldwide)	R-Y6B-010-y <sup>2</sup> R-Y6B-010-y <sup>2</sup>

## Waveform playback licenses (N76xxEMBC)

Software license	Description	Support subscription
R-Y5B-001-A <sup>2</sup> R-Y4B-001-z <sup>1</sup>	Node-locked perpetual Node-locked 12-month	R-Y6B-001-y <sup>2</sup> Included
R-Y5B-004-D <sup>2</sup> R-Y4B-004-z <sup>1</sup>	Transportable perpetual Transportable 12-month	R-Y6B-004-y <sup>2</sup> Included

- z means different subscription license durations: F for 6 months, L for 12 months, X for 24 months, and Y for 36 months. All subscription licenses include support for the duration of the subscription.
- y means different support subscription durations: L for 12 months (as default), X for 24 months, Y for 36 months, and Z for 60 months. You must purchase a support subscription for all perpetual licenses with 12 months as default. Software licenses with a valid support subscription include all software upgrades and KeysightCare. You can extend support subscriptions for perpetual licenses with monthly support extensions.



# PathWave Signal Generation Subscription Bundles

If you have a short-term need for multiple applications in the same category, Keysight offers subscription bundles with several PathWave Signal Generation licenses. You may choose from the licensing types and the duration you need to use the software. Refer to the following table as the PathWave Signal Generation subscription bundles are predefined, and each application bundle includes the specified licenses.

A more flexible PathWave Signal Generation subscription bundle enables you to choose any three or five PathWave Signal Generation licenses from the waveform playback or PC application list in the following table. The supported PathWave Signal Generation licenses are subject to change according to new application launches or discontinuance of some applications.

Description	Model number	PathWave signal generation licenses included
<b>5G and 4G Waveform Playback Bundle</b>	N7689EM1C	<ul style="list-style-type: none"> <li>• N7624EMBC: LTE / LTE-A / LTE-A Pro FDD</li> <li>• N7625EMBC: LTE / LTE-A TDD</li> <li>• N7631EMBC: 5G NR</li> </ul>
<b>Wireless Connectivity Waveform Playback Bundle</b>	N7689EM2C	<ul style="list-style-type: none"> <li>• N7606EMBC: Bluetooth®</li> <li>• N7607EMBC: DFS radar profiles</li> <li>• N7610EMBC: IoT</li> <li>• N7617EMBC: WLAN 802.11</li> </ul>
<b>2G and 3G Waveform Playback Bundle</b>	N7689EM4C	<ul style="list-style-type: none"> <li>• N7600EMBC: W-CDMA / HSPA+</li> <li>• N7601EMBC: cdma2000 / 1xEV-DO</li> <li>• N7610EMBC: GSM / EDGE / Evo</li> <li>• N7612EMBC: TD-SCDMA / HSPA</li> </ul>
<b>5G and 4G PC Application Bundle</b>	N7689AP1C	<ul style="list-style-type: none"> <li>• N7624APPC: LTE / LTE-A / LTE-A Pro FDD</li> <li>• N7625APPC: LTE / LTE-A TDD</li> <li>• N7631APPC: 5G NR</li> </ul>
<b>O-RAN Studio Bundle</b>	N7689ORNC	<ul style="list-style-type: none"> <li>• N7624ORNC: LTE / LTE-A / LTE-A Pro FDD</li> <li>• N7625ORNC: LTE / LTE-A TDD</li> <li>• N7631ORNC: 5G NR</li> </ul>
<b>Pick Any 3 or 5 Waveform Playback Bundle</b>	N7689EAXC	<p>Pick any 3 or 5 from Keysight PathWave Signal Generation N76xxEMBC waveform playback licenses</p> <ul style="list-style-type: none"> <li>• N7600EMBC, N7601EMBC, N7602EMBC, N7605EMBC</li> <li>• N7606EMBC, N7607EMBC, N7608EMBC, N7609EMBC</li> <li>• N7610EMBC, N7611EMBC, N7612EMBC, N7614EMBC</li> <li>• N7615EMBC, N7617EMBC, N7623EMBC, N7624EMBC</li> <li>• N7625EMBC, N7626EMBC, N7630EMBC, N7631EMBC</li> <li>• N7637EMBC, N7640EMBC, N7632EMBC</li> </ul>
<b>Pick Any 3 or 5 PC Application Bundle</b>	N7689PAXC	<p>Pick any 3 or 5 from Keysight PathWave Signal Generation N76xxAPPC PC application licenses for VXG and MXG, or E76xxAPPC for MXG</p> <ul style="list-style-type: none"> <li>• N7608APPC, N7621APPC, N7624APPC, N7625APPC</li> <li>• N7626APPC, N7630APPC, N7631APPC, N7637APPC</li> <li>• N7640APPC, N7642APPC, N7653APPC</li> <li>• E7608APPC, E7621APPC, E7642APPC, E7653APPC</li> </ul>

Description	Model number	PathWave signal generation licenses included
<b>Pick Any 3 or 5 Signal Studio Waveform Playback and X-apps Bundle</b>	N7689EAYC	Pick any 3 or 5 Signal Studio waveform playback and X-apps licenses from the list of N7689EAXC and N9089BAXE
<b>Pick Any 3 or 5 Signal Studio PC Application and X-apps Bundle</b>	N7689PAYC	Pick any 3 or 5 Signal Studio PC applications and X-apps licenses from the list of N7689PAXC and N9089BAXE
<b>Pick Any 3 or 5 Signal Studio Waveform Playback and PathWave 89600 VSA Bundle</b>	N7689EAZC	Pick any 3 or 5 Signal Studio waveform playback and 89600 VSA licenses from the list of N7689EAXC and 89601BAXC
<b>Pick Any 3 or 5 Signal Studio PC Applications and PathWave 89600 VSA Bundle</b>	N7689PAZC	Pick any 3 or 5 Signal Studio PC applications and 89600 VSA licenses from the list of N7689PAXC and 89601BAXC

**Note:**

1. Those subscription bundles support only the node-locked license type.
2. The subscription duration can be 12 months or 36 months.

## Try before you buy!

Free 30-day trials of Signal Studio or PathWave Signal Generation software provide unrestricted use of the features and functions, including signal generation, with your compatible platform.

Redeem a trial license online at [www.keysight.com/find/SignalStudio\\_trial](http://www.keysight.com/find/SignalStudio_trial).

## Hardware configurations

To learn more about compatible hardware and required configurations, please visit the following page:

[www.keysight.com/find/SignalStudio\\_platforms](http://www.keysight.com/find/SignalStudio_platforms)

## PC requirements

You need a [PC to run Signal Studio or PathWave Signal Generation](#).

## Model numbers and options

To learn more about Signal Studio or PathWave Signal Generation licensing, model numbers, and options, please visit the [PathWave Signal Generation page](#).

## Signal Studio or PathWave Signal Generation software

To download the latest or previous Signal Studio or PathWave Signal Generation software, please visit the following pages:

- [www.keysight.com/find/signalstudio\\_software](http://www.keysight.com/find/signalstudio_software)
- [www.keysight.com/find/PWSG\\_software](http://www.keysight.com/find/PWSG_software)

## Signal Studio or PathWave Signal Generation Software 30-day free trial

To redeem Signal Studio application 30-day free trial license for your existing signal generators where available, please visit the follow page:

- [www.keysight.com/find/signalstudio\\_trial](http://www.keysight.com/find/signalstudio_trial)



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