mmWave 5G Non-Signaling Solution
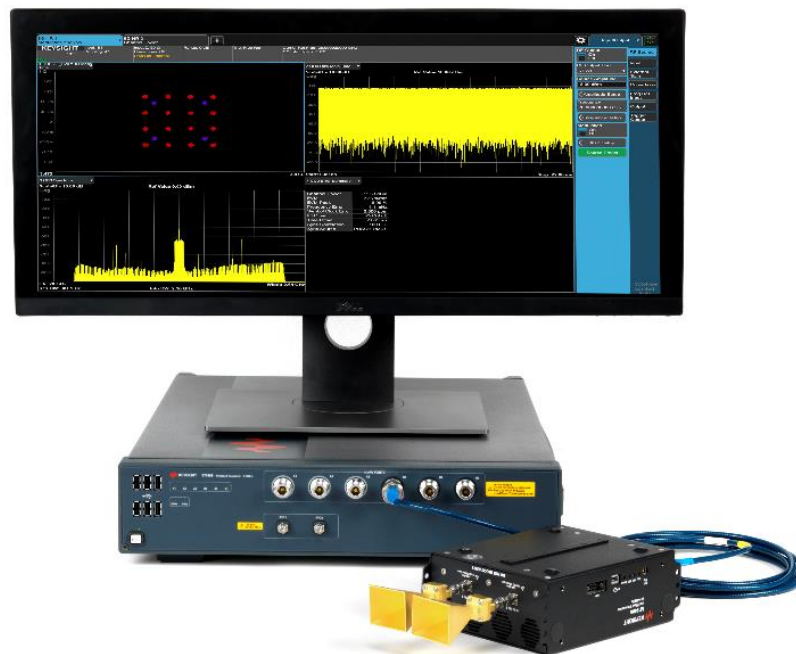

Figure 1: E7760B wideband transceiver and M1740A mmWave transceiver for 5G

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Introduction

Keysight's mmWave 5G non-signaling solution addresses over-the-air (OTA) testing of a broad range of 5G modules. It reduces system cost and development time with a streamlined approach built around a test head that can be re-used across multiple Keysight platforms. The wideband transceiver also ensures consistent results across your workflow, and your product lifecycle, by using proven Keysight X-Series measurement applications that run on most of Keysight's analysis solutions.

Within the system, a wideband transceiver provides access to IF and serves as the foundation of a flexible mmWave test solution. Adding one mmWave transceiver provides tunable access to the four bands 3GPP has defined at 28 (two), 39 and 40 GHz. The solution can also be configured with a chamber for OTA testing.

Overview

This configuration guide contains a step-by-step process to help you configure your E7760B wideband transceiver and M1740A mmWave transceiver for 5G hardware with software, accessories and services as a solution for testing 5G at mmWave frequencies.

The E7760B wideband transceiver is the foundation for the solution providing intermediate frequency (IF) input and output ports for stimulation and measurement of your device under test (DUT). It also sends and receives signals from the M1740A mmWave transceiver for 5G which provides frequency conversion to and from mmWave. Both the E7760B and the M1740A are required for the mmWave 5G solution.

Items Included with the Solution

- IQ analyzer measurement application providing basic measurement capability

Configure Your Keysight E7760B Wideband Transceiver

Step 1. Select mmWave and IF hardware		
Option Number	**Description**	**Additional Information**
E7760B-RF2	IF Testing	Optional
E7760B-RF4	mmWave OTA (independent VSA and VSG)	Required

Display, keyboard and mouse are purchased separately.

Step 2. Select frequency ranges At least one frequency range must be selected.		
Option Number	**Description**	**Additional Information**
E7760B-FB1	Frequency band: 24.25 to 29.5 GHz	
E7760B-FB5	Frequency band: 37 to 40 GHz	
E7760B-FB6	Frequency band: 40 to 43.5 GHz	

Step 3. Select software		
Option Number	**Description**	**Additional Information**
Y9085EM0E	5G NR non-signaling waveform and measurement application	Required Embedded 5G NR software
N9054EM1E	VMA custom OFDM X-series measurement application	Optional 5GTF measurements
N7630EMBC	Pre-5G, waveform playback signal studio application	Optional 5GTF waveforms

Flexible Software Licensing and KeysightCare Software Support Subscriptions

Keysight offers a variety of flexible licensing options to fit your needs and budget. Choose your license term, license type, and KeysightCare software support subscription.

License Terms

Perpetual – Perpetual licenses can be used indefinitely.
Time-based – Time-based licenses can be used through the term of the license only (6, 12, 24, or 36 months).

License Types

Node-locked – License can be used on one specified instrument/computer.
Transportable – License can be used on one instrument/computer at a time but may be transferred to another using Keysight Software Manager (internet connection required).
USB Portable – License can be used on one instrument/computer at a time but may be transferred to another using a certified USB dongle (available for additional purchase with Keysight part number E8900-D10).
Floating (single site) – Networked instruments/computers can access a license from a server one at a time. Multiple licenses can be purchased for concurrent usage.

KeysightCare Software Support Subscriptions

Perpetual licenses are sold with a 12 (default), 24, 36, or 60-month software support subscription. Support subscriptions can be renewed for a fee after that.

Time-based licenses include a software support subscription through the term of the license.

> **KeysightCare Software Support Subscription provides peace of mind amid evolving technologies.**
>
> - Ensure your software is always current with the latest enhancements and measurement standards.
> - Gain additional insight into your problems with live access to our team of technical experts.
> - Stay on schedule with fast turnaround times and priority escalations when you need support.

Selecting your license:

Step 1. Choose your software product (e.g., Y9085EM0E).
Step 2. Choose your license term: perpetual or time-based.
Step 3. Choose your license type: node-locked, transportable, USB portable, or floating.
Step 4. Depending on the license term, choose your support subscription duration.

Configure Your Keysight M1740A mmWave Transceiver for 5G

Step 1. Select hardware and accessories		
Option Number	**Description**	**Additional Information**
M1740A	mmWave transceiver for 5G	
M1740A-CA4	RF cable N-SMA, 4 meters	Quantity two (2) is required for each M1740A

Select Hardware Support Plans

Hardware support includes items such as warranty, calibration, repair services, solution support, access to loaner units and additional support services. Hardware support plans can be renewed when the purchased term has expired. Please contact your Keysight sales representative for more details.

Select Upgrades for Your Existing Solution (Optional)

Once you have purchased your solution, additional items are available to enhance and maintain the system. For example, you may wish to have more mmWave transceivers or additional frequency ranges.

Step 1. Add IF testing

Option Number	Description	Additional Information
E7760BK-RF2	IF Testing	

Step 2. Select frequency ranges to add

Option Number	Description	Additional Information
E7760BK-FB1	Add frequency band: 24.25 to 29.5 GHz	
E7760BK-FB5	Add frequency band: 37 to 40 GHz	
E7760BK-FB6	Add frequency band: 40 to 43.5 GHz	

Step 3. Add mmWave transceivers and cables

Option Number	Description	Additional Information
M1740A	mmWave transceiver for 5G	
M1740AU-CA4	RF cable N-SMA, 4 meters	Quantity two (2) is required for each M1740A

Example Configurations

Example 1: 28 GHz 5G NR for one DUT without IF testing and node-locked software license

Option Number	Description	Quantity
E7760B-RF4	mmWave OTA (independent VSA and VSG)	1
E7760B-FB1	Frequency band: 24.25 to 29.5 GHz	1

Example 1: 28 GHz 5G NR for one DUT without IF testing and node-locked software license

Option Number	Description	Quantity
	Hardware support for E7760B, 12 months	1
Y9085EM0E	5G NR non-signaling waveform and measurement application	
	Node-locked perpetual license	1
	KeysightCare software support subscription, node-locked, 12 months	1
M1740A	mmWave transceiver for 5G	1
M1740A-CA4	RF cable N-SMA, 4 meters	2
	Hardware support for M1740A, 12 months	1

Example 2: 28 and 39 GHz 5G NR for three DUTs with IF testing and transportable software license

Option Number	Description	Quantity
E7760B-RF2	IF testing	1
E7760B-RF4	mmWave OTA (independent VSA and VSG)	1
E7760B-FB1	Frequency band: 24.25 to 29.5 GHz	1
E7760B-FB5	Frequency band: 37 to 40 GHz	1
	Hardware support for E7760B, 36 months	1
Y9085EM0E	5G NR non-signaling waveform and measurement application	
	KeysightCare software support subscription, transportable license, 36 months	1
M1740A	mmWave transceiver for 5G	3
M1740A-CA4	RF cable N-SMA, 4 meters	6
	Hardware support for M1740A, 36 months	3

Example 3: Add 39 GHz to an existing 28 GHz 5G NR solution

Option Number	Description	Quantity
E7760BK-FB5	Add frequency band: 37 to 40 GHz	1

Keysight 5G Solutions

Keysight's solutions span the entire 5G workflow.
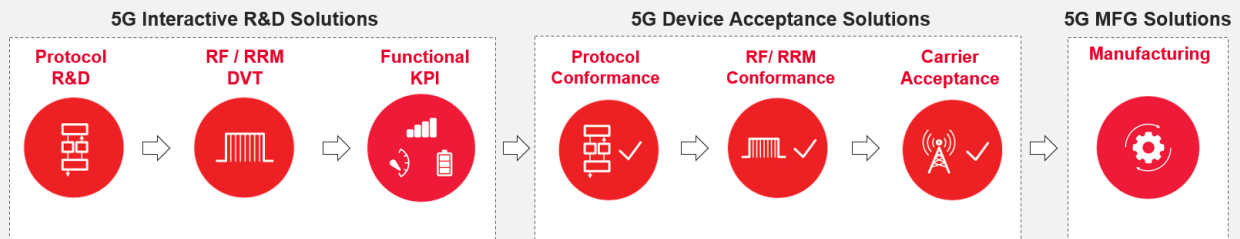

Figure 2: Workflow Solutions

For additional information, visit

- Keysight 5G solutions: www.keysight.com/find/5g
- mmWave 5G non-signaling test solution: www.keysight.com/find/e7760b
- M1740A mmWave transceiver for 5G: www.keysight.com/find/m1740a

Learn more at: www.keysight.com

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus

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