

# E7760B Wideband Transceiver

## Streamlined, integrated testing across any 3GPP mmWave band

Mobile operators around the world are accelerating 5G deployments to capture early market opportunities. As a result, wireless equipment manufacturers need to support a more rapid pace of development, while addressing evolving 5G New Radio (NR) specifications.

Most 5G mobile devices operating in mmWave frequency spectrum rely on modules with highly integrated RFIC architectures. This requires new 5G designs to be verified across both intermediate frequencies (IF) and mmWave frequencies. Since 5G mmWave devices use phased-array antennas that lack connectorized ports, performance validation needs to take place in Over-the-Air (OTA) test environments. Creating and maintaining a calibrated system when using multiple platforms to perform measurements in OTA test environments can be challenging and lead to unreliable measurement results.

Keysight's mmWave 5G non-signaling solution supports performance validation across any 3GPP-defined mmWave band. The integrated test solution ensures a streamlined approach to reliably verify transmit and receive paths between IF and mmWave frequencies.



Non-signaling test is useful for verification of baseband, IF, RF and mmWave modules before protocol firmware is added. Keysight's mmWave 5G non-signaling solution ensures a streamlined approach to reliably verify transmit and receive paths between IF and mmWave frequencies.



Figure 1: E7760B Wideband Transceiver RF and IF ports

## Performance Characteristics

### Definitions

#### Specification (spec)

The warranted performance of a calibrated instrument that has been stored for a minimum of 2 hours within the operating temperature range and after a 60-minute warm up period. Specifications are valid from 20 to 35 °C unless otherwise noted.

#### Typical (typ)

The characteristic performance, that 95 percent of the units exhibit with a 95 percent confidence level. This data, shown in *Italics*, is not warranted, does not include measurement uncertainty, and is valid only at room temperature (approximately 23 °C).

#### Nominal (nom)

The mean or average characteristic performance, or the value of an attribute that is determined by design. This data is not warranted and is measured at room temperature (approximately 23 °C).

#### Measured (meas)

An attribute measured during development for purposes of communicating the expected performance. This data is not warranted and is measured at room temperature (approximately 23 °C).

### Conditions

The specifications in this document apply to a single E7760B wideband transceiver connected to a single M1740A remote radio head with serial number larger than US5848xxxx or MY5848xxxx.

## IF Vector Signal Analyzer Performance Characteristics

Measured at the two IF input ports of the E7760B.

Frequency	Performance	Conditions
Frequency range	6 to 18 GHz	
Maximum bandwidth	1.4 GHz	
Amplitude	Performance	Conditions
CW input level range	-90 to 0 dBm	
Modulated input level range	-50 to 0 dBm	
CW absolute level accuracy	< ±1.0 dB, typical	-80 to 0 dBm input
CW amplitude linearity	< ±0.5 dB, nominal	-90 to 0 dBm input
Carrier leakage	< -40 dBc, nominal	-50 to 0 dBm input

Error Vector Magnitude (EVM)	Performance	Conditions
100 MHz, 1 carrier, 64QAM	< -40 dB, nominal	-40 to 0 dBm input

## IF Vector Signal Generator Performance Characteristics

Measured from the two IF output ports of the E7760B.

Frequency	Performance	Conditions
Frequency range	6 to 18 GHz	
Maximum bandwidth	1.4 GHz	
Amplitude	Performance	Conditions
CW input level range	-45 to 7 dBm	
Modulated input level range	-20 to 0 dBm	
CW absolute level accuracy	< $\pm 1.0$ dB, typical	-45 to 7 dBm output
Carrier leakage	< -40 dBc, nominal	-20 to 0 dBm output
Error Vector Magnitude (EVM)	Performance	Conditions
100 MHz, 1 carrier, 256QAM	< -40 dB, nominal	-20 to -5 dBm output 6 to 18 GHz
	< -38 dB, nominal	0 dBm output 8 to 12 GHz

## Internal Timebase Performance Characteristics

Aging Rate	Performance	Conditions
Daily	< $\pm 5$ ppb/day	After 72 hours of operation
Annually	< $\pm 0.1$ ppm/year	After 72 hours of operation
Cumulative	< $\pm 0.6$ ppm/10years	After 72 hours of operation
Temperature Effects	Performance	Conditions
20 to 30 °C	< $\pm 10$ ppb	

Full operating range	< ±50 ppb	
<b>Frequency Accuracy</b>		
< ± [(time since last adjustment x aging rate) + temperature effects + calibration accuracy]		

### External Reference Input Performance Characteristics

Aging Rate	Performance	Conditions
Frequency	10 MHz	
Lock range	±1 ppm	
Amplitude	0 to 10 dBm	

### Instrument Performance Characteristics

General Attributes	Performance
Power consumption	350 W with 100 to 120 V AC
Dimensions (W × H × D)	425 x 89x 559 mm (46.7 × 3.5 × 22 inches)
Weight	15 kg (33 pounds)
Operating temperature	10 to 40 °C <sup>1</sup>
Storage temperature	-40 to 70 °C
Power requirements	100/120 V AC or 220/240 V AC, 50/60 Hz

<sup>1</sup> Nominal specifications apply at room temperature, 23 °C, only.

Regulatory Information	Performance
EMC	<p>Complies with the essential requirements of the European EMC Directive as well as current editions of the following standards (dates and editions are cited in the Declaration of Conformity):</p> <ul style="list-style-type: none"> <li>• IEC/EN 61326-1</li> <li>• CISPR 11, Group 1, class A</li> <li>• AS/NZS CISPR 11</li> <li>• ICES/NMB-001</li> </ul> <p>This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme a la norme NMB-001 du Canada.</p> <p>South Korean Class A EMC declaration: This equipment has been conformity assessed for use in business environments. In a residential environment this equipment may cause radio interference.</p> <div data-bbox="613 785 1403 974" style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">사 용 자 안 내 문</p> <p>이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.</p> </div>
Safety	<p>Complies with the essential requirements of the European Low Voltage Directive as well as current editions of the following standards (dates and editions are cited in the Declaration of Conformity):</p> <ul style="list-style-type: none"> <li>• IEC/EN 61010-1</li> <li>• Canada: CSA C22.2 No. 61010-1</li> <li>• USA: UL std no. 61010-1</li> </ul>
Acoustic statement	<p>(European Machinery Directive) Acoustic noise emission LpA &lt; 70 dB Operator position Normal operation mode per ISO 7779</p>

To find a current Declaration of Conformity for a specific Keysight product, go to:  
<http://www.keysight.com/go/conformity>

## Keysight 5G Solutions

Keysight's solutions span the entire 5G workflow. The E7760B wideband transceiver is one component in the mmWave 5G solutions.

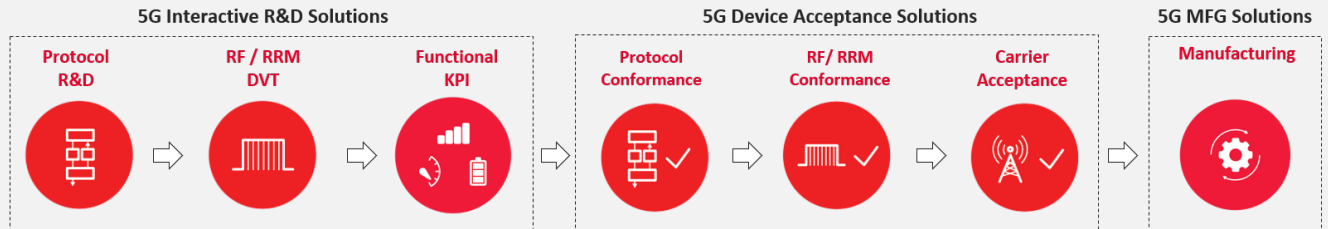


Figure 4: Workflow Solutions

For more information about Keysight's 5G solutions, visit [www.keysight.com/find/5G](http://www.keysight.com/find/5G).

For more information about Keysight's PathWave, visit [www.keysight.com/find/pathwave](http://www.keysight.com/find/pathwave).

Additional information about the E7760B is available at [www.keysight.com/find/e7760b](http://www.keysight.com/find/e7760b).

Learn more at: [www.keysight.com](http://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](http://www.keysight.com/find/contactus)

