DATA SHEET

M1749B Performance mmWave Transceiver 22.7 – 49.2 GHz

Overview

The M1749B Performance mmWave Transceiver is designed to be used as the millimeter-wave interface between a wireless test system and a millimeter-wave Device Under Test. The M1749B upconverts the test system's Tx output to the higher range of the DUT, and downconverts the received signal from the DUT to the lower range of the test system's Rx input. The DUT-facing ports of the M1749B (RF Tx/Rx 1 and RF Tx/Rx 2) are half-duplex ports -- that is, either port can transmit or receive (although never both at once).

KEYSIGHT TECHNOLOGIES

Remote Radio Head

Confidently test over the air at mmWave frequencies in the 24, 28, 39, 40 and 47 GHz bands using one M1749B remote radio head (RRH). Verify Tx and Rx performance of 5G RFFEs, base stations, chipsets and devices using stimulus and analysis provided by one of several Keysight platforms.

Multiple mmWave Bands

The M1749B is the only RRH supporting bi-directional testing at five mmWave frequency bands with one hardware set. Two RF ports support Tx and Rx verification.

Versatile 5G Solutions

Flexibly analyze mmWave 5G performance with or without signaling using the M1749BRRH with accompanying platforms. Improve time to market by finding and solving issues early in the product life cycle. Save valuable development and test time with consistent results from Keysight's common measurement algorithms.

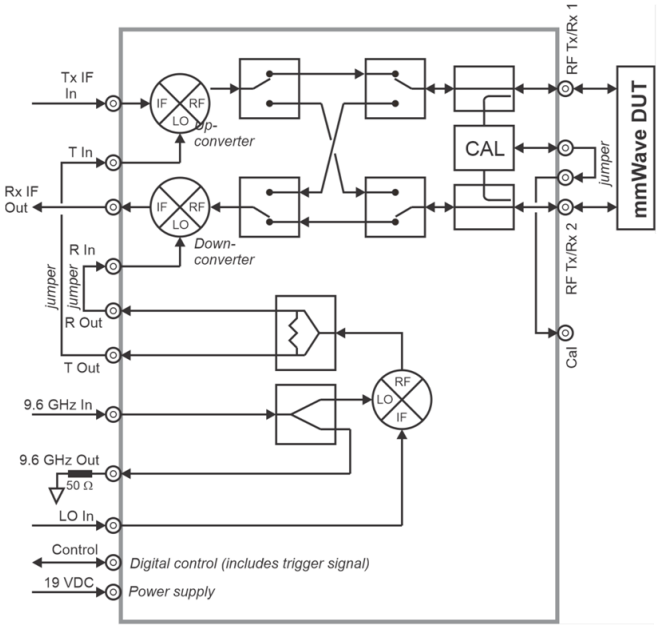

Figure 1. M1749B Block Diagram Source: Keysight.com

The DUT-facing ports of the M1749B (RF Tx/Rx 1 and RF Tx/Rx 2) are half-duplex ports -- that is, either port can transmit or receive (although never both at once).

5G

Reduce Path Loss

Reduce path loss at mmWave frequencies with a broadband remote radio head. Mount the compact head near an over-the air test chamber without losing valuable space. Keep cable lengths short for best repeatability and accuracy.

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 30-minute warm up period. Specifications are valid from 20 to 30 °C unless otherwise noted.

Typical (typ)
Typical (typ) describes additional product performance information. It is performance beyond specifications that 95 percent of the units exhibit with a 95 percent confidence level at room temperature (approximately 23 °C). Typical performance does not include measurement uncertainty.

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 information in the following tables for TX and RX apply to the M1749B remote radio head in CW mode. All the modulation or de-modulation performances apply to their specific base instruments that supply the modulation signal along with other interfaces (IF, LO frequency and reference frequency).

Upconverter (Tx Output) Performance Characteristics

Frequency Parameter	Value	Conditions
Frequency range	24.5 to 49.2 GHz	Full 1.4 GHz Bandwidth
	22.7 to 49.2 GHz	Settable CW
Bandwidth, maximum	100 MHz	22.7 to 24.2 GHz
	800 MHz	24.2 to 24.5 GHz
	1400 MHz	24.5 to 49.2 GHz
Amplitude Parameter	**Value**	**Conditions**
Settable CW output power range	-70 to +20 dBm	22.7 to 49.2 GHz
Max CW output power	+23 dBm nominal	24.5 to 33 GHz
	+10 dBm nominal	33 to 49.2 GHz
CW gain (level) accuracy	< ±2.0 dB, nominal	-70 to 10 dBm 22.7 to 49.2 GHz
CW linearity referenced to 0 dBm	< ±1.0 dB, spec *< ±0.75 dB, typical*	-20 to 10 dBm 22.7 to 49.2 GHz
	< ±1.5 dB, spec *< ±1.0 dB, typical*	-70 to -20 dBm 22.7 to 49.2 GHz

Downconverter (Receive Input) Performance Characteristics

Frequency Parameter	Value	Conditions
Frequency range	24.5 to 49.2 GHz	Full 1.4 GHz Bandwidth
	22.7 to 49.2 GHz	Settable CW
Bandwidth, maximum	100 MHz	22.7 to 24.2 GHz
	800 MHz	24.2 to 24.5 GHz
	1400 MHz	24.5 to 49.2 GHz
Amplitude Parameter	**Value**	**Conditions**
CW input power range	-70 to 10 dBm, settable	
CW gain (level) accuracy	< ±2.0 dB, nominal	-70 to 10 dBm 22.7 to 49.2 GHz
CW linearity referenced to 0 dBm	< ±1.4 dB, spec *< ±0.8 dB, typical*	-20 to 10 dBm 22.7 to 49.2 GHz
	< ±1.0 dB, spec *< ±0.5 dB, typical*	-70 to -20 dBm 22.7 to 49.2 GHz
Absolute maximum ratings	20 dBm CW, ±10 VDC	
Port to Port Isolation	25 dB nominal	

Connectors

Connector	Type	Description
RF Tx/Rx 1	2.4mm female	Millimeter wave test interface
RF Tx/Rx 2	2.4mm female	Not in use with M9384B VXG
Cal	2.4mm female	Internal use only
Rx IF Out	SMA female	Not in use with M9384B VXG
Tx IF In	SMA female	IF input to transmit upconverter
LO In	3.5mm female	Variable frequency LO input used to generate up- and downconverter mixer LOs
9.6 GHz In	3.5mm female	Fixed frequency reference input used to generate up- and downconverter mixer Los
9.6 GHz Out	3.5mm female	Fixed frequency reference output which can be connected to another M1749B transceiver's 9.6 GHz In connector
Aux	15-pin Micro D male	Internal use only
USB	USB micro-B female	USB control communication interface, device side
Trig 2	SMB male	5V-tolerant, 3.3V LVCMOS trigger input/output Not in use with M9384B VXG
Trig 1	SMB male	5V-tolerant, 3.3V LVCMOS trigger input/output Not in use with M9384B VXG
Control	SMA female	Modem and trigger control communication interface, can be used instead of USB Not in use with M9384B VXG
Power	4-pin round female	19 V DC power supply input

Instrument Performance Characteristics

General Attributes	
Power consumption	95 W at 19 VDC, typical 105 W at 120 VAC via supplied 0950-6166 AC/DC adapter, typical
Dimensions (D x H x W)	345 x 70 x 175 mm 13.58 x 2.76 x 6.89 inches
Weight	3.5 kg, 7.7 pounds
Operating temperature	15 to 35 °C
Storage temperature	-40 to 70 °C
Regulatory Information	
EMC	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): • IEC/EN 61326-1 • CISPR 11, Group 1, class A • AS/NZS CISPR 11 • ICES/NMB-001 This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme a la norme NMB-001 du Canada. 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. 사 용 자 안 내 문 이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.
Safety	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): IEC/EN 61010-1 Canada: CSA C22.2 No. 61010-1 USA: UL std no. 61010-1
Acoustic statement	(European Machinery Directive) Acoustic noise emission LpA <70 dB Operator position Normal operation mode per ISO 7779

Ordering Information

Product	Description
M1749B	mm-Wave upconverter for 5G

Keysight 5G Solutions

Keysight's solutions span the entire 5G workflow. The M1749B RRH is one component of the mmWave 5G solutions.

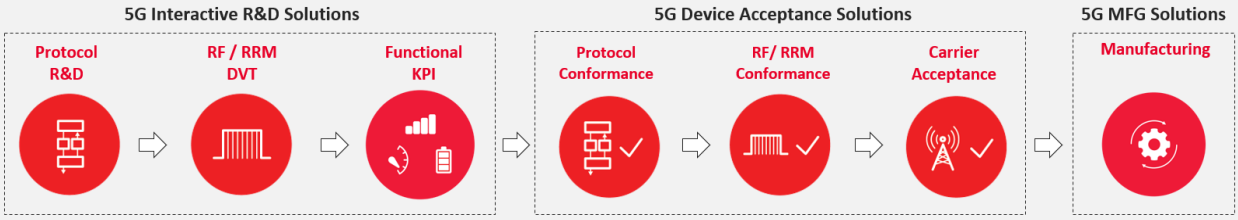

Figure 2. 5G Workflow Solutions

For more information about Keysight's 5G solutions, visit www.keysight.com/find/5G.

For more information about Keysight's PathWave, visit www.keysight.com/find/PathWave.

For more information on the M1749B mmWave transceiver, visit the web page.

Additional information about Keysight solutions enabled by the E7515B is available at

- 5G protocol R&D toolset: www.keysight.com/en/pd-2813844/5g-protocol-rd-toolset?cc=US&lc=eng
- 5G RF and RRM DVT toolset with network emulation: www.keysight.com/en/pd-2856440/5g-rf-dvt-toolset?cc=US&lc=eng

Learn more at: www.keysight.com

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KEYSIGHT TECHNOLOGIES