TECHNICAL SPECIFICATIONS

IQxel-MW™ 7G

Connectivity and Cellular Test System up to 7.3 GHz

LITEPOINT

Port Descriptions

Front Panel

2-port

IQxel-M2W 7G

8-port

IQxel-M8W 7G

16-port

IQxel-M16W 7G

Port Descriptions

Front Panel

2-port

IQxel-M2W 7G, 6GHz

8-port

IQxel-M8W 7G, 6GHz

16-port

IQxel-M16W 7G, 6GHz

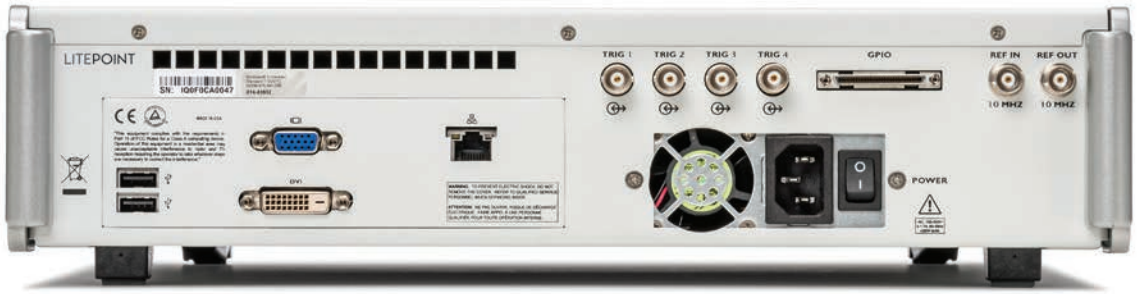
I/O	Function	Type
Power Switch	Power On/Off	Pushbutton Switch
RF1A/RF1B/RF1C/RF1D	RF input/output	N female
RF2A/RF2B/RF2C/RF2D	RF input/output	N female
RF3A/RF3B/RF3C/RF3D	RF input/output	N female
RF4A/RF4B/RF4C/RF4D	RF input/output	N female
Power Indicator	LED green – powered up, running LED orange – powered up, standby	LED indicator
Session Indicator	LED green – remote session active LED red – remote session lock	LED indicator
Status Indicator	LED green – no faults/errors detected LED orange – software error detected LED red – hardware fault detected	LED Indicator
RF port 1 indicator	LED green – ports RF1 A/B, C/D are in one of the following status: OFF/IN IN/OFF IN/IN LED orange – ports RF1 A/B, C/D are in one of the following status: OUT/IN IN/OUT LED red – ports RF1 A/B, C/D are in one of the following status: OFF/OUT OUT/OFF OUT/OUT	LED indicator
RF port 2 indicator	LED green – ports RF2 A/B, C/D are in one of the following status: OFF/IN IN/OFF IN/IN LED orange – ports RF2 A/B, C/D are in one of the following status: OUT/IN IN/OUT LED red – ports RF2 A/B, C/D are in one of the following status: OFF/OUT OUT/OFF OUT/OUT	LED indicator
RF port 3 indicator	LED green – ports RF3 A/B, C/D are in one of the following status: OFF/IN IN/OFF IN/IN LED orange – ports RF3 A/B, C/D are in one of the following status: OUT/IN IN/OUT LED red – ports RF3 A/B, C/D are in one of the following status: OFF/OUT OUT/OFF OUT/OUT	LED indicator

I/O	Function	Type
RF port 4 indicator	LED green – ports RF4 A/B, C/D are in one of the following status: OFF/IN IN/OFF IN/IN LED orange – ports RF4 A/B, C/D are in one of the following status: OUT/IN IN/OUT LED red – ports RF4 A/B, C/D are in one of the following status: OFF/OUT OUT/OFF OUT/OUT	LED indicator
USB (2 ports)	USB 2.0 compatible connection to external controller	USB Type A

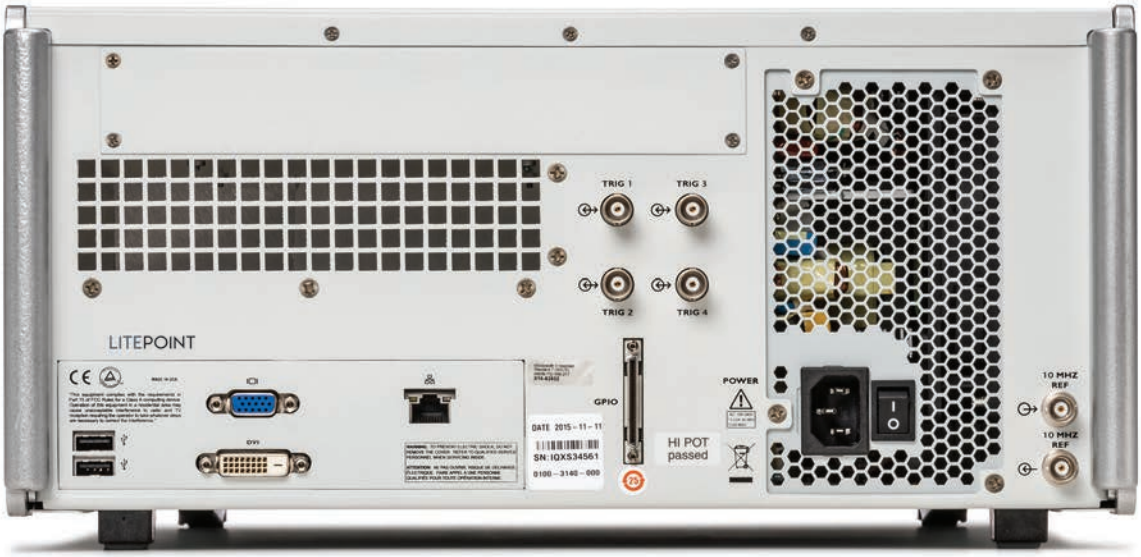
Port Descriptions

Rear Panel

2-port
8-port



16-port



Rear Panel

I/O	Function	Type
10 MHz ref input	10 MHz reference input	BNC female
10 MHz ref output	10 MHz reference output	BNC female
Marker out / trigger in 1	TTL compatible	BNC female
Marker out / trigger in 2	TTL compatible	BNC female
Marker out / trigger in 3	TTL compatible	BNC female
Marker out / trigger In 4	TTL compatible	BNC female
USB (2 ports)	USB 2.0 compatible connection to external controller	USB Type A
AC in	AC power input	100 to 240 VAC (automatically switched) 50 to 60 Hz, Includes hard power switch
DVI port	Display	DVI-D
VGA port	Display	VGA-15 pin
Communication I/O LAN	1000 Base-T LAN	RJ-45
GPIO	General purpose input/output	50-pin connector

General Hardware Specifications

Vector Signal Analyzer (VSA)

Parameters	Ports	Value
Frequency Range	RF1 to RF4	400 to 6000 MHz (TDD) (6 GHz test system) 400 to 7300 MHz (TDD) (7 GHz test system) 400 to 3800 MHz (FDD)
IF Bandwidth	RF1 to RF4	200 MHz
Input Power	RF1 to RF4	+34 dBm (average) +36 dBm (peak)
Input Power Accuracy	RF1 to RF4	Specification for Input > -40 dBm: ± 0.5 dB (400 MHz – 3800 MHz) ± 1 dB (3800 MHz – 7300 MHz) Typical: ± 0.4 dB (400 MHz – 3800 MHz) ± 0.5 dB (3800 MHz – 7300 MHz)
Input return loss	RF1 to RF4	17 dB (400 to 3800 MHz), typical 14 dB (3800 to 6000 MHz), typical 13 dB (6000 to 7300 MHz), typical
Spurious (signal applied)	RF1 to RF4	< -52 dBc (CW, for signal levels greater than -20 dBm)
Spectral Flatness	RF1 to RF4	Specification: ≤ ± 1 dB (± 100 MHz) Typical: ± 0.50 dB (± 100 MHz)
Inherent spurious floor (no signal)	RF1 to RF4	RF1 to RF4 ≤ -80 dBm
Noise Figure	RF1 to RF4	at minimum input attenuation ≤ 25 dB (< 6000 MHz) ≤ 30 dB (≥ 6000 MHz)
Integrated Phase Noise	RF1 to RF4	≤ 0.3 degrees (100 Hz to 1 MHz) 0.2 degrees (100 Hz to 1 MHz), typical
Signal to Noise Ratio	RF1 to RF4	≥ 55 dB 100 kHz RBW
Sample data rates		10, 20, 30.72, 40, 80, 160, 240 MHz
Waveform Capture Duration		at 10 MHz sampling data rate: 9600 ms at 20 MHz sampling data rate: 4800 ms at 30.72 MHz sampling data rate: 3125 ms at 40 MHz sampling data rate: 2400 ms at 80 MHz sampling data rate: 1200 ms at 160 MHz sampling data rate: 600 ms at 240 MHz sampling data rate: 400 ms

RF Analyzer – Signal Trigger

Parameter	Range	
Absolute minimum value	Wideband RF	-40 dBm
	Video (Level or Egde)	-40 dBm
Absolute maximum value	Limited by the maximum input power	
Edge trigger relative threshold	Up to -40 dB below RLEV	
Level accuracy	± 2 dB	

Vector Signal Generator (VSG)

Parameters	Ports	Value
Frequency Range	RF1 to RF4	400 to 6000 MHz (TDD) (6 GHz test system) 400 to 7300 MHz (TDD) (7 GHz test system) 400 to 3800 MHz (FDD)
IF Bandwidth	RF1 to RF4	200 MHz
Output Power Range (CW)	RF1 to RF4	1 port active: +5 to -130 dBm (< 6000 MHz) +2 to -130 dBm (≥ 6000 MHz) All ports active: 0 to -130 dBm (< 6000 MHz) -3 to -130 dBm (≥ 6000 MHz)
Output Power Range (CW) (VSG1 + VSG2 through internal combiner)		1 port active: -5 to -130 dBm All ports active: -10 to -130 dBm Internal combiner: Max power delta between VSG1 and VSG2 ≤ 30 dB, and VSG1 (Signal of Interest) ≥ VSG2 (Interferer)
Output Power Accuracy	RF1 to RF4 (1 port active)	Specifications and [Typical]: ± 0.5 dB @ levels ≥ -50 dBm (400 MHz to 3800 MHz) ± 1 dB [0.7 dB] @ levels ≥ -50 dBm (3800 MHz to 7300 MHz) ± 0.75 dB @ -100 to < -50 dBm (400 MHz to 3800 MHz) ± 1 dB @ -100 to < -50 dBm (3800 MHz to 7300MHz)
	RF1 to RF4 (Broadcast mode, all ports active)	Specifications and [Typical]: ± 0.75 dB @ levels ≥ -50 dBm (600 MHz to 3800 MHz) ± 1.25 dB [1 dB] @ levels ≥ -50 dBm (3800 MHz to 7300 MHz) ± 1 dB @ -100 to < -50 dBm (600 MHz to 3800 MHz) ± 1.5 dB @ -100 to < -50 dBm (3800 MHz to 7300MHz)
	RF1 to RF4 (1 port active, through internal combiner)	Specifications: ± 1dB @ levels ≥ -50 dBm (400 MHz to 3800 MHz) ± 1.25 dB @ levels ≥ -50 dBm (3800 MHz to 7300 MHz) ± 1.25 dB @ levels < -50 dBm (400 MHz to 3800 MHz) ± 1.5 dB @ levels < -50 dBm (3800 MHz to 7300 MHz)
Output return loss	RF1 to RF4	17 dB, 400 to 3800 MHz, typical 14 dB, 3800 to 6000 MHz, typical 13 dB, 6000 to 7300 MHz, typical

Parameters	Ports	Value	
Spurious (in channel)	RF1 to RF4	Specification:	≤ -40 dBc (200 MHz, >-55 dBm) (CW)
		Typical:	≤ -50 dBc (200 MHz, >-55 dBm) (CW)
Spurious (out of channel)	RF1 to RF4	Out-of-band (> ± 100 MHz from carrier) (CW, excluding harmonic distortions)	≤ -40 dBc (<6000 MHz) ≤ -35 dBc (≥6000 MHz)
		2nd and 3rd Harmonics	< -25 dBc (400 to 7300 MHz, < -5 dBm)
Spectral Flatness	RF1 to RF4	Specification:	± 1 dB (± 100 MHz)
		Typical:	± 0.50 dB (± 100 MHz)
Integrated Phase Noise (TDD Mode)		≤ 0.3 degrees (100 Hz to 1 MHz)	
Integrated Phase Noise (FDD Mode)		≤ 0.4 degrees (100 Hz to 1 MHz)	
Signal to Noise Ratio		Specification:	≥ 60 dB (100 KHz signal BW), power level -40 dBm
		Typical:	≥ 70 dB (100 KHz signal BW), power level -40 dBm
Carrier leakage		≤ -40 dBc (CW output) for Power > -50 dBm	
Gap power		≤ -90 dBm/100 kHz	
Sampling data rate		10, 20, 30.72, 40, 80, 160, 240 MHz	
Waveform Playback Duration		at 10 MHz sampling data rate: 9600 ms at 20 MHz sampling data rate: 4800 ms at 30.72 MHz sampling data rate: 3125 ms at 40 MHz sampling data rate: 2400 ms at 80 MHz sampling data rate: 1200 ms at 160 MHz sampling data rate: 600 ms at 240 MHz sampling data rate: 400 ms	

Port Isolation

Measurement	Value
Port to Port Isolation	VSA-to-VSA: 100 dB, <2500 MHz, typical 90 dB, >2500 MHz, typical VSG-to-VSG: 90 dB, <2500 MHz, typical 80 dB, >2500 MHz, typical VSG-to-VSA: 100 dB, <2500 MHz, typical 80 dB, >2500 MHz, typical

Timebase

Parameters	Value
Oscillator type	OCXO
Frequency	10 MHz
Initial accuracy (25°C, after 60 minute warm-up)	< +/- 0.05 ppm
Maximum aging	< +/- 0.1 ppm per year
Temperature stability	< +/-0.05 ppm over 0°C to 50°C range, referenced to 25°C
Warm-up time (to within ±0.1ppm at 25°C)	30 minutes

Frequency Reference Input

Parameters	Value
Frequency	10 MHz
Max Frequency Variation	0.5 ppm
Input Voltage Range	0.3 Vpp to 4.0 Vpp
Impedance	200 Ω

Frequency Reference Output

Parameters	Value
Frequency	10 MHz
Output Voltage	> 0.8 Vpp
Impedance	50 Ω

TTL Trigger Input/Output

Parameter	Value
Impedance	5 kΩ nominal
Trigger1/2/3/4 Input Level	3.5 V – V(IH) 1.5 V – V(IL)
Trigger1/2/3/4 Output Level	3.8 V to 4.9 V - V(OH) 0.1 V to 0.55 V - V(OL)

Wireless LAN 802.11a/b/g/n/p/j/ah/af, 802.11ac (Wi-Fi 5), 802.11ax (Wi-Fi 6, Wi-Fi 6E) Measurement Specifications

Controls	Description	Performance
EVM	EVM averaged over payload based on standard requirements (Typical)	Residual loopback EVM[1]: ≤ -51 dB (+20 to -20 dBm, full packet channel estimation) ≤ -48 dB (+20 to -20 dBm, preamble only channel estimation) 2.4 GHz frequency band 802.11ax waveform, 40 MHz, MCS 11, low distortion mode power levels from -5 to +20 dBm measured with an external amplifier ≤ -51 dB (+20 to -18 dBm, full packet channel estimation) ≤ -48 dB (+20 to -18 dBm, preamble only channel estimation) 5 and 6 GHz frequency bands 802.11ax waveform, 80 MHz, MCS 11 low distortion mode power levels from -8 to +20 dBm measured with an external amplifier
	EVM averaged over payload based on standard requirements (Nominal)	Residual loopback EVM[1]: ≤ -52 dB (-10 dBm, full packet channel estimation) ≤ -49 dB (-10 dBm, preamble only channel estimation) Conditions: Measured at 7015 MHz Averaged over 20 packets 802.11ax waveform, 80 MHz, MCS 11 Using low distortion mode
Peak power	Peak power over all symbols (dBm)	VSA power accuracy: ± 0.5 dB (400 MHz – 3800 MHz) ± 1 dB (3800 MHz – 7300 MHz)
RMS power	All: average power of complete data capture (dBm)	
	No gap: average power over all symbols after removal of any gap between packets (dBm)	
Max avg power	Peak value of the amplitude as a moving average over 40 samples (dBm)	
I/Q amplitude error	I/Q amplitude imbalance (%) and approximate contribution to EVM (dB)	
I/Q phase error	I/Q phase imbalance (degrees) and approximate contribution to EVM (dB)	
Frequency error	Carrier frequency error (kHz)	VSA measurement error: ≤ ± 0.2 ppm calibrated

Note 1: Measured using shared VSA/VSG LO source path

RMS phase noise	Integrated phase noise (degrees)	VSA integrated phase noise: < 0.3 degrees (100 Hz to 1 MHz)
PSD	Power spectral density (dBm/RBW per 100kHz)	
Spectral mask	Transmit spectrum mask	
Spectral flatness	Reflects variation of signal energy as a function of OFDM subcarrier number	VSA flatness over 160 MHz BW: ± 1 dB
CCDF (complementary cumulative distribution function)	Probability of peak signal power being greater than a given power level versus peak-to-average power ratio (dB)	
Power on / power down ramp	On: relative power level (% of average) versus time (CCK signals only) Power-on time from 10% to 90% Power-on time from 90% power level to start of packet (Not provided for OFDM signals) Off: relative power level (% of average) versus time (CCK signals only) Power-off time from 90% to 10% Power-off time from 90% power level to end of packet (Not provided for OFDM signals)	
Eye diagram	I and Q channels versus time (DSSS signals only)	
PSDU data	Recovered binary data sequence, including the MAC header and Frame Check Sequence, if present	
Raw capture data	I and Q signals versus time	
General waveform analysis	DC offset, RMS level, minimum/ maximum amplitude, peak-to-peak amplitude, RMS I- and Q-channel levels	

802.11ax (Wi-Fi 6, Wi-Fi 6E) Waveform Generation

Feature	Configuration
PPDU format	HE-SU, HE-MU, HE-EXT-SU (extended range), HE-TRIG (trigger based)
Bandwidth	20 MHz, 40 MHz, 80 MHz, 160 MHz, 80 + 80 MHz
Modulation	BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM, 4096-QAM
OFDMA	HE-MU (Downlink), HE-TRIG PPDU (Uplink)
MU MIMO	Downlink, Uplink, up to 8 users
HE PPDU configuration	HE-LTF, GI time, SIG-A, SIG-B
DCM (Dual Carrier Modulation)	On, Off
Coding type	LDPC, BCC
HE-MU PPDU configuration	Per RU configuration: Station ID, size, user number, index, segment, power boost factor, MCS index, spatial mapping
Trigger Frame configuration	Per RU configuration: index, RU allocation, MCS index, target RSSI
HE-TRIG based PPDU	Per RU configuration: size, user number, index, MCS index, spatial mapping

802.11ax (Wi-Fi 6, Wi-Fi 6E) Waveform Analysis

Feature	Configuration
PPDU format	HE-SU, HE-MU, HE-EXT-SU (extended range), HE-TRIG (trigger based)
TX Quality Info	PSDU analysis and decode including HE-LTF, GI time, SIG-A, SIG-B and CRC, user number, RU index, size, MCS index
Downlink OFDMA & MU-MIMO analysis	Per User/RU composite and individual EVM and Power results
Uplink HE-TRIG PPDU & MU-MIMO analysis	Per User/RU composite and individual EVM and Power results including EVM of unoccupied tones
Trigger Frame analysis	Decode of common info fields and user info fields
Trigger Based Test	Dual ended test designed to verify STA and AP compliance for HE-TRIG PPDU: Downlink transmission of Trigger frame with configurable index, RU allocation, MCS index, target RSSI Uplink analysis of STA Carrier Frequency Offset (CFO) in the HE-TRIG PPDU per user/RU Uplink analysis of time offset between the trigger frame and the STA HE-TRIG PPDU per user/RU

802.11be EHT160 MHz Product Option

Wireless LAN 802.11be (Wi-Fi 7) Measurement Specifications

Controls	Description	Performance
EVM	Residual loopback EVM averaged over payload based on standard requirements, full packet channel estimation	≤ -52 dB, nominal ≤ -51 dB (-8 dBm to -18 dBm), typical 6 GHz frequency band, 160 MHz channel
		≤ -53 dB, nominal ≤ -52 dB (-8 dBm to -18 dBm), typical 5 GHz frequency band, 160 MHz channel
	Residual loopback EVM averaged over payload based on standard requirements, preamble only channel estimation	≤ -48 dB, nominal ≤ -47 dB (-8 dBm to -18 dBm), typical 6 GHz frequency band, 160 MHz channel
		≤ -49 dB, nominal ≤ -48 dB (-8 dBm to -18 dBm), typical 5 GHz frequency band, 160 MHz channel
Conditions: 802.11be waveform, 160 MHz, MCS 13 Low Distortion Mode Loopback EVM measured using common VSA/VSG LO source path		

802.11be (Wi-Fi 7) Waveform Generation and Analysis (Compliant Draft 1.1)

Feature	Configuration
PPDU format	EHT MU (OFDMA, non-OFDMA SU, non-OFDMA MU), EHT TB, EHT Sounding NDP
Bandwidth	20 MHz, 40 MHz, 80 MHz, 160 MHz
Modulation	BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM, 4096-QAM, DCM, DUP-DCM MCS 0-15
OFDMA	HE-MU PPDU (Downlink), HE-TRIG PPDU (Uplink)
MU MIMO	Downlink, Uplink, up to 8 streams
EHT PPDU configuration	U-SIG, EHT-SIG, EHT-STF, EHT-LTF, Data, PE
EHT DL-OFDMA	DL-OFDMA MU All RU sizes (26 to 996x4) All Multi-RU combinations with and without preamble puncturing Power boost factor for individual RU's
EHT UL-OFDMA (TB PPDU)	MU TB PPDU All RU sizes (26 to 996x4) All Multi-RU combinations TB PPDU CFO testing EHT variant trigger frames

MIMO System Performance

The additional specifications in the table below apply to the complete IQxel-MW 7G MIMO system.

Measurement	Range
VSA capture trigger accuracy	≤ ± 3.5 ns
VSA start trigger accuracy	≤ ± 3.5 ns

802.11az Waveform Generation and Analysis (Compliant Draft 1.5)

Feature	Description
FTM legacy	
HE Ranging NDP	HE SU and HE MU sounding NDP PPDU, HE SU and HE MU secure* sounding NDP PPDU
HE TB Ranging NDP	HE SU and HE MU sounding NDP PPDU, HE SU and HE MU secure* sounding NDP PPDU

* Analysis of secure ranging requires user imported LTF-Keys

802.11ba Wake Up Radio Waveform Generation and Analysis (Compliant Draft 7.0)

Feature	Description
WUR Basic PPDU	WUR Basic PPDU 20 MHz, LDR, HDR
Transmitter Tests	Phase and Symbol clock error LO leakage Transmit On and Off Symbols power ratio (sync and data fields) Correlation test (sync and data fields) Spectral flatness (average, low limit, high limit)
Receiver Tests	CRC state Symbol Clock error Phase and amplitude imbalance

Bluetooth® (1.0, 2.0, 2.1, 3.0) Measurement Specifications

For performance refer to general VSA/VSG hardware specifications

Controls	Description
TX output power	Transmit DUT output power (dBm)
TX output spectrum	Transmit DUT power spectral density
20 dB bandwidth	Bandwidth between the ± 20 dB down points of the modulation waveform
In-band emissions (Adjacent channel)	Spurious emission measured at ± 5 MHz of DUT TX frequency only
Modulation characteristics	Average and peak frequency deviation (Hz)
Carrier frequency tolerance	Carrier frequency offset (Hz)
Carrier frequency drift	Carrier frequency change over the Bluetooth burst (Hz)
Relative transmit power (EDR)	Average power of complete data capture (dBm)
Carrier frequency stability (EDR)	Frequency drift over the Bluetooth EDR burst duration (Hz)
Receive sensitivity[1]	Receive sensitivity test using LitePoint or user-generated waveforms. Includes Dirty Packets.
Maximum input signal level	Assuming single-ended BER measurement
RMS EVM (EDR)	RMS EVM for Bluetooth EDR
Peak EVM (EDR)	Peak EVM for Bluetooth EDR

Note 1: IQxel-MW 7G supports testing sensitivity with Dirty Packets

Bluetooth® (4.0, 4.1, 4.2) Measurement Specifications

For performance refer to general VSA/VSG hardware specifications

Controls	Description
Output power at NOC[1]	
Output power at EOC[1]	
In-band emissions at NOC[1]	Spurious emission measured at ±5 MHz of DUT TX frequency only
In-band emissions at EOC[1]	
Modulation characteristics	Average and peak frequency deviation (Hz)
Carrier frequency offset and drift at NOC[1]	Carrier frequency offset (Hz) and change over the Bluetooth burst (Hz)
Carrier frequency offset and drift at EOC[1]	
Receiver sensitivity at NOC[1,2]	Receive sensitivity test using LitePoint or user-generated waveforms
Receiver sensitivity at EOC[1,2]	

C/I and receiver selectivity performance[3]	
Blocking performance[3]	
Intermodulation performance	
Maximum input signal level	Assuming single-ended BER measurement
PER report integrity	Verifies the DUT PER report mechanism

Note 1: NOC and EOC tests are the same except for the operating conditions which do not impact the test equipment requirements
Note 2: External signal source required for these measurements (not LitePoint supplied)
Note 3: IQxel-MW 7G provides the wanted signal only. No interfering signal is available

Bluetooth® (5.0, 5.1, 5.2[1]) Measurement Specifications

For performance refer to general VSA/VSG hardware specifications

Measurement	Description
In-band emissions	Spurious emission measured at ± 5 MHz of DUT TX frequency only. Tested at 1 Mbps, 2 Mbps
Modulation Characteristics	Average and peak frequency deviation (Hz). Tested at 1 Mbps, 2 Mbps, 125 kbps
Carrier Frequency offset and drift	Carrier frequency offset (Hz) and change over the Bluetooth burst (Hz). Tested at 1 Mbps, 2 Mbps, 125 kbps
Stable Modulation Characteristics	Tested at 1 Mbps, 2 Mbps
Receiver Sensitivity	Receive sensitivity test using LitePoint or user-generated waveforms. Tested at 1 Mbps, 2 Mbps, 125 kbps
Receiver Sensitivity – Stable Modulation Index	Tested at 1 Mbps, 2 Mbps, 500 kbps, 125 kbps
Maximum Input signal level	Assuming single-ended BER measurement. Tested at 1 Mbps, 2 Mbps
Maximum Input signal level – Stable Modulation Index	Tested at 1 Mbps, 2 Mbps
C/I and Receiver Selectivity Performance	Tested at 1 Mbps, 2 Mbps, 500 kbps, 125 kbps
Blocking Performance	Tested at 1 Mbps, 2 Mbps
Intermodulation Performance	Tested at 1 Mbps, 2 Mbps
PER Report Integrity	Verifies the DUT PER report mechanism. Tested at 1 Mbps, 2 Mbps, 500 kbps, 125 kbps

Note 1: Support for BT 5.2 Isochronous PDU type

Bluetooth® 5.1 Measurement Specifications

For performance refer to general VSA/VSG hardware specifications

Measurement	Description
Output Power, with Constant Tone Extension	Verifies maximum peak and average power emitted when transmitting with a Constant Tone Extension.
Carrier Frequency offset and drift, with Constant Tone Extension	Verifies carrier frequency offset and carrier drift of the transmitted Constant Tone Extension portion in a transmitted signal with a Constant Tone Extension. Tested at 1 Mbps, 2 Mbps.
IQ Samples Coherency, AoD Receiver	Verifies relative phase values derived from the I/Q values sampled at AoD Receiver from a Constant Tone Extension. Tested at 1 Mbps, 2 Mbps, 1 µs Slot, 2 µs Slot.
IQ Samples Coherency, AoA Receiver[1]	Verifies relative phase values derived from the I/Q values sampled at AoD Receiver from a Constant Tone Extension. Tested at 1 Mbps, 2 Mbps, 2 µs Slot.
IQ Samples Dynamic Range, AoD Receiver	Verifies the I/Q values sampled at AoD Receiver when varying the dynamic range of the Constant Tone Extension. Tested at 1 Mbps, 2 Mbps, 1 µs Slot, 2 µs Slot.
IQ Samples Dynamic Range, AoA Receiver[1]	Verifies the I/Q values sampled at AoA Receiver when varying the dynamic range of the Constant Tone Extension. Tested at 1 Mbps, 2 Mbps, 2 µs Slot.
Transmit Power Stability, AoD Transmitter[1]	Verifies that AoD transmit signal has settled and remains stable within the reference period and transmit slots. Tested at 1 Mbps, 2 Mbps, 1 µs Slot, 2 µs Slot.
Antenna Switching Integrity, AoD Transmitter[2]	Verifies that the antenna switching occurs during the switching slots of the Constant Tone Extension.

Note 1: Test requires an external splitter/combiner
Note 2: Test requires an external splitter/combiner and IQ3101 Switch

ZigBee (802.15.4), Z-wave (ITU-T G.9959), Wi-SUN (MR-FSK IEEE 802.15.4g)

For performance refer to general VSA/VSG hardware specifications

Measurement	Description
Output power	Transmit DUT output power (dBm)
Power spectral density	Transmit DUT power spectral density
Center Frequency Tolerance	Tx center frequency tolerance
EVM	Offset: compensate the I and Q offset in OQPSK Normal: no compensation applied
Other modulation quality measurements	LO leakage, clock error, phase error, symbol clock error
CCDF (complementary cumulative distribution function)	Probability of peak signal power being greater than a given power level versus peak-to-average power ratio (dB)

DECT (ETSI EN 300 176-1)

For performance refer to general VSA/VSG hardware specifications

Measurement	Description
Power	Normal Transmit Power
Power vs. time	Power time template
Frequency offset	Frequency offset
Frequency drift	Frequency drift during packet transmission
Frequency deviation	S field, B field, whole packet

Navigation[1]

Measurement	Description
Test Capability	Carrier-to-noise ratio
Output power range	-60 to -130 dBm
Level accuracy	± 0.75 dB

Note 1: Navigation is a standard feature included with general purpose RF function

5G Measurement Specifications

3GPP TS 38.101-1	Paragraph Reference	Notes
Transmit Power	6.2	Maximum Power
Output Power Dynamics	6.3	Min Power Relative Power On/Off Time Mask
Transmit Signal Quality	6.4	Frequency Error EVM: -45 dB Typical (Tx-Rx loopback at 100 MHz CC, 3.5 GHz, MCS14, -10 dBm transmit power level) Carrier Leakage In-band Emissions
Output RF Spectrum Emissions	6.5	Occupied Bandwidth Spectrum Emission Mask ACLR
Receiver Sensitivity	7.3	Reference Sensitivity Power
Receiver Level	7.4	Maximum Input Level
Receiver Blocking	7.5	Adjacent Channel Selectivity (Characterization only, not recommended for manufacturing)
	7.6	In-band Blocking (Requires DUT support)

5G NR Small Cell Base Station Tests

Measurement	TS 38.141-1 Paragraph Reference	Notes
Base Station Output Power	6.2	
Output Power Dynamics	6.3.3	Total Power Dynamic Range
Transmit ON/OFF Power	6.4.1 6.4.2	Transmitter OFF Power Transmitter Transient Period
Transmitted Signal Quality	6.5.2 6.5.3 6.5.4	Frequency Error Modulation Quality Time Alignment Error
Unwanted Emissions	6.6.2 6.6.3 6.6.4	Occupied Bandwidth Adjacent Channel Leakage Power Ratio (ACLR) Operating band unwanted emissions (OBUE)
Reference Sensitivity Level	7.2	DUT support required
In-Band Selectivity and Blocking	7.4.1 7.4.2	Adjacent Channel Selectivity In-Band Blocking (Characterization only, not recommended for manufacturing. Requires additional signal generator)
Receiver Intermodulation	7.7	Characterization only, not recommended for manufacturing. Requires additional signal generator
In-Channel Selectivity	7.8	Characterization only, not recommended for manufacturing. Requires additional signal generator

LTE Terminal Tests for UE Categories 1 through 12, Cat-0 (Cat-M1), and Cat-NB1 (NB-IoT)

Standard Test	3GPP TS 36.521-1 Reference Paragraph	Notes
Maximum output power	6.2.2	
Maximum power reduction	6.2.3	
Transmit on/off time mask	6.3.4	
Minimum output power	6.3.2	
Transmit off power	6.3.3	
Power control absolute	6.3.5.1	
Power control relative	6.3.5.2	
Frequency error	6.5.1	
Error vector magnitude	6.5.2.1	
EVM equalizer spectrum flatness	6.5.2.4	
Carrier leakage	6.5.2.2	

Standard Test	3GPP TS 36.521-1 Reference Paragraph	Notes
Occupied bandwidth	6.6.1	
In-band emissions for non-allocated RB	6.5.2.3	
ACLR	6.6.2.3	
Spectrum emission mask	6.6.2.1	
Spurious emissions	6.6.3.1	75 MHz to 6 GHz
Reference sensitivity	7.3	DUT support required
Maximum input level	7.4	DUT support required
RX level		DUT support required. A common test as part of device calibration / verification.

WCDMA/HSPA/HSPA+/Dual Carrier HSPA+Terminal Tests

Bands	Frequency Range (Analyzer)	Frequency Range (Generator)
Maximum output power	5.2	
Minimum output power	5.4.3	
Transmitter off power	5.5.1	
Inner loop power control	5.4.2	
Frequency error	5.3	
Error Vector Magnitude (EVM)	5.13.1	
Phase discontinuity	5.13.3	
I/Q mismatch	5.13.1AAA	
Occupied BW	5.8	
Peak code domain error	5.13.2	
ACLR	5.10	
Spectrum Emission Mask (SEM)	5.9	
Spurious emissions	5.11	75 MHz to 6 GHz
Reference sensitivity	6.2, 6.2A	DUT support required
Maximum input level	6.3, 6.3B	DUT support required
RX level		DUT support required. A common test as part of device calibration / verification
RSCP		DUT support required. A common test as part of device calibration / verification

GSM/EDGE Tests

Standard Test	3GPP TS 51.010-1 Reference Paragraph	Notes
TX output power	13.3, 13.17.3	
Transmit burst timing	13.3, 13.17.3	
Frequency error	13.1, 13.17.1	
Phase error	13.1, 13.17.1	
Error Vector Magnitude (8-PSK)	13.17.1	
Origin offset suppression	13.17.1	I/Q Mismatch, I/Q Offset
Output RF spectrum due to modulation (M-ORFS)	13.4, 13.17.4	
Output RF spectrum due to switching (S-ORFS)	13.4, 13.17.4	
Reference sensitivity	14.2	DUT support required
Usable input level range	14.3	DUT support required
RX level		DUT support required. A common test as part of device calibration / verification

TD-SCDMA Tests

Standard Test	3GPP TS 34.122 Reference Paragraph	Notes
Maximum output power	5.2	
Power time mask	5.4.4	
Transmitter off power	5.4.4	
Modulation accuracy	5.7	
Occupied bandwidth	5.5.1	
Spectrum emission mask		
ACLR	5.5.2	
RX sensitivity	6.2	DUT support required
RX maximum input level	6.3	DUT support required
Throughput (single-ended)	9.3	DUT support required

cdma2000 / 1xEV-DO Tests

Standard Test	Reference Paragraph		Notes
	C.S0011-C	C.S0033-B	
Maximum output power	4.4.5	4.3.4	
Frequency accuracy	4.3.4	4.2.2	
EVM			Available but not part of standards for cdma2000
Rho(p)	4.3.4	4.2.2	
Code domain power	4.3.5	4.3.8	
ACLR			Available but not part of standards for cdma2000. Faster than the Conducted Spurious Emissions Test.
Receiver sensitivity	3.5.1	3.3.1	DUT support required
RX dynamic range	3.5.1	3.3.1	DUT support required
RX level			DUT support required. A common test as part of device calibration / verification.

General and Environmental

Parameter	Description
Dimensions	8- port: 14.5" W x 3.2" H x 20.5" D (368 mm x 82 mm x 521 mm) 16-port: 16.75" W x 7.4" H x 24" D (426 mm x 188 mm x 610 mm)
Weight	8-port: 26 lbs (11.8 kg) 16-port: 49.2 pounds (22.3 kg)
Power consumption (maximum)	8-port: 200 W 16-port: 350 W
Power consumption (average)	8-port: 150 W 16-port: 300 W
Power requirements	100 - 240 VAC, 50-60 Hz
Supported browsers	Google Chrome, Mozilla Firefox
Operating temperature	+10°C to +50°C
Storage temperature	-20°C to +70°C (IEC EN60068-2-1, 2, 14)
Specification validity	20°C to 35°C 60 minutes warm-up time at ambient temperature
Operating humidity	15% to 95% relative humidity, non-condensing (IEC EN60068-2-30)

EMC/EMI	61326-1: 2013 Industrial Environment, CISPR11 Class A per EN61326-1:2013 , FCC Part 15 Class A, VCCI V-3 Class A, BSMI CNS-13438 Class A, ACMA AS/NZS CISPR11: 2011, ICES-003 Class A
Safety	IEC 61010-1, EN61010-1, UL61010-1:2012 and Canada: CSA C22.2 No. 61010-1, GI1, GI2
Mechanical vibration	MIL-STD 810G for Random Vibration
Mechanical shock	ASTM D3332-99
RF Connector Torque	13 in-lbs (147 N-cm) Recommended
Recommended calibration cycle	12 months
Warranty	12 months hardware, 12 months software updates

Order Codes

Code	Product
0100-MW7G-006	IQxel-M2W 7G (2x2) test system with 2 RF ports active. Includes 2VSA / 2VSG, 400 to 7300 MHz. Includes WLAN measurement suite software for SISO 802.11a/b/g/n/p
0100-MW7G-002	IQxel-M8W 7G (2x4) test system with 4 RF ports active. Includes 2VSA / 2VSG, 400 to 7300 MHz. Includes WLAN measurement suite software for SISO 802.11a/b/g/n/p
0100-MW7G-001	IQxel-M8W 7G (2x8) test system with 8 RF ports active. Includes 2VSA / 2VSG, 400 to 7300 MHz. Includes WLAN measurement suite software for SISO 802.11a/b/g/n/p
0100-MW7G-007	IQxel-M16W 7G (4x4) test system with 4 RF ports active. Includes 4VSA / 4VSG, 400 to 7300 MHz. Includes WLAN measurement suite software for SISO 802.11a/b/g/n/p
0100-MW7G-004	IQxel-M16W 7G (4x8) test system with 8 RF ports active. Includes 4VSA / 4VSG, 400 to 7300 MHz. Includes WLAN measurement suite software for SISO 802.11a/b/g/n/p
0100-MW7G-003	IQxel-M16W 7G (4x16) test system with 16 RF ports active. Includes 4VSA / 4VSG, 400 to 7300 MHz. Includes WLAN measurement suite software for SISO 802.11a/b/g/n/p
0100-MW7G-016	IQxel-M2W 7G (2x2), 6 GHz test system with 2 RF ports active. Includes 2VSA / 2VSG, 400 to 6000 MHz. Includes WLAN measurement suite software for SISO 802.11a/b/g/n/p
0100-MW7G-012	IQxel-M8W 7G (2x4), 6 GHz test system with 4 RF ports active. Includes 2VSA / 2VSG, 400 to 6000 MHz. Includes WLAN measurement suite software for SISO 802.11a/b/g/n/p
0100-MW7G-011	IQxel-M8W 7G (2x8), 6 GHz test system with 8 RF ports active. Includes 2VSA / 2VSG, 400 to 6000 MHz. Includes WLAN measurement suite software for SISO 802.11a/b/g/n/p
0100-MW7G-017	IQxel-M16W 7G (4x4), 6 GHz test system with 4 RF ports active. Includes 4VSA / 4VSG, 400 to 6000 MHz. Includes WLAN measurement suite software for SISO 802.11a/b/g/n/p
0100-MW7G-014	IQxel-M16W 7G (4x8), 6 GHz test system with 8 RF ports active. Includes 4VSA / 4VSG, 400 to 6000 MHz. Includes WLAN measurement suite software for SISO 802.11a/b/g/n/p
0100-MW7G-013	IQxel-M16W 7G (4x16), 6 GHz test system with 16 RF ports active. Includes 4VSA / 4VSG, 400 to 6000 MHz. Includes WLAN measurement suite software for SISO 802.11a/b/g/n/p
0150-MW7G-033	Product Option: Enables 802.11be EHT160 MHz Option for IQxel-MW 7G and IQxel-MW 7G, 6GHz for 2x2, 2x4 and 2x8 Systems

0150-MW7G-034	Product Option: Enables 802.11be EHT160 MHz Option for IQxel-MW 7G and IQxel-MW 7G, 6GHz for 4x4, 4x8 and 4x16 Systems
0300-MW7G-001	802.11ac VHT80 (80MHz signal bandwidth) software license
0300-MW7G-057	802.11ac VHT160 (80+80MHz and 160MHz signal bandwidth) software license (Requires 802.11ac VHT80 license)
0300-MW7G-069	802.11ax software license (Requires 802.11ac VHT80 license for 80MHz signal bandwidth or 802.11ac VHT160 license for 160MHz signal bandwidth)
0300-MW7G-061	WLAN MIMO software license. Enables MIMO option for 802.11n, 802.11ac, and 802.11ax (Requires associated 802.11 technology license)
0150-MW7G-003	WLAN MIMO kit. Includes MIMO software license and tester synchronization cables
0300-MW7G-003	Sequence Based Test (SBT) software license, also enables Trigger Based Test (TBT) for 802.11ax
0300-MW7G-089	WiFi Traffic Sniffer software license (Requires 802.11ax license)
0300-MW7G-002	Bluetooth measurement suite software license. Supports Bluetooth 1.0 - 4.x
0300-MW7G-071	Bluetooth 5 measurement suite software license (Requires Bluetooth 1.0 - 4.x license)
0300-MW7G-008	Zigbee measurement suite software license. Includes measurement capability for Zigbee, Wi-SUN and Z-wave
0300-MW7G-009	DECT measurement suite software license
0300-MW7G-044	802.11ah measurement suite software license
0300-MW7G-059	802.11af measurement suite software license
0300-MW7G-065	Sigfox measurement suite software license
0300-MW7G-055	LTE measurement suite software license
Others	Contact LitePoint for additional cellular technologies order codes

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