iQgig-IF

TECHNICAL SPECIFICATIONS

IQgig-IF™
Technical Specifications

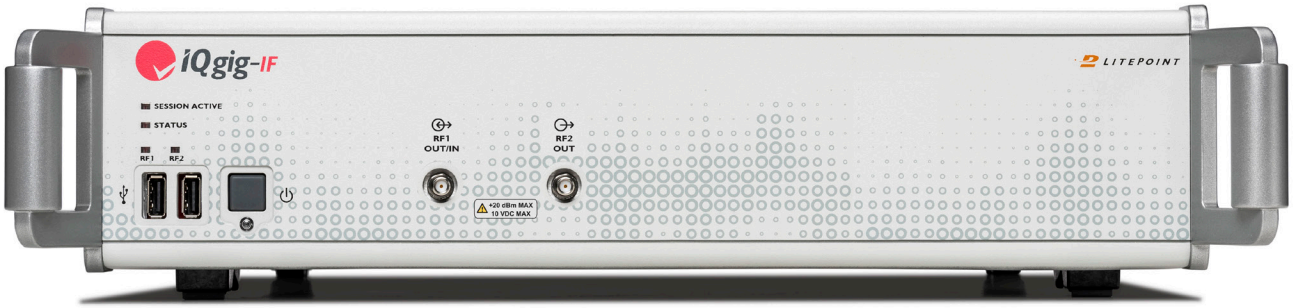
LITEPOINT

IQgig-IF is a compact, physical-layer test solution, optimally designed for 802.11ad (WiGig) IF modules and the IF chain of final products. It complements LitePoint's IQgig-RF Over-the-Air 60 GHz test system as they measure the same 802.11ad test items and share the same test platform, providing a simple data correlation. IQgig-IF covers the wide ranges of major chipset companies' proprietary IF frequency ranges, ensuring a frequency coverage for all of your WiGig IF needs.

IQgig-IF Features

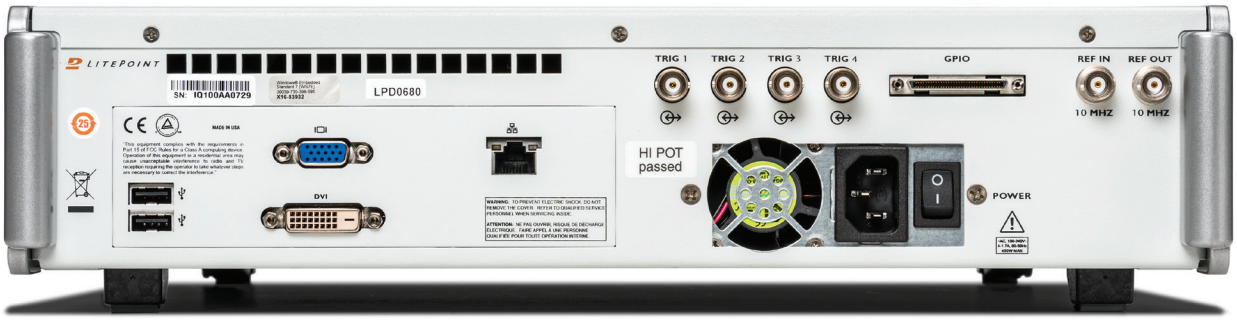
- IF frequency coverage: 4.9 GHz to 19.4 GHz
- High performance VSA EVM measurements for signals up to MCS12
- High performance VSG tests various RX test conditions

Port Descriptions



IQgig-IF Front Panel

I/O	Function	Type
Power Switch	Power On/Off	Pushbutton Switch
Power Indicator	LED Red – Powered Up, Standby LED Green – Powered Up, Running	LED indicator
Session Active 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
Port Status Indicators (2)	LED Green – Port is a VSA input LED Red – Port is a VSG output	LED indicator
USB (2)	USB Input / Output	Type A
RF1 OUT/IN	RF Output/Input (50Ω nom, 10V DC Max)	SMA female
RF2 OUT	RF Output (50Ω nom, 10V DC Max)	SMA female



IQgig-IF Rear Panel General I/O

I/O	Function	Type
10 MHz REF In	10 MHz Reference In	BNC female
10 MHz REF Out	10 MHz Reference Out	BNC female
TRIG 1	TTL Trigger Input / Output	BNC female
TRIG 2	TTL Trigger Input / Output	BNC female
TRIG 3	TTL Trigger Input / Output	BNC female
TRIG 4	TTL Trigger Input / Output	BNC female
GPIO	General Purpose Input / Output	50-pin connector

IQgig-IF Test Controller Communication I/O

I/O	Function	Type
VGA	Video Output	15 pin DSUB
DVI	Video Output	DVI-I
USB 1	USB I/O – Keyboard	Type A
USB 2	USB I/O – Mouse	Type A
LAN 1	1000 Base-T LAN	RJ-45

General Hardware Specifications

RF Analyzer

Parameter	Ports	Value
Frequency Range	RF1	5.8 to 18.5 GHz (Carrier frequency) 4.9 to 19.4 GHz (Input RF spectrum)
IF bandwidth	RF1	1.9 GHz
Input Power Maximum	RF1	+20 dBm
Input Power Range	RF1	-10 to -40 dBm (Average modulated power) 0 to -40 dBm (CW)
Input Power Accuracy	RF1	±1 dB
Input Return Loss	RF1	> 11 dB (Typ)
Spurious[1]	RF1	< -50 dBc (CW) at Input Power = -10 dBm
Image Rejection	RF1	< -30 dBc (CW) at Input Power = -10 dBm
Carrier Leakage	RF1	< -45 dBc, 5.8 to 16 GHz < -35 dBc, 16 GHz to 18.5 GHz
Spectral flatness	RF1	≤ 1.4 dB, 5.8 to 17 GHz center frequency MAX - MIN (±850 MHz)
Inherent spurious floor	RF1	≤ -80 dBm at minimum input attenuation
Noise figure	RF1	≤ 20 dB at minimum input attenuation
Integrated phase noise	RF1	< 0.75 degrees (100 kHz to 100 MHz)
VSG/VSA Isolation	RF1	> 40 dB
Digitizer Resolution	RF1	12 bits
Sampling data rate	RF1	2.4 GS/s
Waveform capture duration	RF1	50 ms
Absolute minimum trigger level	RF1	-40 dBm
Absolute maximum trigger level	RF1	0 dBm
Trigger relative threshold	RF1	30 dB
Trigger Level Accuracy	RF1	< ±2 dB

1 Excludes harmonic products, image rejection, and carrier leakage

RF Generator

Parameter	Ports	Value
Frequency Range	RF1, RF2	5.8 to 18.5 GHz (Carrier frequency) 4.9 to 19.4 GHz (Output RF spectrum)
IF bandwidth	RF1, RF2	1.9 GHz
Output Power Range	RF1, RF2	0 to -30 dBm (Ave modulated power) +5 to -30 dBm (CW)
Output Power Accuracy	RF1, RF2	±1.0 dB
Output Return Loss	RF1, RF2	> 11 dB (Typ)
Spurious (in channel)[1]	RF1, RF2	< -35 dBc
Image Rejection	RF1, RF2	< -30 dBc, 5.8 to 17 GHz center frequency
Spectral flatness	RF1, RF2	≤ 1.6 dB MAX - MIN (± 850 MHz), 5.8 to 17 GHz center frequency
Integrated phase noise	RF1, RF2	< 0.75 degrees (100 kHz to 100 MHz)
Carrier leakage	RF1, RF2	< -30 dBc, < 12 GHz < -35 dBc, 12 to 17 GHz relative to total transmit power
Generator Resolution	RF1, RF2	14 bits
Sampling data rate	RF1, RF2	2.4 GS/s
Waveform playback duration	RF1, RF2	200 ms

1 Excludes harmonic products, image rejection, and carrier leakage

Wireless LAN (802.11ad) Measurement Specification

Measurement	Description	Performance
EVM	EVM averaged over payload based on standard requirements	Preamble only channel estimation: MCS 1: < -35 dB Typ (-5 to -20 dBm), < -32 dB Typ (-20 to -30 dBm) MCS 12: < -33 dB Typ (-5 to -20 dBm), < -31 dB Typ (-20 to -30 dBm) Note: - 8 to 17 GHz - Averaged over 20 CPHY/SC packets, 512+/1000+ data symbols long - Measured in system loopback
TX Peak power	Peak power over all symbols (dBm)	VSA power accuracy: ±1.0 dB (-10 to -40 dBm)
TX 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)	
TX Max avg power	Peak value of the amplitude as a moving average over 40 samples (dBm)	
TX Frequency error	Carrier frequency error (kHz)	VSA measurement error: ≤ ±0.2 ppm calibrated
TX RMS phase noise	Integrated phase noise (degrees)	VSA residual integrated phase noise: < 0.75 degrees (100 kHz to 100 MHz)
TX PSD	Power spectral density (dBm/Hz) versus frequency offset center frequency ±850 MHz	
TX Spectral mask	Transmit spectrum mask	±3.06 GHz
TX Spectral flatness	Reflects variation of signal energy as a function of OFDM subcarrier number 802.11ad OFDM signals only	≤ 1.4 dB, MAX - MIN (±850 MHz)
TX center freq. (LO) leakage (LOFT)		VSA residual < -35 dBc with respect to overall transmit power
TX CCDF (complementary cumulative distribution function)	Probability of peak signal power being greater than a given power level versus peak-to-average power ratio (dB)	
TX Power on / power down ramp		(10 to 90% of average frame power)
RX TX Turnaround Time max.		
RX TX Switch Time max.		

TX PSDU data	Recovered binary data sequence, including the MAC header and Frame Check Sequence, if present	
TX Raw capture data	I and Q signals versus time	
TX General waveform analysis	DC offset, RMS level, minimum/maximum amplitude, peak-to peak amplitude, RMS I- and Q-channel levels	
TX CW frequency analysis	Frequency & power of CW tone	
RX Sensitivity	Receiver sensitivity	VSG power accuracy: ±1 dB
RX Maximum Input Level		VSG power range: 0 to -30 dBm

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

General and Environmental

Parameters	Value
Dimensions	15.5" W x 3.2" H x 20" D (394 mm x 82 mm x 508 mm)
Weight	24.1 pounds (10.95 kg)
Power consumption (maximum)	< 220 W
Power consumption (average)	115 W
Power requirements	100 - 240 VAC, 50-60 Hz
Supported browsers	Google Chrome
Operating temperature	+10°C to +55°C (IEC EN60068-2-1, 2, 14)
Storage temperature	-20°C to +70°C (IEC EN60068-2-1, 2, 14)
Specification validity temperature	20°C to 35°C (valid range for specifications)
Operating humidity	15% to 95% relative humidity, non-condensing (IEC EN60068-2-30)
EMC	EN61326-1 Class A, EN55011
EMI (Immunity)	EN61000-4
Safety	IEC 61010-1, EN61010-1, UL61010-1:2012 and CAN/CSA-C22.2 No. 61010-1-12
Mechanical vibration	IEC 60068-2-6 for Sine Vibration and MIL-STD 810G for Random Vibration
Mechanical shock	ASTM D3332-99
Recommended calibration cycle	12 months
Warranty	12 months hardware, 12 months software updates

Order Codes

Code	Product
0100-IGIG-002	IQgig IF 802.11ad Test System

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