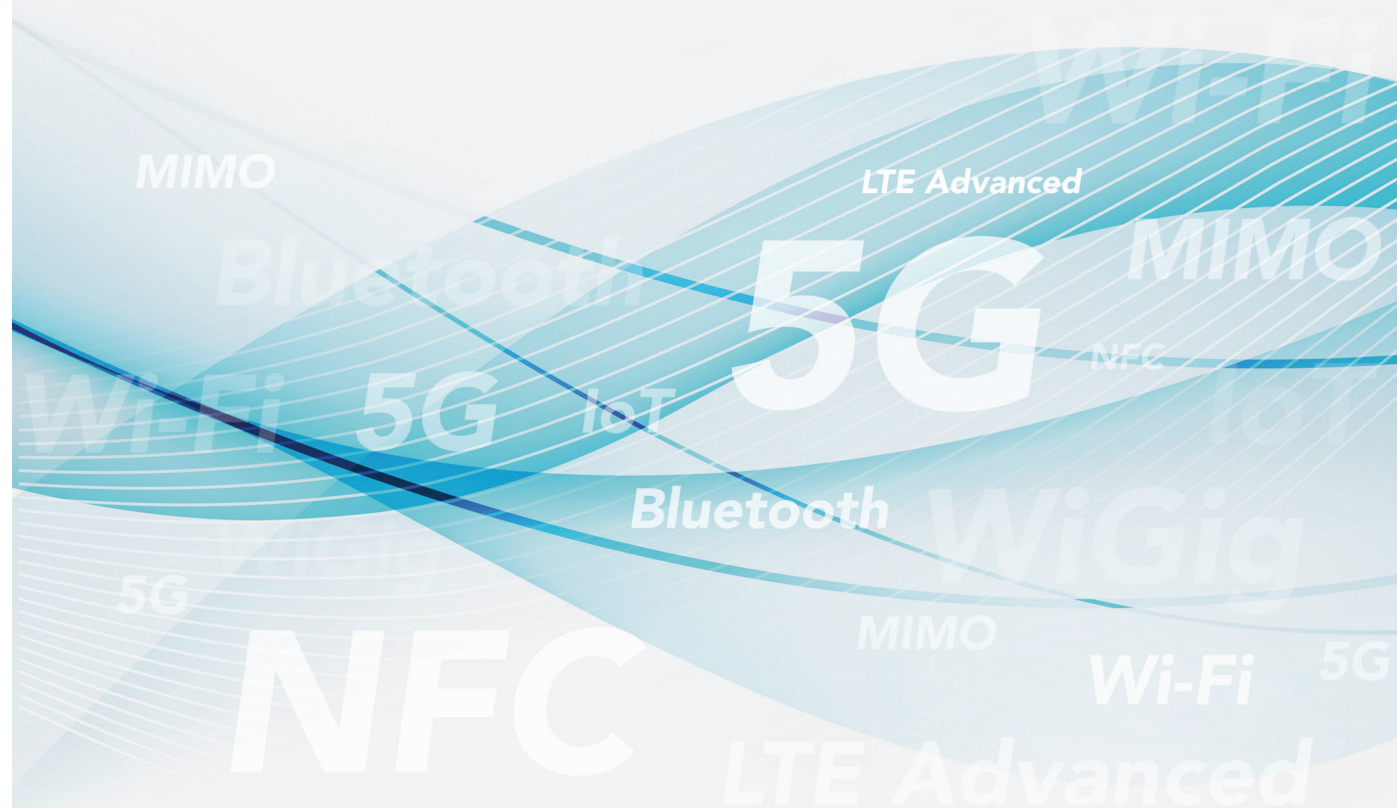


IQgig-RF™ Model B

Technical Specifications



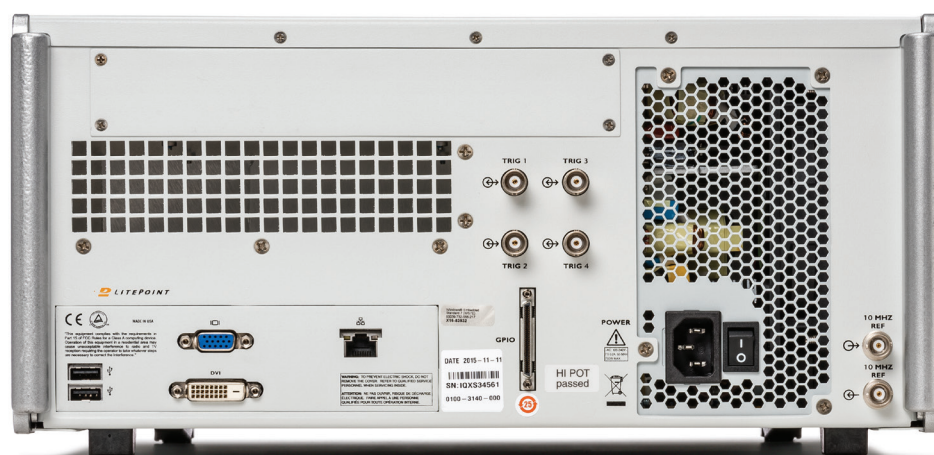
Port Descriptions



IQgig-RF Test Controller Front Panel

| I/O | Function | Type |
|--------------------------|--|------------------------------------|
| Power Switch | Power On/Off | Push-button 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 |
| USB (2) | USB Input / Output | Type A |
| RF1A | Vector Test Head Connection | Proprietary Mixed-Signal Connector |
| RF2A | Vector Test Head Connection | Proprietary Mixed-Signal Connector |
| RF1B | Vector Test Head Connection | Proprietary Mixed-Signal Connector |
| RF2B | Vector Test Head Connection | Proprietary Mixed-Signal Connector |
| Test Head Indicators | LED Green – Test Head is an input LED Red – Test Head is an output | LED Indicator |

'A' denotes the first/bottom module and 'B' denotes the second/top module.



IQgig-RF

| 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-RF 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 |



Note: Test heads do not include horn antennas

IQgig-RF Vector Test Head (VTH) I/O

| I/O | Function | Type |
|----------------------|--|------------------------------------|
| Controller Interface | Connection to Test Controller | Proprietary Mixed-Signal Connector |
| Test Port | RF I/O | WR-15 |
| Status Indicator | LED Green – Power on, normal operation | LED Indicator |

General Hardware Specifications

RF Vector Signal Analyzer (Vector Test Head)¹

| Parameter | Ports | Value | |
|--------------------------------|-----------|---|--------|
| Frequency Range | TEST PORT | 55 to 70 GHz EVM Measurements available at: CHAN 1: 58.32 GHz CHAN 2: 60.48 GHz CHAN 3: 62.64 GHz CHAN 4: 64.80 GHz CHAN 5: 66.96 GHz | |
| RF Bandwidth | TEST PORT | 1.9 GHz | |
| Input Power Maximum | TEST PORT | +15 dBm peak | |
| Input Power Range | TEST PORT | 0 to -70 dBm | |
| Input Power Accuracy | TEST PORT | ± 1.5 dB (-5 to -55 dBm) | |
| Input Power Linearity | TEST PORT | ± 1 dB (± 0.5 dB Typ.) (-5 to -55 dBm) | |
| Spurious (non-harmonics) | TEST PORT | < -50 dBc (50 kHz RBW) (CW) at Input Power = -10 dBm | |
| Spectral Flatness | TEST PORT | ≤ ± 0.8 dB (± 850 MHz) | |
| Inherent Spurious Floor | TEST PORT | ≤ -80 dBm at minimum input attenuation , 1 MHz RBW | |
| Noise Figure | TEST PORT | ≤ 20 dB at minimum input attenuation | |
| Integrated Phase Noise | TEST PORT | < 0.8 degrees RMS (100 kHz to 100 MHz) | |
| Digitizer Resolution | TEST PORT | 12 bits | |
| Sampling Data Rate | TEST PORT | 300, 600, 1200, 2400 MHz | |
| Waveform Capture Duration | TEST PORT | at 300 MHz sampling data rate | 200 ms |
| | | at 600 MHz sampling data rate | 100 ms |
| | | at 1200 MHz sampling data rate | 50 ms |
| | | at 2400 MHz sampling data rate | 25 ms |
| Absolute Minimum Trigger Level | TEST PORT | Wideband RF: -30 dBm Video: -40 dBm | |
| Absolute Maximum Trigger Level | TEST PORT | 0 dBm | |
| Trigger Relative Threshold | TEST PORT | 30 dB | |
| Trigger Level Accuracy | TEST PORT | < ±2 dB | |

¹ All specifications referenced to the waveguide flange connection at test head

RF Vector Signal Generator (Vector Test Head)¹

| Parameter | Ports | Value |
|--|-----------|---|
| Frequency Range | TEST PORT | CHAN 1: 58.32 GHz CHAN 2: 60.48 GHz CHAN 3: 62.64 GHz CHAN 4: 64.80 GHz CHAN 5: 66.96 GHz |
| RF Bandwidth | TEST PORT | 1.9 GHz |
| Output Power Settable Range | TEST PORT | +5 to -70 dBm |
| Output Power Accuracy | TEST PORT | CW: ± 2.0 dB (+5 to -40 dBm), ± 3 dB (<-40 dBm) |
| Output Power Linearity | TEST PORT | ± 1 dB (± 0.5 dB Typ.) (+5 to -65 dBm) |
| Spurious (in channel) ² | TEST PORT | < -35 dBc CW, or -75 dBm (< 0dBm) |
| Spurious (out of channel) ³ | TEST PORT | < -20 dBc CW, or -60 dBm, whichever is higher ⁴ |
| Spectral Flatness | TEST PORT | $\leq \pm 0.8$ dB (± 850 MHz) |
| Integrated Phase Noise | TEST PORT | < 0.8 degrees RMS (100 kHz to 100 MHz) |
| Carrier Leakage | TEST PORT | < -30 dBc CW (+5 to -30 dBm) |
| Generator Resolution | TEST PORT | 14 bits |
| Sampling Data Rate | TEST PORT | 2400 MHz |
| Waveform Playback Duration | TEST PORT | 25 ms |

¹ All specifications referenced to the waveguide flange connection at test head

² Carrier frequency ± 1 GHz

³ Up to carrier Frequency ± 8 GHz

⁴ 55 to 70 GHz

Wireless LAN (802.11ad) Measurement Specification (Vector Test Head)¹

| Measurement | Description | Performance |
|--|---|--|
| EVM | EVM averaged over payload based on standard requirements | (Averaged over 20 CPHY/SC packets, 512+/1000+ data symbols long) Preamble only channel estimation Residual VSA EVM: ≤ -30 dB MCS12 (-12 to -33 dBm) Residual VSG EVM: ≤ -30 dB MCS12 (-12 to -33 dBm) |
| TX Peak Power | Peak power over all symbols (dBm) | VSA power accuracy: ± 1.5 dB (-5 to -55 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 Average Power | Peak value of the amplitude as a moving average over 40 samples (dBm) | |
| TX Frequency Error | Carrier frequency error (kHz) | VSA measurement error: $\leq \pm 0.2$ ppm calibrated |
| TX RMS Phase Noise | Integrated phase noise (degrees) | VSA residual integrated phase noise: < 0.8 degrees RMS (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, Data packets longer than 10 μ s without training fields, RBW = 1 MHz |
| TX Spectral Flatness | Reflects variation of signal energy as a function of OFDM subcarrier number 802.11ad OFDM signals only | VSA flatness over $\leq \pm 0.8$ dB (± 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 Center Frequency Convergence | Converge to within 1ppm of its final value from the start of the packet. | |
| TX Power On / Power Down Ramp | 10 to 90% of average frame power | |

¹ All specifications referenced to the waveguide flange connection at test head

| | | |
|------------------------------|--|--|
| 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 (CW): ± 2.0 dB (+5 to -40 dBm), ± 3 dB (<-40 dBm) |
| RX Maximum Input Level | | VSG settable power range: +5 to -70 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 ± 0.1 ppm at 25°C) | < 30 minutes |

¹ All specifications referenced to the waveguide flange connection at test head

General and Environmental

| Parameters | Value |
|------------------------------------|--|
| Dimensions | Controller: 16.75" W x 7.4" H x 24" D (426 mm x 188 mm x 610 mm) Test head: 6.2" L x 4.8" D x 1.9" H (157mm x 122 mm x 45 mm) |
| Weight | Controller (Single module version): 37.8 pounds (17.1 kg) Vector test head and cable: 3.7 pounds (1.7 kg) |
| Power Consumption (maximum) | < 350 W |
| Power Consumption (average) | 150 W |
| Power Requirements | 100 - 240 VAC, 50-60 Hz |
| Supported Browsers | Google Chrome, Mozilla Firefox |
| Operating Temperature | +10°C to +40°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 30°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 Connector Torque | SMA: 7 lb-in (0.791 N-m) Test head cable: 5 lb-in (0.565 N-m) |
| Recommended Calibration Cycle | 12 months |
| Warranty | 12 months hardware, 12 months software updates |

Order Codes

| Code | Product |
|---------------|--|
| 0100-IGIG-004 | IQgig-RF Model B Test Controller and 1 Vector Test Head with controller cable |
| 0100-IGIG-005 | IQgig-RF Model B Test Controller and 2 Vector Test Heads with controller cables |
| 0100-IGIG-006 | IQgig-RF Model B Test Controller with 2 modules and 2 Vector Test Heads with controller cables |
| 0100-IGIG-007 | IQgig-RF Model B Test Controller with 2 modules and 4 Vector Test Heads with controller cables |
| 0300-IGIG-005 | WiGig 11ad software measurement suite |
| 0300-IGIG-007 | WiGig 11ay software measurement suite. Supports MCS 0 to 16, MCS 17-20 (64QAM). Requires WiGig 11ad SW license as a prerequisite. |
| 0150-IGIG-100 | 60 GHz Reference Horn Antenna with a UG-385 flange for WR-15 waveguide. Supports frequency range 50 - 75 GHz with a nominal 23 dBi gain. |
| 0150-IGIG-101 | 60 GHz mmWave Over-the-Air Test Chamber |

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