

# IXVERIWAVE® 11AX 8X8 APPLIANCE

## STRONG, COMPREHENSIVE WI-FI 11AX TESTING

### PROBLEM: COMPLEXITY OF WI-FI ECOSYSTEMS IS DIFFICULT TO TEST

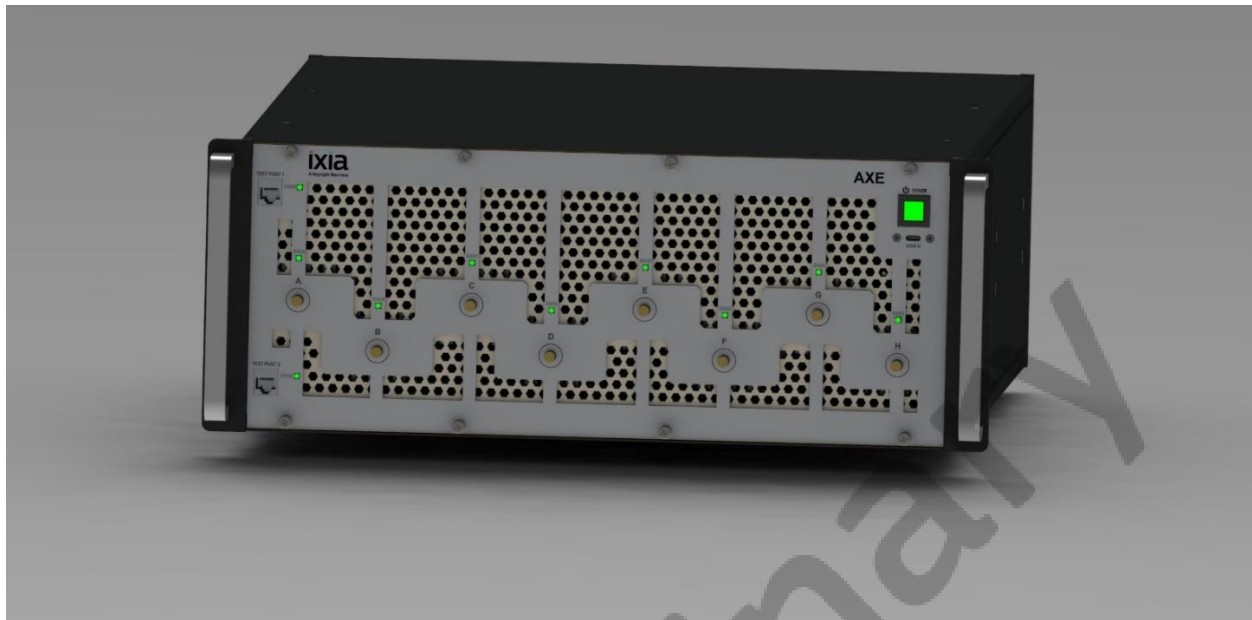
Wi-Fi has fast become the industry-leading technology for fixed and mobile high-speed IP access. 802.11ax introduces extensive Wi-Fi operation enhancements built on a new technology foundation. Users have high expectations that any application, at anytime, anywhere should work flawlessly. But the only way to ensure that it will work as it should requires assessment and validation of the entire Wi-Fi ecosystem—networks, access points (APs) and Internet of things (IoT) devices.

### SOLUTION:

The new IxVeriWave 11ax 8x8 Appliance is the world's most advanced Wi-Fi test solution. Supporting 500 stateful 802.11 clients per port (4000 per appliance), the appliance's load capability is an industry-first for evaluating the functionality and performance of IEEE 802.11-based WLAN networking products. Integrating control-plane simulation, traffic generation/analysis, and multi-path channel emulation capabilities on a single platform, it is a powerful, one-stop solution for validating 802.11-based products. Whether testing the access point (AP), IoT device, or network, IxVeriWave enables R&D labs to quickly and effectively validate Wi-Fi ecosystems.

## HIGHLIGHTS

- Precisely measure critical performance metrics at data rates reaching maximum theoretical limits, using up to 500 fully independent, stateful 802.11a/b/g/n/ac/ax clients per port
- Comprehensive 802.11ax feature testing with 8x8 MIMO and MU-MIMO
- Benchmark up to full theoretical PHY rates of 9.6Gbps
- Save time with simplified setup that includes single-click selection of desired channel model and pre-packaged scenarios
- Quickly determine real-world performance using built-in channel models for six typical WLAN multi-path scenarios
- Designed for full Wi-Fi performance and in-depth real-time analysis of Wi-Fi
- Model real-world scenarios with interference injection
- World's most advanced MU-MIMO test capability
- 160MHz and 80+80MHz channel bandwidth
- Gain full control over APs to build robust and functional IoT devices
- Achieve network scale with 64 fully-independent APs simulated per port
- Multiple port allocations, software controlled for 1 port 8x8, 2 port 4x4, 4 port 2x2 operation
- Supports both IxVeriWave and Ixia IoT test software



**IxVeriWave 11ax 8x8 Appliance**

## IXVERIWAVE GOLDEN CLIENT

The new 11ax 8x8 Appliance enables various types of validation, ranging from functional testing at the AP level to scale testing for a large 802.11 infrastructure network.

- Up to 500 fully independent and stateful 802.11 clients per port (4000 per appliance) enables precise measurement of critical performance metrics at data rates, reaching maximum theoretical limits
- Highly scaled setup in a single test-bed to validate real-world deployment levels of controllers, APs, and clients
- Ease of use through simplified setup, including single-click selection of desired channel model to be used on clients in a wide-array of IxVeriWave test suites
- Built-in channel models help determine real-world performance in six typical WLAN multi-path scenarios, per recommendations of IEEE 802.11n task group
- Full support of IEEE 802.11a/b/g/n/ac/ax traffic generation and analysis through simplified setup in a wide array of IxVeriWave test suites, applications, and WaveAutomation
- DFS pulse generation capability for DFS certification

## IXIA IoT GOLDEN AP

During the early stages of a product's lifecycle, device manufacturers need a stable test platform that can help them qualify functionality and baseline performance. Ixia's Golden AP is designed to do just that.

This is the only solutions in the market capable of simulating a fully configurable AP or an entire Wi-Fi network with multiple generations of APs (802.11 a/b/g/n/ac/ax SISO to 8x8 MIMO), from a single system.

Built from the ground up by Ixia, Golden AP features innovations that enable test realism to speed time-to-market for any Wi-Fi product—a must-have for any R&D lab.

## KEY FEATURES

- Fully configurable AP “Golden AP”, 802.11 a/b/g/n/ac/ax from SISO to 8x8 MIMO
- Enables network scale, 64 APs and clients simulated per port, to model Wi-Fi deployments and to test and optimize device performance
- Built-in traffic generation with line-rate throughput for benchmarking high-performance Wi-Fi devices
- Real-time statistics and analysis, continuous monitoring of WLAN traffic, and large FPGAs to analyze and compute statistics in real-time
- Distance simulation measures performance of IoT device at various distances without having to move the device
- Channel emulation recreates real-world channel conditions as defined by TGN specifications and highlights performance degradation

## RF ANALYSIS

Incorporating the functionality of three separate test products, Ixia’s RF Appliance is the world’s only test solution capable of testing from the RF layer to the application layer in a single, integrated solution.

Ixia’s 802.11ax solution introduces a radically new architecture that advances the state of the art for RF measurements in communication systems. Built from the ground up to be a full-rate, lab-grade RF and traffic test system without compromise, the solution includes RF traffic generator/analyzer modules for Layer 1-7 validation. Rather than limit the design by using the memory-buffer techniques common in existing vector signal analyzers (VSA) and vector signal generators (VSG), the RF Appliance is engineered with on-board horsepower to process each and every frame in real time, allowing worst-case measurements obtained over extended periods of time. This approach improves test cycles by expanding coverage while reducing test time.

Traditional memory-based VSAs limited by short sample intervals simply miss many events. Run all measurements at full rate and produce min, max, and average results over time. This approach provides RF engineers with a much-improved level of confidence in measurements as, without the limits of memory buffers, long aggregate frames critical to 802.11n/ac/ax performance boosts can be received and analyzed to ensure they are being transmitted coherently for their entire duration.

As a signal generator, the RF Appliance is much easier to use than traditional VSG solutions. In combination with Ixia’s WaveGen software, users can create a wide range of stimuli from simple tones to advanced, time-variant 802.11 a/b/g/n/ac/ax frames—using a simple point-and-click user interface. There’s no need to develop complex mathematical models to create IQ sequences as this functionality is entirely embedded.

Since the solution has no memory-length limitations, long aggregate frames can be easily created to test receivers’ ability to handle the performance-boosting aggregate frames. Users can generate complex sequences of frames that test receivers’ abilities to dynamically adjust to varying power levels, channel

impairments, PHY rates, and so forth as a complex sequence of frames are received. With no need to download waveforms into a memory buffer from the user's PC.

As with all IxVeriWave products from Ixia, RF Appliance also functions as a Layer 2 to 7 load module. Once RF testing is complete, users can begin leveraging the same load module to assess the performance of the fully integrated design. Capable of behaving as up to 500 fully independent, fully stateful clients per port, this is the fastest, most complete method of verifying functionality, benchmarking performance, and conducting system testing of 802.11ax APs.

Engineers can immediately leverage the full suite of existing IxVeriWave applications in conjunction with the RF Appliance and use the IxVeriWave solution's wide array of test tools and methodologies. As a bonus, users can switch between RF metrics and L2-7 metrics without having to change test setups or re-cable, dramatically improving test coverage while reducing test times once again.

## KEY FEATURES

- Real-time PHY layer frame generation and analysis
- Measure RF transmission characteristics such as EVM and spectral compliance
- Benchmark RF receiver performance using highly diverse and realistic traffic
- Generate MAC, IP, and Layer 4-7 traffic to characterize a fully integrated device's ability to forward traffic efficiently at rates up to the maximum possible with 802.11ax
- Apply different RF impairments at Layer 1 on a frame-by-frame or client-by-client basis
- Validate MU-MIMO 11ax beamforming accuracy
- Simple point-and-click application support for PHY-layer testing
- Up to 500 fully independent, stateful 802.11a/b/g/n/ac/ax clients per port enable precise measurement of critical performance metrics at data rates reaching up to maximum theoretical limits
- Built-in channel models help determine real-world performance in six typical WLAN multi-path scenarios in accordance with recommendations by the IEEE 802.11n task group
- Full support of legacy IEEE 802.11 a/b/g/n/ac/ax traffic generation and analysis for all existing IxVeriWave test suites, applications, and WaveAutomation capabilities

## ETHERNET

Ethernet Server Appliance capability provides a complete Layer 2-7 test module used to evaluate the functionality and performance of Ethernet-based networking products. Each Ethernet port generates fully interleaved, multi-protocol IP traffic from hundreds of independent Ethernet clients or servers at wire-speed and analysis.

## KEY FEATURES

- Up to 500 fully independent Ethernet clients/subscribers or servers per port enable precise measurement of critical performance metrics at data rates reaching up to 10Gbps
- Capable of generating wire-speed stateful TCP traffic and other traffic including raw Ethernet frames, UDP, RTP, etc.

- Complete control over MAC and IP address scheme including automatic addressing and incremental addressing per user-defined step sizes
- Wire-speed interleaved flow generation with unique ID, rate, timestamps, sequence numbers, data integrity signature, and flow group identifiers
- Real-time statistics to track up to 131,072 traffic flows and 16 user-customizable latency histogram buckets
- Industry-best simultaneous bi-directional (TX/RX) wire-speed packet capture support of 1GB on each port
- Ease of use through simplified set-up in a wide-array of IxVeriWave Test Suites and WaveAutomation

## 11AX APPLIANCE SPECIFICATIONS

### GENERAL CHARACTERISTICS

	11AX 8X8
<b>802.11 versions supported</b>	802.11a/b/g/n/ac/ax
<b>Frequency Range / Channels Supported</b>	<b>2.4 GHz:</b> 1-14
	<b>4.9 GHz:</b> 20-26
	<b>5.0 GHz:</b> 34, 36, 38, 40, 42, 44, 46, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140, 144, 149, 153, 157, 161, 165
<b>Channel Bandwidth</b>	20 MHz, 40 MHz, 80 MHz, 160 MHz, 80+80 MHz
<b>PLCP Type</b>	Legacy, HT, VHT, HE
<b>RF Connector(s)</b>	Male 50 Ω SMA Connector
<b>Test Ports per Appliance</b>	1, 2, 4
<b>MIMO Configurations</b>	<ul style="list-style-type: none"> <li>• 1 port of up to 8x8</li> <li>• Up to 2 ports of 4x4</li> <li>• Up to 4 ports of 2x2</li> </ul> <i>Other combinations under investigation</i>
<b>Maximum Number of Spatial Streams</b>	8

11AX 8X8	
<b>SU/MU-MIMO Support</b>	Both SU and MU MIMO Only supported in 4x4 or 8x8 configurations

BASEBAND CONTROL CHARACTERISTICS

11AX 8X8	
<b>Supported Modulation Schemes</b>	DBPSK, DQPSK, CCK (4bits), CCK (8bits), BPSK (1/2), BPSK (3/4), QPSK (1/2), QPSK (3/4), 16-QAM (1/2), 16-QAM (3/4), 64-QAM (2/3), 64-QAM (3/4), 64-QAM (5/6), 256-QAM (3/4), 256-QAM (5/6), 1024-QAM (3/4), 1024-QAM (5/6)
<b>IEEE Channel Models</b>	<ul style="list-style-type: none"> <li>• By-pass mode - does not impose any channel conditions</li> <li>• Model A - typical home/small office environment</li> <li>• Model B - typical medium office environment</li> <li>• Model C - typical large office environment</li> <li>• Model D - typical open space environment</li> <li>• Model E - typical large open space environment</li> <li>• Model F - complex environment with many scatters</li> </ul>
<b>Supported CCK Preamble Types</b>	Short and long
<b>OFDM guard Intervals</b>	400, 800, 1600, and 3200 ns
<b>Forward Error Correction</b>	LDPC / BCC(Viterbi)

RF FREQUENCY CONTROL CHARACTERISTICS

		11AX 8X8 RF	11AX 8X8
<b>Frequency Accuracy (NOMINAL)</b>	<b>Initial Accuracy</b>	+/- 0.2 ppm	+/- 1.0 ppm
	<b>Aging per year</b>	+/- 0.05 ppm	+/- 1.0 ppm

RF RECEIVER CHARACTERISTICS

	11AX 8X8 RF			11AX 8X8		
<b>Rx Maximum Input Power Level</b>	+10dBm					
<b>RSSI Accuracy (NOMINAL)</b>	+/- 1.0 dBm (over input range of +10 to -40 dBm)			+/- 1.0 dBm (over input range of +10 to 0 dBm)		
	+/- 2.5 dBm (over input range of -41 to -82 dBm)			+/- 2.5 dBm (over input range of -1 to -82 dBm)		
<b>Rx Minimum Sensitivity (NOMINAL)</b>	Modulation	Coding Rate	Minimum sensitivity (dBm) 20 MHz channel Spacing	Minimum sensitivity (dBm) 40 MHz channel Spacing	Minimum sensitivity (dBm) 80 MHz channel Spacing	Minimum sensitivity (dBm) 160 MHz channel Spacing
	BPSK	1/2	-82	-79	-76	-73
	BPSK	3/4	-81	-78	-75	-72
	QPSK	1/2	-79	-76	-73	-70
	QPSK	3/4	-77	-74	-71	-68
	16-QAM	1/2	-74	-71	-68	-65
	16-QAM	3/4	-70	-67	-64	-61
	64-QAM	2/3	-66	-63	-60	-57
	64-QAM	3/4	-65	-62	-59	-56
	64-QAM	5/6	-64	-61	-58	-55
	256-QAM	3/4	-59	-56	-53	-50
	256-QAM	5/6	-57	-54	-51	-48
	1024-QAM	3/4	-54	-51	-48	-45
	1024-QAM	5/6	-52	-49	-46	-43
	Receiver performance criteria are based on achieving a frame error rate of less than 10% using 4096 octet frames.					
<b>RX EVM (NOMINAL)</b>	The relative constellation RMS error, averaged over subcarriers, OFDM frames and packets for a data rate of 64-QAM with a coding rate of 5/6 is less than -41dB for power levels less than -10dBm.					

RF TRANSMITTER CHARACTERISTICS

	11AX 8X8 RF	11AX 8X8
<b>Transmit Center Frequency Tolerance</b> (NOMINAL)	Typical, 2.5ppm over all operating conditions	
<b>Transmit Power</b>	+14dBm to -60dBm	+14dBm to -60dBm
<b>Transmit Power Control Resolution</b>	1dB	1dB
<b>Transmit Power Absolute Accuracy</b> (NOMINAL)	Any single frame shall be generated with an absolute accuracy of +/- 1.0dB measured over the burst of that frame.  Multiple consecutive frames from the AP shall be generated such that the initial frame shall have an absolute accuracy of +/- 1.0dB. Subsequent frames shall be generated with an absolute accuracy of +/- 0.8dB.	Any single frame shall be generated with an absolute accuracy of +/- 2.0dB measured over the burst of that frame.  Multiple consecutive frames from the AP shall be generated such that the initial frame shall have an absolute accuracy of +/- 2.0dB. Subsequent frames shall be generated with an absolute accuracy of +/- 1.0dB.
<b>Transmit Constellation Error*</b>	The relative constellation RMS error, averaged over subcarriers, OFDM frames and packets for a data rate of 64-QAM with a coding rate of 5/6 is less than:	
	<b>Power level greater or equal to -10dbm</b>	
	Nominal	Nominal
	-36dB (1.585%)	-35dB (1.778%)
	<b>Power level less than -10dBm</b>	
	Nominal	Nominal
	-41dB (0.891%)	-37db (1.413%)
*Measured on a per radio basis transmitting a single 20MHz spatial stream.		



	11AX 8X8 RF		11AX 8X8		
<b>Minimum Signal to Noise Ratio</b> (Nominal)	<b>Power</b>	<b>Bandwidth (MHz)</b>			
	(dBm)	20	40	80	160, 80+80*
	-34 to +14	62 dB	59 dB	56 dB	53 dB
	-40 to -35	57 dB	54 dB	51 dB	48 dB
	Below -41	Power +97dB	Power +94dB	Power +91dB	Power +88dB

IXVERIWAVE FEATURE CHARACTERISTICS

11AX 8x8	
<b>Aggregation</b>	Tx and Rx: A-MPDU and Block-ACK Tx and Rx: A-MSDU
<b>Traffic Timestamp Accuracy</b>	50 nS
<b>Maximum Number of Stateful Clients per Port</b>	500
<b>Maximum Number of Traffic Flows Generated per Port</b>	1000
<b>Maximum Number of Traffic Flows Analyzed per Port</b>	131,000
<b>802.11 MAC Control (all parameters)</b>	Independent per client
<b>802.1x Authentication</b>	PEAP/MSCHAPv2, TLS, LEAP/EAP-FAST, TTLS
<b>Encryption Support</b>	WEP-40 and WEP-104, TKIP (WPA), AES-CCMP (WPA2)
<b>OSI Layer 3 and Layer 4 (IP, UDP, TCP, etc.) Control (all parameters)</b>	Independent per client
<b>Port Counters</b>	Comprehensive set of Layer 2, 3, and 4 frame types

11AX 8x8	
<b>Flow and Flowgroup Counters</b>	Frames sent / received, bytes sent / received, out-of-order frames, payload integrity, latency histogram
<b>IPv6</b>	<ul style="list-style-type: none"> <li>• NDP: Neighbor/router discovery and address assignment</li> <li>• ICMPv6 &amp; DHCPv6</li> <li>• Multicast Listener Discover (MLDv1, MLDv2)</li> <li>• Dual stack operation of both IPv4 and IPv6</li> <li>• UDP, RTP, stateful TCP, and multicast flows</li> <li>• Max of 32 IPv6 addresses per client: One Link-local, up to 31 Global</li> </ul>
<b>Capture Buffer</b>	<ul style="list-style-type: none"> <li>• 1 GB</li> <li>• Captures all transmitted and received frames during normal testing</li> <li>• Adds IxVeriWave Radio Tap header to provide additional debugging information such as PHY rate, RF power, aggregation, detected errors on per-frame basis</li> </ul>

## IXIA IOT FEATURE CHARACTERISTICS

11AX 8X8	
<b>Aggregation</b>	Tx and Rx: A-MPDU and Block-ACK Tx and Rx: A-MSDU
<b>Traffic Timestamp Accuracy</b>	50 nS
<b>802.11 MAC Control (all parameters)</b>	Independent per client
<b>OSI Layer 3 and Layer 4 (IP, UDP, TCP, etc.) Control (all parameters)</b>	Independent per client
<b>Flow and Flowgroup Counters</b>	Frames sent / received, bytes sent / received, out-of-sequence frames, payload integrity, smoothed inter-arrival jitter, burst loss, offered load, forwarding rate, aggregation

11AX 8X8	
<b>Client (DUT) Counters</b>	Probe handshake count, authentication handshake count, association handshake count, DHCP handshake count, ARP handshake count, BlockACK handshake count, Rx Deauthentication frames, Rx Disassociation frames, Rx Management frames PHY rate, HT/VHT Management frames received, Management frame RSSI, Tx CTS count, Tx RTS count, Tx Data PHY rate, Tx Management PHY rate, Tx Data MCS Index, Tx Data PHY type, Guard Interval, Tx Data signal bandwidth, Tx data number of spatial streams
<b>Port Counters</b>	Tx/Rx flow medium utilization, Tx Failed ACK frames, Rx FCS errored frames, Tx Failed ACK frames per second, Rx FCS errored frames per second

SIGNAL ANALYZER MEASUREMENTS

11AX 8x8 RF	
<b>Power</b>	Average Power
	Peak Power
	Power Spectral Density
	Power Peak Excursion
	Power-on / Power-down
<b>Frequency</b>	Center Frequency Tolerance
	Symbol Clock Frequency Tolerance
	Preamble Frequency Error
	RF Carrier Suppression
<b>Spectral</b>	Transmit Spectrum Mask
	Spectral Flatness
	Transmit Center Frequency Leakage
	CCDF
	Occupied Bandwidth

11AX 8x8 RF	
<b>Modulation</b>	Constellation Error
	Error Vector Magnitude (EVM)
	Transmitter Modulation Accuracy
<b>I/Q</b>	Gain Mismatch
	Phase Mismatch

SIGNAL/FRAME GENERATION CONTROLS

11AX 8X8	
<b>Frame Generation</b>	Encoding
	Length
	Frame Transmission Rate
<b>Modulation</b>	a/b/g/n/ac/ax PHY Rates
	Preamble
	FEC
<b>Impairments</b>	Frequency Offset
	Pre/post Encoder Bit Errors
	IEEE Channel Models A-F

ETHERNET SPECIFICATIONS

11AX 8x8	
<b>Number of Ports</b>	2
<b>Number of Interleaved Flows</b>	2000
<b>Connector Type</b>	RJ45

11AX 8x8	
<b>Ethernet PHY Type</b>	1/2.5/5/10 Gbps 10GBASE-T
<b>Transmit Capability</b>	Wire-speed hardware frame generation with timestamps, sequence numbers, data integrity signature, and flow group identifiers
<b>Receive Capability</b>	Wire-speed frame filtering, data integrity, and sequence checking, capture, real-time latency measurement on each flow
<b>Maximum Number of Stateful Clients per Port</b>	<ul style="list-style-type: none"> <li>• 500 per port</li> <li>• Up to 1,000 total</li> </ul>
<b>User Defined Field Modifier (per flow)</b>	Increment or decrement by user-defined step; up to 256 bytes from start of frame
<b>Frame Length Control</b>	Fixed, increment by user-defined step or automatic
<b>Statistics and Rate Counters</b>	Link State, Line Speed, Frames Sent, Signature Valid Frames Received, Signature Error Frames Received, Bytes Sent/Received, Fragments Received, Undersize, Oversize, VLAN Tagged Frames, Per User Priority QoS counters, FCS errors, Bad Sequence Errors, Bad Payload Checksum, ARP, DHCP and Ping requests and replies, IP/ICMP/UDP/TCP checksum errors, IP Multicast packets, Sent/Received IP Packets
<b>Flow Analysis</b>	Real-time statistics to track up to 131,072 flows
<b>Time-Stamp Accuracy</b>	50 ns resolution
<b>IPv4, UDP, TCP</b>	Hardware checksum generation
<b>IPv6</b>	<ul style="list-style-type: none"> <li>• NDP: Neighbor/router discovery and address assignment</li> <li>• ICMPv6 and DHCPv6</li> <li>• Multicast listener discover (MLDv1, MLDv2)</li> <li>• Dual-stack operation of both IPv4 and IPv6</li> <li>• UDP, RTP, stateful TCP, and multicast flows</li> <li>• Max of 32 IPv6 addresses per client: One Link-local, up to 31 Global</li> </ul>

## ENVIRONMENTAL

11AX 8X8	
<b>PHYSICAL SPECIFICATIONS</b>	
<b>Weight</b>	TBD Estimate (50 lbs (22.8 kg))
<b>Size</b>	TBD Estimates: <ul style="list-style-type: none"> <li>• Height: 5.25 inches (13.4 cm) [3U]</li> <li>• Width: 19 inches (48.3 cm)</li> <li>• Depth: 28 inches (71.2 cm)</li> </ul>
<b>Mounting Screw Torque</b>	3.5 inch-lbs
<b>SMA Cable Torque</b>	8 inch-lbs
<b>ENVIRONMENTAL CHARACTERISTICS</b>	
<b>Temperature</b>	Operating +5° to +25° C ambient Storage: -20° to +70° C
<b>Humidity</b>	Operating: 20% to 80% relative humidity Storage: +40° C at 95% relative humidity, non-condensing
<b>Altitude</b>	Operating: -1000 ft. to +6560 ft. (2000 meters)
<b>Vibration, Random</b>	Operating: 5 Hz to 500 Hz, 0.27 GMS Non-operating: 5 Hz to 500 Hz, 2.3G
<b>Shock</b>	2G shock tolerance
<b>Sound Level</b>	69 dB(A)
<b>RF Isolation</b>	Isolation: > 80 dBm isolation between Wi-Fi radios

## POWER SPECIFICATIONS

11AX 8X8	
<b>Max Power</b>	TBD Estimate (1800 Watts)
<b>CERTIFICATIONS</b>	
<b>Product Safety Compliance</b>	Listed TUV-USA and TUV-Canada Low Voltage Direction EN 61010-1:2010
<b>Electromagnetic Compliance</b>	EU EMC Directive 89/336/ECC, as amended EN 61000-6-2:2001: Class B Radiated Emissions EN 55011(AMD. A1:1999) Class B Conducted Emissions EN 61000-3-2:2000: Current Harmonics EN 61000-3-3:2001: Voltage Fluctuations EN 61000 -6-2:2001: Immunity Class A part 15 FCC Standards for Radiated and Conducted Emissions

## FUNCTIONAL TEST CERTIFICATION

The Appliance will undergo functional test certification before shipment to ensure the equipment performs as expected under Ixia's procedures. Appliance performance characteristics are detailed in this datasheet. The functional test certification includes RF radio functional tests. Customers can elect to recertify their Appliance depending on their specific requirements. It is recommended that RF Appliances are returned on a yearly basis for functional test certification to ensure continued as expected operation.

## ORDERING INFORMATION

**980-2092**

11ax 8x8 L2-7 Multiport Appliance High Performance Traffic Generator and Performance Analyzer for IxVeriWave with 20/40/80/160MHz Bandwidth. Multiple configurations includes 2x 10/5/2.5/1 Gbps Ethernet ports. Includes 11ax operation and legacy 11a/b/g/n/ac.

Preliminary

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