TECHNICAL SPECIFICATIONS

IQgig-UWB+™

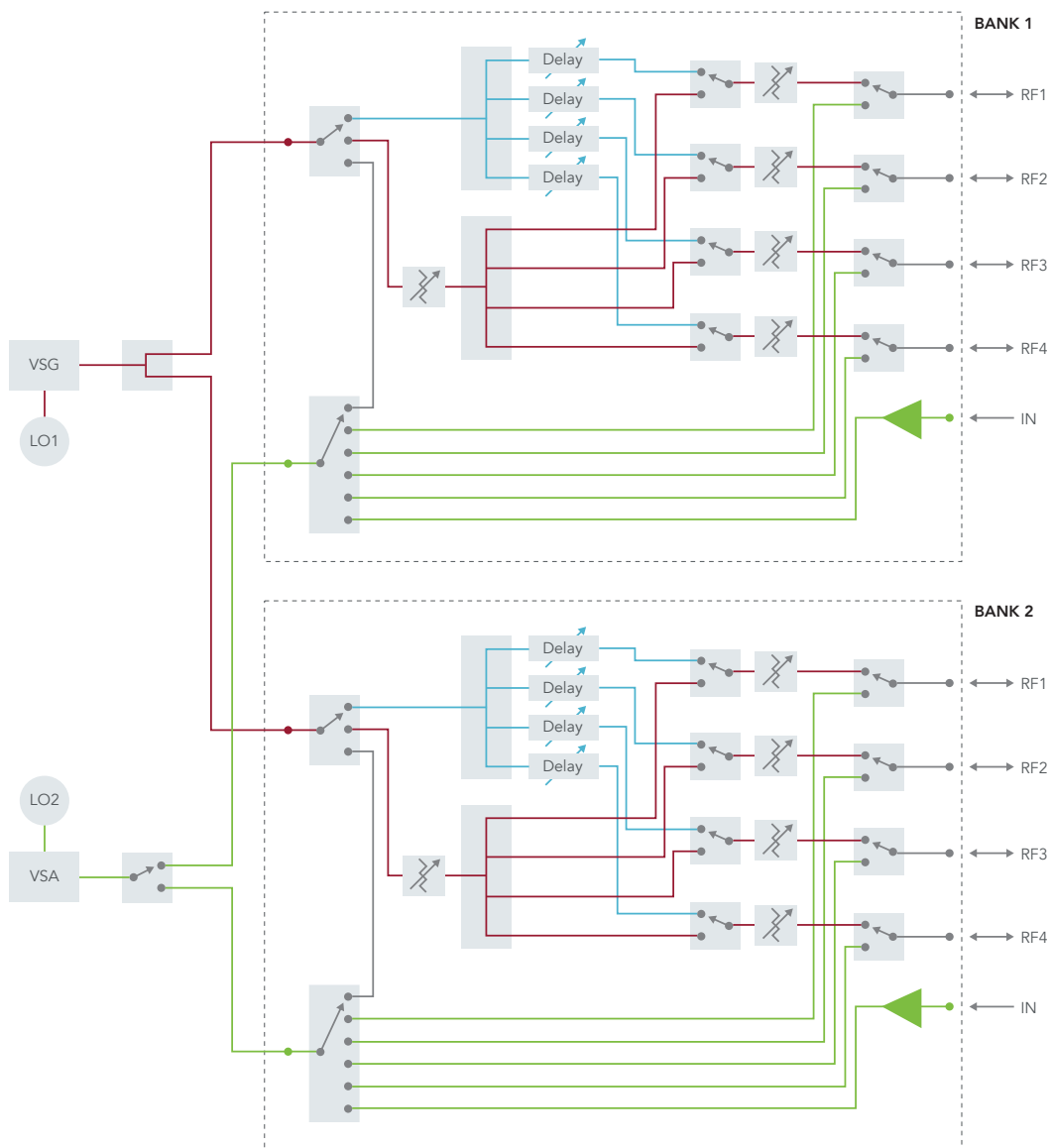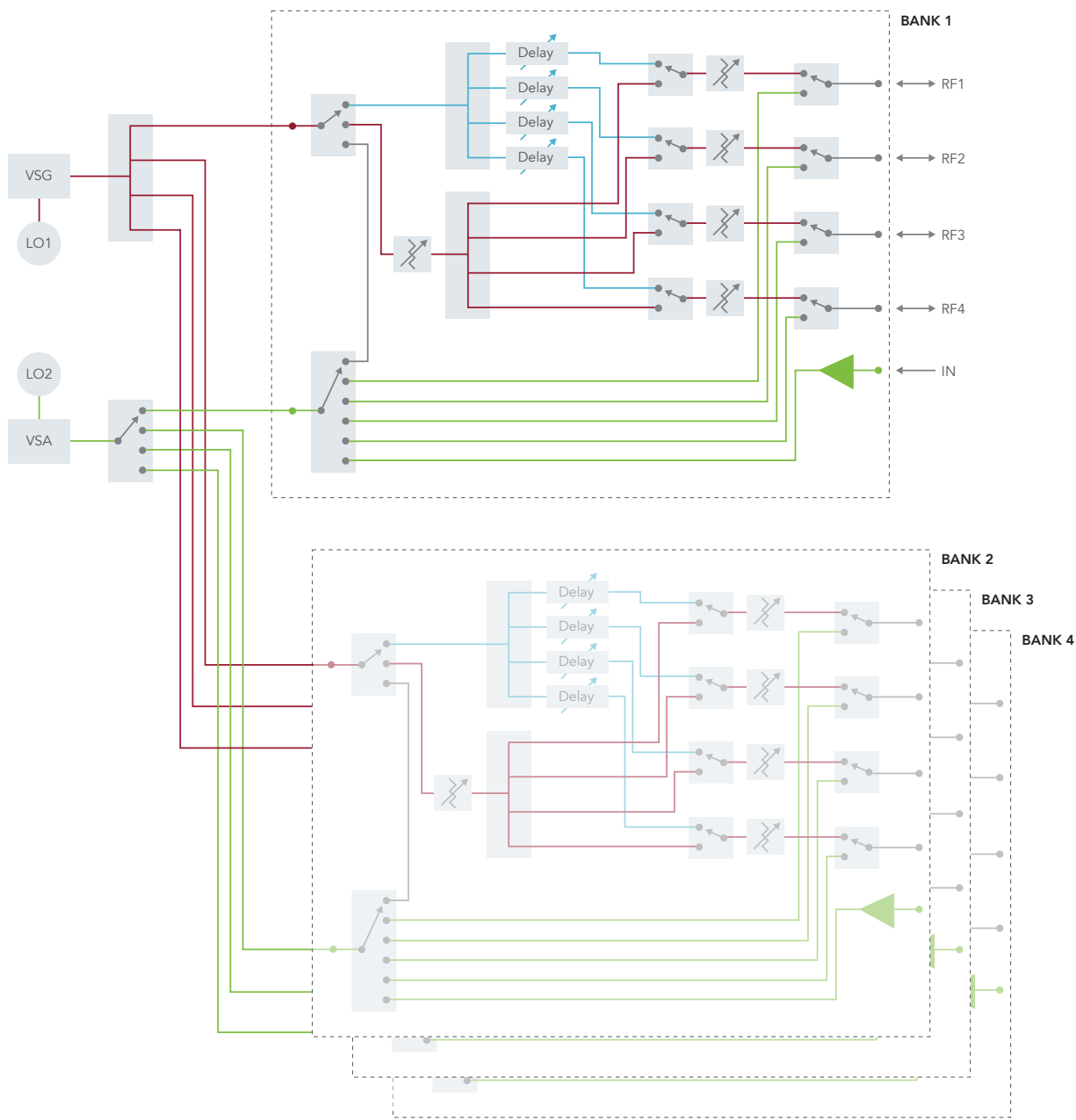**LITEPOINT**

Overview

The IQgig-UWB+ is a versatile instrument that covers the full range of PHY UWB test case scenarios for 802.15.4z and 802.15.4ab, including AoA measurements with programmable per-port delay line control and high dynamic range OTA testing using the built-in LNA. With its robust design and compact one-box solution, the IQgig-UWB+ simplifies cabling and eliminates the need for external switches, combiners, attenuators, and delay line instruments.
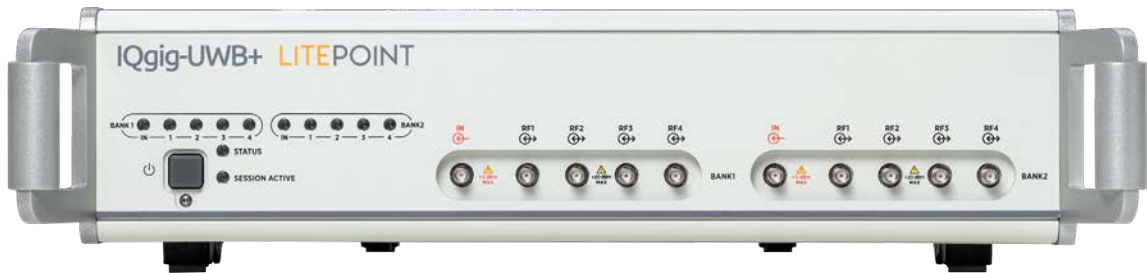
10-Port Functional Block Diagram
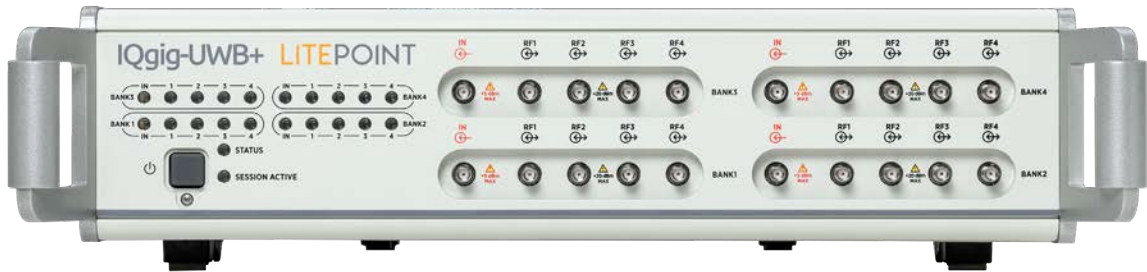
20-Port Functional Block Diagram

BANK 1

Delay
Delay
Delay
Delay

RF1
RF2
RF3
RF4
IN

VSG
LO1
LO2
VSA

BANK 2
BANK 3
BANK 4

Delay
Delay
Delay
Delay

Port Descriptions

Front Panel

5- and 10-port IQgig-UWB+

20-port IQgig-UWB+

I/O	Function	Type
Power Switch	Power On/Off	Pushbutton Switch
Power Indicator	LED Off - AC switch on the back panel is turned off or the AC power cable is not connected LED Solid Red - test system is in standby mode LED Blinking Red - test system is powering off LED Blinking Green - test system is booting up LED Solid Green - test system is powered on	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
RF Port Indicator (10 or 20)	LED Green - port is a VSA input LED Orange – port is in VSG Delay mode LED Red - port is a VSG output	LED indicator

Bank 1 RF1/RF2/RF3/RF4	RF Input/Output	SMA female
Bank 1 IN	RF Input	SMA female
Bank 2 RF1/RF2/RF3/RF4	RF Input/Output	SMA female
Bank 2 IN	RF Input	SMA female
Bank 3 RF1/RF2/RF3/RF4 (20-port only)	RF Input/Output	SMA female
Bank 3 IN (20-port only)	RF Input	SMA female
Bank 4 RF1/RF2/RF3/RF4 (20-port only)	RF Input/Output	SMA female
Bank 4 IN (20-port only)	RF Input	SMA female

Back Panel

I/O	Function	Type
10 MHz REF IN	10 MHz reference input	BNC female
10 MHz REF OUT	10 MHz reference output	BNC female
TRIG/MKR 1	TTL trigger input / output	BNC female
TRIG/MKR 2	TTL trigger input / output	BNC female
HDMI	Video output	HDMI
LAN	1000 Base-T LAN	RJ45
USB (4 ports)	USB 3.0 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
DATA 1	DATA 1 connection	iPass PCIe x4
DATA 2	DATA 2 connection	iPass PCIe x4
AUX 1	General purpose I/O	iPass
AUX 2	General purpose I/O	iPass
AUX 3	General purpose I/O	iPass
TRIG I/O	TRIG/MKR extender port	iPass

General Hardware Specifications

Vector Signal Analyzer (VSA)

Parameter	Ports	Value	
Frequency Range	IN, RF1 to RF4	5.6 GHz to 10.2 GHz (Carrier Frequency) 4.9 GHz to 10.9 GHz (Input RF Spectrum)	
Bandwidth	IN, RF1 to RF4	1.4 GHz	
Maximum Input Power	IN	+5 dBm peak	
	RF1 to RF4	+20 dBm peak	
Input Power Accuracy	IN	±1 dB (-70 to -10 dBm) (CW)	
	RF1 to RF4	±1 dB (-50 to +20 dBm) (CW)	
Input Return Loss	IN	> 8 dB	
	RF1 to RF4	> 10 dB (≤ 6 GHz), > 11 dB (6 to 9 GHz), > 8 dB (≥ 9 GHz)	
Spurious[1]	IN, RF1 to RF4	< -60 dBc (CW) at Input Power = -10 dBm	
Spectral Flatness	IN, RF1 to RF4	≤ 1.4 dB; MAX-MIN (± 700 MHz)	
Image Rejection	IN, RF1 to RF4	< -40 dBc (CW) at Input Power = -10 dBm	
Carrier Leakage	IN, RF1 to RF4	< -50 dBc (CW) at Input Power = -10 dBm	
Spurious Floor (no signal, at minimum input attenuation)	IN	≤ -100 dBm	
	RF1 to RF4	≤ -85 dBm	
Noise Figure (at minimum input attenuation)	IN	< 7 dB (≤ 9 GHz), < 10 dB (> 9 GHz)	
	RF1 to RF4	< 21 dB (≤ 9 GHz), < 24 dB (> 9 GHz)	
Integrated Phase Noise[1]	IN, RF1 to RF4	< 0.35 degrees (100 kHz to 100 MHz)	
VSG/VSA Isolation (at maximum output power, VSG mode)	RF1 to RF4	> 50 dB (≤ 9 GHz), > 45 dB (> 9 GHz)	
Digitizer Resolution	IN, RF1 to RF4	14 bits	
Digitizer Sampling Rate	IN, RF1 to RF4	300, 600, 1200, 2400 MHz	
Waveform Capture Duration	IN, RF1 to RF4	at 300 MHz sampling data rate	1789 ms
		at 600 MHz sampling data rate	894 ms
		at 1200 MHz sampling data rate	447 ms
		at 2400 MHz sampling data rate	223 ms

1 Tested at UWB channel center frequencies from Channel 5 to 15

Vector Signal Generator (VSG)

Definitions of the Modes
VSG Mode: One port active, no delay applied
VSG Broadcast Mode: 2 or more ports active, no delay applied
VSG Delay Mode: 2 or more ports active, delay applied

Parameter	Ports	Value
Frequency Range	RF1 to RF4	VSG Mode, VSG Broadcast Mode: 5.6 GHz to 10.2 GHz (Carrier Frequency) 4.9 GHz to 10.9 GHz (Output RF Spectrum) VSG Delay Mode: 5.9 GHz to 10.2 GHz (Output RF Spectrum)
Bandwidth	RF1 to RF4	1.4 GHz
Output Power Range (CW)	RF1 to RF4	VSG Mode: -110 to -10 dBm VSG Broadcast Mode: -110 to -20 dBm VSG Delay Mode: -110 to -30 dBm
Output Power Accuracy (CW)	RF1 to RF4	VSG Mode: ±1.0 dB VSG Broadcast Mode: ±1.5 dB VSG Delay Mode: ±1.5 dB
Output Return Loss	RF1 to RF4	> 11 dB (≤ 9 GHz), > 8 dB (> 9 GHz)
Spurious (in channel)[1]	RF1 to RF4	< -45 dBc
Image Rejection	RF1 to RF4	< -35 dBc
Spectral Flatness	RF1 to RF4	≤ 1.4 dB; MAX-MIN (±250 MHz for VSG Delay Mode, ±700 MHz for all other modes)
Integrated Phase Noise	RF1 to RF4	< 0.35 degrees (100 kHz to 100 MHz)
Carrier Leakage	RF1 to RF4	< -45 dBc (Output Power = -10 dBm)
Maximum Settable Output Power Difference Between Ports (Broadcast Mode)	RF1 to RF4	20 dB
Delay Line Step Resolution (VSG Delay Mode)	RF1 to RF4	1 ps
Delay Step Accuracy (VSG Delay Mode)	RF1 to RF4	±2 ps (nominal)
Delay Line Maximum Delay (VSG Delay Mode)	RF1 to RF4	80 ps (nominal)
Frequency Settling[2]	RF1 to RF4	< 500 µs
Generator Resolution	RF1 to RF4	14 bits
Generator Sampling Rate	RF1 to RF4	300, 600, 1200, 2400 MHz

1 Tested at UWB channel center frequencies from Channel 5 to 15
2 In Sequence Mode

Waveform Playback Duration	RF1 to RF4	at 300 MHz sampling data rate	480 ms
		at 600 MHz sampling data rate	240 ms
		at 1200 MHz sampling data rate	120 ms
		at 2400 MHz sampling data rate	60 ms

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

TTL Trigger Input/Output

Parameters	Value
Impedance	5 kΩ nominal
Trigger Input Level	3.5 V – VIH 1.5 V – VIL
Trigger Output Level	3.8 V to 4.9 V – V(OH), 32 mA max 0.1 V to 0.55 V – V(OL), 32 mA max

Frequency Reference Input

Parameters	Value
Frequency	10 MHz
Input Voltage Range	+1 to +16 dBm (0.7 Vp-p to 4.0 Vp-p)
Impedance	50 Ω

Frequency Reference Output

Parameter	Range
Frequency	10 MHz
Output Voltage	+8.5 dBm minimum (1.7 Vp-p) +11.0 dBm nominal (2.2 Vp-p)
Impedance	50 Ω

General and Environmental

Parameters	Value
Dimensions	14.75" W x 3.5" H x 22.4" D (375 mm x 89 mm x 569 mm)
Weight	5-port: 24.7 pounds (11.2 kg) 10-port: 26.6 pounds (12.1 kg) 20-port: 30.4 pounds (13.8 kg)
Power consumption (maximum)	5/10-port: 600 W 20-port: 640 W
Power consumption (average)	5/10-port: 210 W 20-port: 230 W
Power requirements	100 - 240 VAC, 50-60 Hz
Supported browsers	Google Chrome, Mozilla Firefox
Operating temperature	+10°C to +55°C
Storage temperature	-20°C to +70°C (IEC EN60068-2-1, 2, 14)
Specification validity temperature	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
Recommended connector torque	7.5 in-lbs (85 N-cm) Recommended 9 in-lbs (107 N-cm) Maximum
Recommended calibration cycle	12 months
Warranty	12 months hardware, 12 months software updates

UWB Measurement Specification

Measurement	Description
Spectrum Mask (PSD)	Transmit spectrum mask
Symbol Modulation Accuracy	Correlation to reference pulse (%)
Carrier Frequency Offset	Carrier frequency error (kHz and ppm)
Chip Clock Error	Chip rate clock error (ppm)
Pulse Main Lobe Width	Width of main lobe in time (ns)
Pulse Side Lobe Power	Power relative to main lobe (%)
Power (Preamble & Data)	Average power of complete data capture (dBm)
Peak Power (Preamble & Data)	Peak power over all symbols (dBm)
Pulse Jitter	Variation in the peaks of the pulses in time domain (ps)
Pulse NMSE	Normalized Mean Square Error to reference pulse shape (ppm)
FiRa NRMSE	Normalized Root Mean Square Error (%)
FiRa Packet Format Check	Header and data format
RX PER	Receiver Packet Error Rate (requires DUT support)
NBA-MMS Switching Time (802.15.4ab)	Measures the time interval between the start of Narrowband and the start of MMS packets
UWB Sensing Time Domain Mask (802.15.4ab)	Measures the baseband impulse response for time-bounded Kaiser pulse for UWB Sensing packets

Order Codes

Code	Product
0100-IUWB-051	IQgig-UWB+ test System 4 RF ports active, an OTA port disabled, with programmable delay control disabled.
0100-IUWB-052	IQgig-UWB+ test System with 4 RF ports active, an OTA port active, with programmable delay control disabled.
0100-IUWB-053	IQgig-UWB+ test System with 4 RF ports active, an OTA port disabled, with programmable delay control enabled.
0100-IUWB-054	IQgig-UWB+ test System with 4 RF ports active, an OTA port active, with programmable delay control enabled.
0100-IUWB-101	IQgig-UWB+ test System with 8 RF ports active, 2 OTA ports disabled, with programmable delay control disabled.
0100-IUWB-102	IQgig-UWB+ test System with 8 RF ports active, 2 OTA ports active, with programmable delay control disabled.
0100-IUWB-103	IQgig-UWB+ test System with 8 RF ports active, 2 OTA ports disabled, with programmable delay control enabled.
0100-IUWB-202	IQgig-UWB+ test System with 16 RF ports active, 4 OTA ports active, with programmable delay control disabled.
0100-IUWB-203	IQgig-UWB+ test System with 16 RF ports active, 4 OTA ports disabled, with programmable delay control enabled.

All configurations include UWBP measurement suite and 1-year hardware warranty.

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