TECHNICAL SPECIFICATIONS

LitePoint IQxstream™

LITEPOINT

© 2019 LitePoint, A Teradyne Company.
All rights reserved.

IQxstream is a manufacturing oriented, physical layer communication system tester, tailored to verifying performance in high volume production environments. Non-signaling physical layer testers offer 3x or better test throughput when compared against signaling based methodologies typical of R&D and conformance testing. IQxstream addresses all major mobile technologies and RF bands including: LTE, W-CDMA / HSPA / HSPA+, GSM / EDGE, CDMA2000 / 1xEV-DO and TD-SCDMA in support of the Smartphone, Tablet, Data-Card, Module, IoT, and Small Cell base station markets.

IQxstream provides comprehensive non-signaling test coverage for LTE, LTE-Advanced, and LTE-Advanced Pro devices and modules. LTE device test coverage includes UE categories 1 through 12 as well as IoT UE categories 0 (Cat-M1) and Cat-NB1 (NB-IoT).

One Instrument – Three Configurations

Available in a Single DUT or 4 DUT configuration, the single Cellular Test Module IQxstream is available with 2 RF Ports or 5 RF Ports enabled.

2-Port configuration for Single DUT
Useful in a lab environment or on a troubleshooting station where multi-DUT capability is not required, the single DUT version of IQxstream provides all the functionality of a multi-DUT solution at reduced cost.

5-Port configuration for 4 DUT
Fully capable of testing today's and tomorrow's Smart Devices and Small Cells, the 4 DUT unit provides support for full TX/RX physical layer testing including the ability to test diversity receivers. In addition to diversity testing, the streaming port can be used to send other waveforms to the DUT such as GPS, GLONASS and UHF TV.

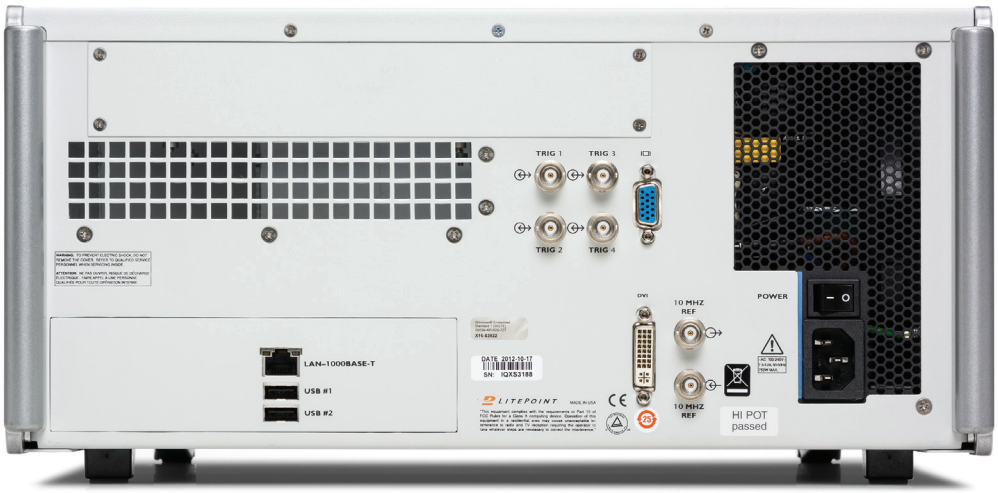
10-Port configuration for 8 DUT SISO / 4 DUT MIMO
Whether your need is to test 8 DUTs in parallel or 4 DUTs with MIMO only the dual Cellular Test Module configuration will do. Capable of generating two independent waveforms, this IQxstream is ready for tomorrow's complex mobile devices with a total of 8 full-featured duplex ports and 2 streaming ports. This configuration has the ability to feed two separate ports on the DUT with completely independent non-coherent waveforms of different levels and data/fading patterns.

Note: A single Cellular Test Module unit can be service center upgraded to a dual unit.

Port Descriptions

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
USB (2)	USB I/O	Type A
RF 1A	VSG / VSA Port	N female
RF 2A	VSG / VSA Port	N female
RF 3A	VSG / VSA Port	N female
RF 4A	VSG / VSA Port	N female
STRM 1A	1st VSG Streaming Port	N female
RF 1B	2nd VSG and VSA Port	N female
RF 2B	2nd VSG and VSA Port	N female
RF 3B	2nd VSG and VSA Port	N female
RF4 B	2nd VSG and VSA Port	N female
STRM 1B	2nd VSG Streaming Port	N female



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

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	1000 Base-T LAN	RJ-45

General Hardware Specifications

Vector Signal Analyzer (VSA)

Parameters	Ports	Value
RF frequency range	RF1A to RF4A, RF1B to RF4B	400 MHz to 3000 MHz 400 MHz to 3800 MHz (option)
RF maximum input power	RF1A to RF4A, RF1B to RF4B	+33 dBm (average power) +36 dBm (peak envelope power PEP)
Capture (IF) bandwidth	RF1A to RF4A, RF1B to RF4B	100 MHz
Digitizer resolution		14 bits
Effective sample rates		150 MHz, 37.5 MHz, 9.375 MHz
Capture memory depth		64 Msamples
Frequency resolution		0.1 Hz
Input impedance	RF1A to RF4A, RF1B to RF4B	50 Ω (nominal)
Power measurement accuracy	RF1A to RF4A, RF1B to RF4B	<+/- 0.4 dB (input > -40 dBm), 400 to 3000 MHz <+/- 0.5 dB (input > -40 dBm), > 3000 MHz <+/- 0.3 dB typical (input > 0 dBm), < 2700 MHz
Noise figure	RF1A to RF4A, RF1B to RF4B	< 27 dB, (MIN attenuation), 400 to 3000 MHz < 29 dB (MIN attenuation) >3000 MHz
Signal to noise ratio	RF1A to RF4A, RF1B to RF4B	≥ 100 dB (RBW = 1 kHz) (level > 0 dBm)
VSWR[1]	RF1A to RF4A, RF1B to RF4B	< 1.5 : 1 (RL > 14 dB) 400 to 800 MHz < 1.2 : 1 (RL > 20 dB) ≥800 to 2400 MHz < 1.5 : 1 (RL > 14 dB) ≥2400 to 3000 MHz < 1.67 : 1 (RL > 12 dB) ≥3000 to 3500 MHz < 2.1 : 1 (RL > 9 dB) ≥3500 to 3800 MHz
Port switching time[2]	RF1A to RF4A, RF1B to RF4B	< 50 µs to within 0.1 dB power level
Isolation	From "OFF" port to VSA with 1 Port Active	> 30 dB (Duplex operation VSA / VSG)
		> 70 dB (VSG OFF)
	Port to Port	
		> 50 dB (all VSG ports ON, 1 VSA ON)
		> 90 dB (1 Port set to VSG/VSA ON)
	VSG on 1 Port to "OFF" port	> 70 dB
	Module 1 to Module 2 (any port)	> 90 dB
	STRM1 to RF1 – RF4	> 70 dB
	STRM 1A to STRM 1B	> 30 dB
Inherent spurious signals floor	RF1A to RF4A, RF1B to RF4B	≤ -95 dBm (no input signal applied)

[1] VSWR spec for when RF port is active. When RF port is not active, the port is in a 50Ω termination state.
[2] When using hardware sequencing control

Parameters	Ports	Value
Input third order intercept point (IIP3)	RF1A to RF4A, RF1B to RF4B	> 47 dBm (at MAX attenuation)
Non-harmonic attenuation	RF1A to RF4A, RF1B to RF4B	> 50 dB (input levels < +5 dBm) (700 MHz ≤ frequency ≤ 3800 MHz)
		> 45 dB (input levels < +5 dBm) (frequency < 700 MHz)
VSA trigger level absolute range	RF1A to RF4A, RF1B to RF4B	-50 to+ 33 dBm (at 9.375 MHz sample rate)
VSA trigger level relative range	RF1A to RF4A, RF1B to RF4B	0 to -40 dB (relative to input signal)
RF trigger level absolute range	RF1A to RF4A, RF1B to RF4B	-35 dBm to + 30 dBm
RF trigger level programmable range	RF1A to RF4A, RF1B to RF4B	0 dBm to -35 dBm
RF trigger level accuracy	RF1A to RF4A, RF1B to RF4B	+/- 2 dB of level set point
Phase noise		< -110 dBc/Hz (250 kHz to 400 kHz offset)

Vector Signal Generator (VSG)

Parameters	Ports	Value
RF frequency range	RF1A to RF4A, RF1B to RF4B	400 MHz to 3000 MHz 400 MHz to 3800 MHz (option)
	STRM 1A, STRM 1B	400 MHz to 3000 MHz
RF output power range	RF1A to RF4A, RF1B to RF4B	-5 to -130 dBm, 400 to 3000 MHz -15 to -130 dBm, > 3000 MHz
	STRM 1A, STRM 1B	+10 to -140 dBm, 400 to 3000 MHz
Frequency resolution		0.1 Hz
Power level resolution		0.01 dB
Per port output attenuation range	RF1A to RF4A, RF1B to RF4B	20 dB range with 0.25 dB step resolution. VSG accuracy specifications valid over 10 dB range
Digitizer resolution		16 bits
Effective sample rates		150 MHz, 37.5 MHz, 9.375 MHz
Memory depth		64 Msamples
Signal generation bandwidth (IF)	RF1A to RF4A, RF1B to RF4B	100 MHz
	STRM 1A, STRM 1B	
Power level settling time[1]	RF1A to RF4A, RF1B to RF4B STRM 1A, STRM 1B	< 50 us to within 0.1 dB
Frequency level settling time[1]	RF1A to RF4A, RF1B to RF4B, STRM 1A, STRM 1B	< 400 us to within 1 kHz <1.4 ms for freq. change from >500 MHz to <500 MHz

[1] When using hardware sequencing control

Parameters	Ports	Value
Output power accuracy	RF1A to RF4A, RF1B to RF4B, STRM 1A, STRM 1B[2]	+/- 0.5 dB (levels ≥ -50 dBm), 400 to 3000 MHz +/- 0.75 dB (levels ≥ -50 dBm), >3000 to 3800MHz
		+/- 0.75 dB (-100 dBm to -50 dBm), 400 to 3000 MHz +/- 1 dB (-100 dBm to -50 dBm), >3000 to 3800 MHz
		+/- 0.7 dB (typical, levels > -100 dBm)
Output power port to port balance	RF1A to RF4A, RF1B to RF4B	+/- 0.5 dB (400 to 3000 MHz) +/- 1 dB (>3000 to 3800 MHz)
Power level repeatability	STRM 1A, STRM 1B	+/- 0.05 dB (within 30 seconds of initial value)
	RF1A to RF4A, RF1B to RF4B	+/- 0.1 dB (within 30 seconds of initial value)
VSWR[3]	STRM 1A, STRM 1B	< 1.5 : 1 (RL > 14 dB), 400 to 3000 MHz
	RF1A to RF4A, RF1B to RF4B	< 1.5 : 1 (RL > 14 dB) 400 to 800 MHz < 1.2 : 1 (RL > 20 dB) ≥800 to 2400 MHz < 1.5 : 1 (RL > 14 dB) ≥2400 to 3000 MHz < 1.67 : 1 (RL > 12 dB) ≥3000 to 3500 MHz < 2.1 : 1 (RL > 9 dB) ≥3500 to 3800 MHz
Harmonic attenuation (duplex)	RF1A to RF4A, RF1B to RF4B	> 30 dB (output levels < -15 dBm)
Harmonic attenuation (broadcast)	STRM 1A, STRM 1B	> 30 dB (output levels < -30 dBm)
Harmonic attenuation (streaming)	RF1A to RF4A, RF1B to RF4B	> 30 dB (output levels < 0 dBm)
Non-harmonic attenuation	STRM 1A, STRM 1B	> 50 dB (output levels < +5 dBm) (700 MHz > frequency < 3000 MHz)
		> 45 dB (output levels < +5 dBm) (frequency < 700 MHz)
	RF1A to RF4A, RF1B to RF4B	> 40 dB (output levels ≤ -5 dBm)
VSG to VSG trigger time mismatch[4]	RFxA to RFxB	< 260 ns
Phase noise		< -110dBc/Hz (250kHz to 400KHz offset)

Timebase

Parameters	Value
Oscillator type	OCXO
Frequency	10 MHz
Initial accuracy (25°C, after 60 minute warm-up)	< +/- 0.04 ppm
Maximum aging	< +/- 0.1 ppm per year
Temperature stability	< +/- 0.05 ppm over 0°C to 50°C range, referenced to 25°C < +/- 0.01 ppm over 20°C to 30°C range
Warm-up time	60 minutes

[2] STRM ports specified from 400 to 3000 MHz
[3] VSWR spec for when RF port is active. When RF port is not active, the port is in a 50Ω termination state.
[4] Between 2 test modules within a single tester

General Purpose RF

Vector Signal Generator

Controls	Description	Setting Range
Frequency	Sets the VSG center frequency	See General HW Specifications
Output power level	Sets the VSG output power level	See General HW Specifications
Sample rate	Sets the VSG sampling rate	See General HW Specifications
Marker	Sets the marker source	VSA, VSG1, VSG2, EXT
Waveform selection	Selects waveforms from included library	

Vector Signal Analyzer

Controls	Description	Setting Range
Frequency	Sets the VSA center frequency	See General HW Specifications
Reference level	Sets the VSA input power range	+33 dBm to -5 dBm
Resolution Bandwidth (RBW)	Sets the VSA resolution bandwidth	1 Hz to 10 MHz
Sample rate	Sets the VSA sample rate	See General HW Specifications
Capture length	Sets the capture time	See General HW Specifications
Trigger source	Sets the trigger input source	VSG1, VSG2, EXT1,2,3,4
Trigger level	Sets the RF trigger level	See General HW Specifications
Edge level	Sets rising or falling edge trigger direction	

Power Meter

Controls	Description	Setting Range
Filter bandwidth	Time domain filter bandwidth	10 kHz to 100 MHz
Offset frequency	Allows power measurements at differing center frequencies within the IF bandwidth. Multiple frequencies can be specified in a single measurement.	+/- 50 MHz

Factory Efficiency Module

The Factory Efficiency Module allows you to detect and repair test fixture wear and tear as well as improve test yield. These features are tailored specifically for issues that are common in the manufacturing environment.

Measurement	Description
Fixture Health Check	Detects any signal integrity change between the tester and the end of the test fixture that could negatively impact RF measurements
DUT Sense	Detects that a DUT has been correctly placed in the test fixture by ensuring that the DUT antenna connection to the tester is of good quality.
Return Loss	A magnitude measurement of the reflected signal as seen by the tester RF port

Factory Efficiency Module Measurement Specifications

Parameters	Ports	Value
Fixture Health Check minimum detectable path change	RF1A to RF4A, RF1B to RF4B	0.05 dB[1]
Maximum external path loss		15 dB
Return Loss Magnitude Uncertainty		< +/- 1 dB, (< +/- 0.6 dB typical) 450 MHz to 3000 MHz < +/- 1.5 dB, (<+/- 1 dB typical) > 3000 MHz

Graphical Display

Results Display	Description
Power in band table	Integrated power results (up to 10 results)
Spectrum (PSD)	Spectrum Display (Power vs. Frequency), Up to 100 MHz span

[1] Relative to fixture reference measurement

General and Environmental

Parameters	Value
Dimensions	16.75" W x 7.4" H x 24" D (426 mm x 188 mm x 610 mm)
Weight	47 pounds (21.3 kg)
Power requirements	100VAC-240VAC, 7.5A-3.2A, 50 Hz - 60 Hz, 750 W Max
Power consumption (maximum)	<350 W
Average power consumption (2-module configuration)	190 W
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 30°C (valid range for specifications)
Operating humidity	15% to 95% relative humidity, non-condensing (IEC EN60068-2-30)
EMC	EN 61326 Immunity for industrial environment, Class A emissions
Safety	IEC 61010-1, EN61010-1, UL3111-1, CAN/CSA-C22.2 No. 61010-1-12
Mechanical vibration	IEC 60068, IEC 61010 and MIL-T-28800D, class 5
Mechanical shock	ASTM D3332-99, Method B
RF port torque	13 lb-in (1.469Nm)
Recommended calibration cycle	24 months
Warranty	12 months hardware 12 months software updates

Wireless Standards Support

IQxstream supports a wide variety of wireless standards and tests. As a software driven instrument, these capabilities will be updated from time to time to meet the needs of changing requirements. This includes the addition of new bands or enhancements to the standards.

At the time of this document's publication, IQxstream includes direct support for the standards based testing documented in the following tables. In addition to the tests noted, other measurements are often available that extend or provide additional information surrounding a specific test. For details of such additional support, please see the IQxstream's user documentation.

IQxstream supports a continuous frequency range between 400 MHz and 3,800 MHz. Technology-specific frequency band support is detailed in the following section, but does not imply that frequency support is restricted only to the band listed.

Many standards specify tests under very specific test conditions. For example all standards contain a variety of power tests e.g. Max Power, Minimum Power, etc. IQxstream fundamentally measures power. If you can set the DUT to the particular state, IQxstream will measure its power. Likewise, for EVM, carrier frequency and a variety of generic measurements. Support for a specific test as described in the following pages does not impose any limitation on IQxstream's capabilities. It only describes a minimum set that it can most certainly do. It can do far more and perhaps more importantly can have specific capabilities added to it as software to meet any specific need you require.

LTE Frequency Bands Supported

Frequency Bands	Frequency Range (Generator)	Frequency Range (Analyzer)	Duplex Mode
1	2110 MHz to 2170 MHz	1920 MHz to 1980 MHz	FDD
2	1930 MHz to 1990 MHz	1850 MHz to 1910 MHz	FDD
3	1805 MHz to 1880 MHz	1710 MHz to 1785 MHz	FDD
4	2110 MHz to 2155 MHz	1710 MHz to 1755 MHz	FDD
5	869 MHz to 894 MHz	824 MHz to 849 MHz	FDD
7	2620 MHz to 2690 MHz	2500 MHz to 2570 MHz	FDD
8	925 MHz to 960 MHz	880 MHz to 915 MHz	FDD
9	1845 MHz to 1880 MHz	1750 MHz to 1785 MHz	FDD
10	2110 MHz to 2170 MHz	1710 MHz to 1770 MHz	FDD
11	1476 MHz to 1496 MHz	1428 MHz to 1448 MHz	FDD
12	728 MHz to 746 MHz	698 MHz to 716 MHz	FDD
13	746 MHz to 756 MHz	777 MHz to 787 MHz	FDD
14	758 MHz to 768 MHz	788 MHz to 798 MHz	FDD
17	734 MHz to 746 MHz	704 MHz to 716 MHz	FDD
18	860 MHz to 875 MHz	815 MHz to 830 MHz	FDD
19	875 MHz to 890 MHz	830 MHz to 845 MHz	FDD
20	791 MHz to 821 MHz	832 MHz to 862 MHz	FDD
21	1495.9 MHz to 1510.9 MHz	1447.9 MHz to 1462.9 MHz	FDD
22	3510 MHz to 3590 MHz	3410 MHz to 3490 MHz	FDD
23	2180 MHz to 2200 MHz	2000 MHz to 2020 MHz	FDD
24	1525 MHz to 1559 MHz	1626.5 MHz to 1660.5 MHz	FDD
25	1930 MHz to 1995 MHz	1850 MHz to 1915 MHz	FDD
26	859 MHz to 894 MHz	814 MHz to 849 MHz	FDD
27	852 MHz to 869 MHz	807 MHz to 824 MHz	FDD
28	758 MHz to 803 MHz	703 MHz to 748 MHz	FDD
29	717 MHz to 728 MHz	Downlink Only	FDD
30	2350 MHz to 2360 MHz	2305 MHz to 2315 MHz	FDD
31	462.5 MHz to 467.5 MHz	452.5 MHz to 457.5 MHz	FDD
33	1900 MHz to 1920 MHz	1900 MHz to 1920 MHz	TDD

Frequency Bands	Frequency Range (Generator)	Frequency Range (Analyzer)	Duplex Mode
34	2010 MHz to 2025 MHz	2010 MHz to 2025 MHz	TDD
35	1850 MHz to 1910 MHz	1850 MHz to 1910 MHz	TDD
36	1930 MHz to 1990 MHz	1930 MHz to 1990 MHz	TDD
37	1910 MHz to 1930 MHz	1910 MHz to 1930 MHz	TDD
38	2570 MHz to 2620 MHz	2570 MHz to 2620 MHz	TDD
39	1880 MHz to 1920 MHz	1880 MHz to 1920 MHz	TDD
40	2300 MHz to 2400 MHz	2300 MHz to 2400 MHz	TDD
41	2496 MHz to 2690 MHz	2496 MHz to 2690 MHz	TDD
42 (with 3800 MHz option)	3000 MHz to 3600 MHz	3000 MHz to 3600 MHz	TDD
43 (with 3800 MHz option)	3600 MHz to 3800 MHz	3600 MHz to 3800 MHz	TDD
44	703 MHz to 803 MHz	703 MHz to 803 MHz	TDD

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	
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	

Standard Test	3GPP TS 36.521-1 Reference Paragraph	Notes
Spurious emissions	6.6.3.1	Limited to 400 MHz to 3800 MHz
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.

LTE Small Cell Base Station Tests

Standard Test	3GPP TS 36.141 Reference Paragraph	Notes
Home BS output power	6.2.1	
Home BS output power for adjacent UTRA channel protection	6.2.6	
Home BS output power for adjacent E-UTRA channel protection	6.2.7	
Transmit off power	6.4.1	
Frequency error	6.5.1	
Error vector magnitude	6.5.2	
Occupied bandwidth	6.6.1	
ACLR	6.6.2	
Operating band unwanted emissions	6.6.3	
Transmitter spurious emissions	6.6.4	75 MHz to 6000 MHz
Reference sensitivity	7.2	DUT support required

WCDMA/HSPA/HSPA+/Dual Carrier HSPA+ Frequency Bands

Bands	Frequency Range (Analyzer)	Frequency Range (Generator)
I	1920 - 1980 MHz	2110 - 2170 MHz
II	1850 - 1910 MHz	1930 - 1990 MHz
III	1710 - 1785 MHz	1805 - 1880 MHz
IV	1710 - 1755 MHz	2110 - 2155 MHz
V	824 - 849 MHz	869 - 894 MHz
VI	830 - 840 MHz	875 - 885 MHz

Measurement		Performance
VII	2500 - 2570 MHz	2620 - 2690 MHz
VIII	880 - 915 MHz	925 - 960 MHz
IX	1749.9 - 1784.9 MHz	1844.9 - 1879.9 MHz
X	1710 - 1770 MHz	2110 - 2170 MHz
XI	1427.9 - 1447.9 MHz	1475.9 - 1495.9 MHz
XII	698 - 716 MHz	728 - 746 MHz
XIII	777 - 787 MHz	746 - 756 MHz
XIV	788 - 798 MHz	758 - 768 MHz

WCDMA Small Cell Base Station Tests

Standard Test	3GPP TS 25.141 Reference Paragraph	Notes
Maximum output power	6.2.1	
Primary CPICH power accuracy	6.2.2	
Frequency error	6.3.1	
Occupied bandwidth	6.5.1	
Spectrum emission mask (SEM)	6.5.2.1	
ACLR	6.5.2.2	
Error Vector Magnitude (EVM)	6.7.1	
Peak Code Domain Error	6.7.2	
Reference sensitivity	7.2	DUT support required

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

Standard Test	3GPP TS 34.121-1 Reference Paragraph	Notes
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	

Measurement		Performance
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	Limited to 400 to 3800 MHz
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 Frequency Bands Supported

Frequency Bands	Frequency Range (Generator)	Frequency Range (Analyzer)
GSM 450 band	460 MHz to 468 MHz	450 MHz to 458 MHz
GSM 480 band	488 MHz to 496 MHz	478 MHz to 486 MHz
GSM 750 band	747 MHz to 762 MHz	777 MHz to 792 MHz
GSM 850 band	869 MHz to 894 MHz	824 MHz to 849 MHz
R-GSM 900 band	921 MHz to 960 MHz	876 MHz to 915 MHz
DCS 1800 band	1805 MHz to 1880 MHz	1710 MHz to 1785 MHz
GSM 1900 band	1930 MHz to 1990 MHz	1850 MHz to 1910 MHz

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 Frequency Bands

Frequency Bands	Frequency Range
33	1900-1920 MHz
34	2010-2025 MHz
35	1850-1910 MHz
36	1930-1990 MHz
37	1910-1930 MHz
38	2570-2620 MHz
39	1880-1920 MHz
40	2300-2400 MHz

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	
RX max input level	6.3	DUT support required
Throughput (single ended)	9.3	DUT support required

cdma 2000 / 1xEV-DO Frequency Bands Supported

Band Class	Frequency Range (Generator)	Frequency Range (Analyzer)
0	860.025 MHz to 893.985 MHz	815.025 MHz to 848.985 MHz
1	1930.000 MHz to 1990.000 MHz	1850.000 MHz to 1910.000 MHz
2	917.0125 MHz to 959.9875 MHz	872.0125 MHz to 914.9875 MHz
3	1840.000 MHz to 1870.000 MHz	887.0125 MHz to 924.9875 MHz
4	421.675 MHz to 493.480 MHz	1750.000 MHz to 1780.000 MHz
5	421.675 MHz to 493.480 MHz	411.675 MHz to 483.480 MHz
6	2110.000 MHz to 2169.950 MHz	1920.000 MHz to 1979.950 MHz
7	746.000 MHz to 764.000 MHz	776.000 MHz to 794.000 MHz
8	1805.000 MHz to 1879.950 MHz	1710.000 MHz to 1784.950 MHz
9	925.000 MHz to 958.750 MHz	880.000 MHz to 913.750 MHz
10	851.000 MHz to 939.975 MHz	806.000 MHz to 900.975 MHz
11	421.675 MHz to 493.475 MHz	411.675 MHz to 483.475 MHz
12	915.0125 MHz to 920.9875 MHz	870.0125 MHz to 875.9875 MHz
13	2620.000 MHz to 2690.000 MHz	2500.000 MHz to 2570.000 MHz
14	1930.000 MHz to 1995.000 MHz	1850.000 MHz to 1915.000 MHz
15	2110.000 MHz to 2155.000 MHz	1710.000 MHz to 1755.000 MHz

Measurement		Performance
16	2624.000 MHz to 2690.000 MHz	2502.000 MHz to 2568.000 MHz
17	2624.000 MHz to 2690.000 MHz	

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.

Global Positioning Waveforms

IQxstream provides support for the downlink signals for the two main location technologies: GPS and GLONASS. These can be used by the DUT to validate GPS operation.

Technology	Band	Notes
GPS	L1 - 1575.42 MHz	
GLONASS	L1 - 1598-1606 MHz	All channels

General Purpose RF

Beyond the standards based testing IQxstream's Vector Signal Generators and Vector Signal generators provide you the ability to playback arbitrary waveforms for delivery to a DUT and capture uplink signals for subsequent analysis. These tests can be performed over the full range of the IQxstream's capabilities as defined in the section IQxstream General Specifications.

When setting up the IQxstream for general purpose RF measurements the following controls are accessible.

Vector Signal Generator	Vector Signal Analyzer	
Frequency	Frequency	Trigger source
Output power level	Reference level (capture range)	Trigger level
Sample rate	Resolution bandwidth	Edge level
Marker source	Sample rate	
Waveform	Capture length	

Beyond the ability to capture a waveform and export it for further analysis, IQxstream has the ability to make some basic measurements and provide displays to the operator as shown in the following table.

Test	Parameter	Notes
Power meter	Time domain filter bandwidth	Allow user selection of measurement windows from 10 kHz to 100 MHz
	Offset frequency	Allows power measurements to be offset within the capture band. This also supports multiple measurements from a single capture.
Power in band table		Displays power by user specified windows (up to 10) within the 100 MHz capture
Spectrum		Power vs. frequency for up to a 100 MHz capture
Power vs. time		Display power vs. time. Useful in analysis of signals that exhibit burst behavior.

Order Codes

Code	Product
0100-XSTR-010	IQxstream Mobile Test System – 10 port version, 400 to 3000 MHz
0100-XSTR-011	IQxstream Mobile Test System – 2 port version, 400 to 3000 MHz
0100-XSTR-012	IQxstream Mobile Test System – 5 port version, 400 to 3000 MHz
0100-XSTR-021	IQxstream Mobile Test System – 2 port version, 400 to 3800 MHz
0100-XSTR-022	IQxstream Mobile Test System – 5 port version, 400 to 3800 MHz
0100-XSTR-042	IQxstream Mobile Test System – 10 port version, 400 to 3800 MHz
0300-XSTR-001	UMTS Measurement Suite Software License for IQxstream includes: • GSM / EDGE Measurement Suite • W-CMDA / HSPA Measurement Suite • W-CDMA / HSPA+ Measurement Suite
0300-XSTR-002	CDMA2000 Measurement suite software license for IQxstream includes: • cdmaOne, EV-DO Rev 0, Rev A, Rev B Measurement Suite
0300-XSTR-003	LTE FDD / TDD Measurement Suite
0300-XSTR-005	WLAN 802.11b/g/n Measurement Suite
0300-XSTR-006	Bluetooth Measurement Suite
0300-XSTR-008	TD-SCDMA Measurement Suite
0300-XSTR-009	W-CDMA Small Cell Measurement Suite
0300-XSTR-010	LTE Small Cell Measurement Suite
0300-XSTR-021	WLAN 802.11af Measurement Suite
0300-XSTR-029	Easy-Detect Software License (Fixture Health Check and DUT Sense)
0300-XSTR-054	Bluetooth 5 Measurement Suite
0300-XSTR-055	LTE-Advanced Pro Measurement Suite
0300-XSTR-057	LTE Cat-NB1 NB-IoT Measurement Suite