

E6474A RANAdvisor

W1314A/B Multi-Band Wireless Measurement Receiver



W1314A



W1314B

Key Benefits

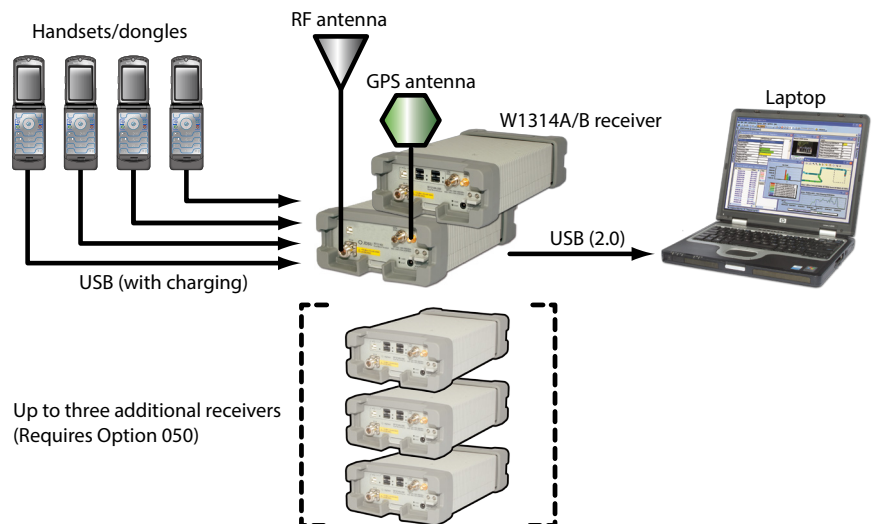
- Perform simultaneous multi-technology measurements during a single drive-test or indoor survey
- Connect up to four UE devices with USB charging, without impacting specified receiver measurement performance (W1314A only)
- Improve measurement performance or add new technologies as they become available through automatic software upgrades to extend product life
- Low weight and power consumption
- Indoor and outdoor applications

Key Features

- Supports LTE, UMTS, GSM, Mobile WiMAX™, 1xEV-DO, cdma2000, iDEN, Spectrum Analysis, and CW
- All measurement collection and analysis is performed within the receiver hardware to minimize laptop processing requirements, ensuring specified receiver performance
- Ruggedized housing with complete RF shielding
- Designed to last for years of daily drive testing
- Integrated 50-channel, high-sensitivity GPS
- 4-port USB 2.0 hub with charging (W1314A only)
- Supports combinations of W1314A and W1314B receivers

The W1314A/B receivers are an integral part of the RANAdvisor system. Easy configuration and robust connections let users get quick and accurate measurements from the receiver when it is combined with the E6474A RANAdvisor Wireless Network Optimization Platform.

Easy connections and configuration let users analyze and optimize networks no matter where they are, or on what technology they are based. With the right receiver, or receivers, users can obtain high-quality measurements fast.



The receivers deliver unparalleled multi-technology measurement capabilities for wireless network optimization and troubleshooting. The following technologies are covered across both receivers: LTE, UMTS, GSM, cdma2000, 1xEV-DO, iDEN, Mobile WiMAX, and Generic Spectrum Analyzer/CW.

The RF front-end of the receivers use discrete preselectors to ensure the greatest possible accuracy of measurement results. Models have been created to meet the coverage needs of each market, as well as two global receiver options that support all LTE-FDD and LTE-TDD bands.

The W1314A/B measurement receiver family covers a comprehensive range of RF bands.

	2-Band	4-Band	8-Band
RF bands ^a	1 uplink and 1 downlink or 2 downlinks	2 uplinks and 2 downlinks or 1 Uplink and 3 downlinks or 4 downlinks	8 various
Technology support	All technologies (2 simultaneously)	All technologies (2 simultaneously)*	All technologies (4 technologies and 32 concurrent measurements)
GPS support	50 Channel	50 Channel	50 Channel
Concurrent measurements	8	8*	32

Note:

Depending on the RF band (center frequency and bandwidth) multiple preselectors may be required to provide complete band coverage.

*Software upgradable to support 3 technologies and 16 concurrent measurements.

Enhanced High-Sensitivity GPS
(Now standard on all models)

The high-sensitivity GPS provides improved position reporting information even in the most challenging environments, from dense urban canyons to tunnels and underground locations. This option improves the quality of the reported measurement data and reduces instances of gaps in the reported position.



The backpack solution provides a user-comfortable setup that houses a W1314A/B receiver, batteries, charger, and room for up to eight phones/UEs.

3

Important Note

There are three receiver options: two-band, four-band, and eight-band, each of which is technology agnostic, meaning each can measure any technology within the frequency band supported by each pre-selector with an associated technology software license.

This technology-agnostic capability is true also for LTE. Note that when LTE is mentioned in the tables below, we mean it supports both TDD and FDD. There are two technology licenses for LTE, one for LTE TDD and one for LTE FDD. Networks having both technologies will need both licenses to make receiver measurements. The use of (DL) and (UL) indicates LTE FDD support in the tables below.

The tables below lists supported technologies and are for example only. When different technologies are present within the frequency band supported by a specific receiver, you can measure that technology with the associated technology software license.

For clarity, two tables are provided for each receiver group, the first of which shows configurations that JDSU experts believe are the most likely/common technology groups in each region. The second table lists the specific frequency ranges for each band.

Each receiver can support any technology in any frequency band with the appropriate software technology license.

For example, W1314B option E16 Band 8 states LTE 2600 (TDD). Using LTE FDD in this band lets you make LTE FDD measurements if you also have an LTE FDD technology software license.

**Receiver Technology:
Two-Band Receivers**

The following table lists the technologies covered by our two-band receiver.

The receiver can measure any technology in any of its supported frequency bands, provided users have the appropriate technology measurement license. The two-band receiver can support up to 32 concurrent measurements.

Technologies supported on the two-band receiver:

W1314A Option	Band 1	Band 2
803	LTE "L-Band" (DL)	LTE "L-Band" (UL)

Refer to "UMTS Frequency Band Reference Table" on page 15 for details of UMTS band numbering.

Frequency ranges supported across each two-band receiver:

W1314A Option	Band 1 (MHz)	Band 2 (MHz)
803	1525 – 1559	1626.5 – 1660.5

4

Receiver Technologies: Four-Band Receivers

The following table lists the technologies that can be tested using the four-band receivers listed. To use the table, select the receiver option that best fits your testing needs. For example, if users must test GSM 900, GSM 1800, and UMTS 2100 networks daily, then choosing receiver options V01 or V02 would be the best receiver for your needs.

W1314A Option	Band 1	Band 2	Band 3	Band 4
150	LTE 850 (DL) UMTS 850 (DL) GSM 850 (DL) cdma2000/EV-DO 850 (DL)	UMTS 1700 (UL)	LTE 1900 (DL) UMTS 1900 (DL) GSM 1900 (DL) cdma2000/EV-DO 1900 (DL)	LTE 2100 (DL) UMTS 2100 (DL) cdma2000/EV-DO 2100 (DL)
151	UMTS 1700 (UL)	LTE 1900 (UL) UMTS 1900 (UL) GSM 1900 (UL) cdma2000/EV-DO 1900 (UL)	LTE 1900 (DL) UMTS 1900 (DL) GSM 1900 (DL) cdma2000/EV-DO 1900 (DL)	LTE 2100 (DL) UMTS 2100 (DL) cdma2000/EV-DO 2100 (DL)
V01	LTE 900 (DL) UMTS 900 (DL) GSM 900 (DL)	LTE 1800 (DL) UMTS 1800 (DL) GSM 1800 (DL)	UMTS 2100 (UL)	LTE 2100 (DL) UMTS 2100 (DL) cdma2000/EV-DO 2100 (DL)
V02	LTE 900 (DL) UMTS 900 (DL) GSM 900 (DL)	LTE 1800 (DL) UMTS 1800 (DL) GSM 1800 (DL)	LTE 2100 (DL) UMTS 2100 (DL) cdma2000/EV-DO 2100 (DL)	LTE 2.6 (DL) Mobile WiMAX 2.5
V03	LTE 900 (DL) UMTS 900 (DL) GSM 900 (DL)	LTE 1800 (DL) UMTS 1800 (DL) GSM 1800 (DL)	LTE 2100 (DL) UMTS 2100 (DL) cdma2000/EV-DO 2100 (DL)	LTE2300 (TDD)
V04	LTE800 (TDD)	UMTS 2100 (UL)	LTE 2100 (DL) UMTS 2100 (DL) cdma2000/EV-DO 2100 (DL)	LTE2300 (TDD)
V05	LTE 700 (DL)	LTE800 (TDD)	LTE 1900 (DL) UMTS 1900 (DL) GSM 1900 (DL) cdma2000/EV-DO 1900 (DL)	LTE 2.6 (DL) Mobile WiMAX 2.5
V06	LTE 700 (DL)	LTE800 (TDD)	LTE 1900 (DL) UMTS 1900 (DL) GSM 1900 (DL) cdma2000/EV-DO 1900 (DL)	LTE 2100 (DL) UMTS 2100 (DL) cdma2000/EV-DO 2100 (DL)
V07	LTE 2100 (DL) UMTS 2100 (DL) cdma2000/EV-DO 2100 (DL)	LTE2300 (TDD)	LTE 1900 (DL) UMTS 1900 (DL) GSM 1900 (DL) cdma2000/EV-DO 1900 (DL)	LTE 2.6 (DL) Mobile WiMAX 2.5

Refer to “UMTS Frequency Band Reference Table” on page 15 for details of UMTS band numbering.

The following table lists the frequency ranges supported across each of the four-band receivers:

W1314A Option	Band 1 (MHz)	Band 2 (MHz)	Band 3 (MHz)	Band 4 (MHz)
150	814 – 854	1705 – 1790	1845 – 1920	2100 – 2180
151	1705 – 1790	1845 – 1920	1925 – 1995	2100 – 2180
V01	921 – 962	1800 – 1885	1895 – 1990	2100 – 2180
V02	900 – 962	1800 – 1885	2100 – 2180	2570 – 2690
V03	900 – 962	1800 – 1885	2100 – 2180	2300 – 2400
V04	780 – 899	1895 – 1990	2100 – 2180	2300 – 2400
V05	698 – 806	780 – 899	1925 – 1995	2570 – 2690
V06	698 – 806	780 – 899	1925 – 1995	2100 – 2180
V07	2100 – 2180	2300 – 2400	2495 – 2595	2570 – 2690

**Receiver Technologies:
Eight-Band Receivers**

The following table lists the technologies that can be tested using the eight-band receivers listed. To use the table, select the receiver option that best fits your testing needs. For example, if users must test multiple LTE-FDD bands daily, then select receiver option E12 to cover most LTE-FDD mobile system profiles. Technologies supported on eight-band receivers:

W1314B Options	Band 1	Band 2	Band 3	Band 4	Band 5	Band 6	Band 7	Band 8
E08	LTE 850 (UL) UMTS 850 (UL) GSM 850 (UL) CDMA/EV-DO 850 (UL)	LTE 850 (DL) UMTS 850 (DL) GSM 850 (DL) CDMA/EV-DO 850 (DL)	LTE 900 (UL) UMTS 900 (UL) GSM 900 (UL)	LTE 900 (DL) UMTS 900 (DL) GSM 900 (DL)	LTE 1800 (UL) UMTS 1800 (UL) GSM 1800 (UL)	LTE 1800 (DL) UMTS 1800 (DL) GSM 1800 (DL)	LTE 2100 (UL) UMTS 2100 (UL) CDMA/EV-DO 2100 (UL)	LTE 2100 (DL) UMTS 2100 (DL) CDMA/EV-DO 2100 (DL)
E09		LTE 700 (DL)	LTE 850 (UL) UMTS 850 (UL) GSM 850 (UL) CDMA/EV-DO 850 (UL)	LTE 850 (DL) UMTS 850 (DL) GSM 850 (DL) CDMA/EV-DO 850 (DL)	<i>[AWS Band UL]</i> LTE 1700 (UL) UMTS 1700 (UL) CDMA/ED-V0 1700 (UL)	LTE 1900 (UL) UMTS 1900 (UL) GSM 1900 (UL) CDMA/EV-DO 1900 (UL)	LTE 1900 (DL) UMTS 1900 (DL) GSM 1900 (DL) CDMA/EV-DO 1900 (DL)	<i>[AWS Band DL]</i> LTE 2100 (DL) UMTS 2100 (DL) CDMA/EV-DO 2100 (DL)
E10	JCDMA 800 (DL)	LTE 850 (DL) JCDMA 800 (DL)	LTE 1500 (DL)	LTE 1700 (DL) UMTS 1700 (DL) CDMA/EV-DO 1700 (DL)	TD-SCDMA	LTE 2100 (DL) UMTS 2100 (DL) CDMA/EV-DO 2100 (DL)	LTE2600 (UL) Mobile WiMAX 2.5	LTE2600 (DL) Mobile WiMAX 2.5 LTE 2600 (TDD)
E12	LTE 700 (UL/DL)	LTE 800/850 (UL/DL) LTE 800 (TDD) LTE 850 (UL/DL) UMTS 850 (UL/DL) GSM 850 (UL/DL) CDMA/EV-DO 850 (UL/DL)	LTE 900 (DL) UMTS 900 (DL) GSM 900 (DL) JCDMA 900 (DL)	LTE 1500 (DL)	LTE 1800 (DL) LTE 1700 (DL) UMTS 1700 (DL) GSM 1800 (DL) CDMA/EV-DO 1700 (DL)	LTE 1900 (DL) UMTS 1900 (DL) GSM 1900 (DL) CDMA/EV-DO 1900 (DL)	LTE 2100 (DL) UMTS 2100 (DL) CDMA/EV-DO 2100 (DL)	LTE 2600 (DL) LTE 2600 (TDD)
E13	LTE 800 (TDD)	LTE 900 (TDD)	LTE 1800(TDD)	LTE 1800 (TDD)	LTE 1900 (TDD)	LTE 2000 (TDD)	LTE 2300 (TDD)	LTE 2600 (TDD) LTE 2600 (DL)
E14	LTE 900 (TDD)	LTE 1800 (TDD)	LTE 1800 (TDD)	LTE 1900 (TDD)	LTE 2000 (TDD)	LTE 2300 (TDD)	Mobile WiMAX 2.5 LTE 2600 (UL)	LTE 2600 (TDD) Mobile WiMAX 2.5 LTE 2600 (DL)
E15	LTE 800 (UL/DL) LTE 800 (TDD) LTE 850 (UL/DL) UMTS 850 (UL/DL) GSM 850 (UL/DL) CDMA/EV-DO 850 (UL/DL)	LTE 900 (TDD) LTE 900 (DL) UMTS 900 (DL) GSM 900 (DL)	LTE 1800(TDD) LTE 1800 (DL) LTE 1700 (DL) GSM 1800 (DL)	LTE 1900 (TDD) LTE 1900 (DL) UMTS 1900 (DL) GSM 1900 (DL) CDMA/EV-DO 1900 (DL)	LTE 2100 (DL) UMTS 2100 (DL) CDMA/EV-DO 2100 (DL)	LTE 2300 (TDD)	Mobile WiMAX 2.5 LTE 2600 (UL)	LTE 2600 (TDD) Mobile WiMAX 2.5 LTE 2600 (DL)
E16		LTE 450 (UL/DL) UMTS 450 (UL/DL) GSM 450 ((UL/DL) CDMA/EV-DO 450 (UL/DL)	LTE 800 (TDD) LTE 850 (UL/DL) UMTS 850 (UL/DL) GSM 850 (UL/DL) CDMA/EV-DO 850 (UL/DL)	LTE 900 (DL) UMTS 900 (DL) GSM 900 (DL)	LTE 1800 (DL) UMTS 1800 (DL) GSM 1800 (DL)	LTE 2100 (DL) UMTS 2100 (DL) CDMA/EV-DO 2100 (DL)	LTE 2300 (TDD)	LTE 2600 (DL) Mobile WiMAX 2.5 LTE 2600 (TDD)
E17	LTE 800 (UL/DL) LTE 800 (TDD) LTE 850 (UL/DL) UMTS 850 (UL/DL) GSM 50 (UL/DL)	LTE 900 (TDD) LTE 900 (DL) UMTS 900 (DL) GSM 900 (DL)	LTE 1800 (TDD) LTE 1800 (DL) LTE 1700 (DL) GSM 1800 (DL)	LTE 1900 (TDD) LTE 2900 (DL) UMTS 1900 (DL) GSM 1900 (DL) CDMA/EV-DO 1900 (DL)	LTE 2100 (DL) UMTS 2100 (DL) CDMA/EV-DO 2100 (DL)	LTE 2600 (TDD) LTE 2600 (DL)	Mobile WiMAX 3.5	Mobile WiMAX 3.5
E18	LTE 800 (UL/DL) LTE 800 (TDD) LTE 850 (UL/DL) UMTS 850 (UL/DL) GSM 850 (UL/DL)	LTE 900 (TDD) LTE 900 (DL) UMTS 900 (DL) GSM 900 (DL)	LTE "L-Band" (DL)	LTE "L-Band" (UL)	LTE 1800 (TDD)	LTE 1900 (TDD) LTE 1900 (DL) UMTS 1900 (DL) GSM 1900 (DL) CDMA/EV-DO 1900 (DL)	Mobile WiMAX 2.5 LTE 2600 (UL)	LTE 2600 (TDD) Mobile WiMAX 2.5 LTE 2600 (DL)
E19	LTE 700 (DL)	LTE 850 (DL) UMTS 850 (UL/DL) GSM 850 (UL/DL) CDMA/EV-DO 850 (UL/DL)	<i>[AWS Band UL]</i> LTE 1700 (UL) UMTS 1700 (UL) CDMA/EV-DO 1700 (UL)	LTE 1900 (UL) UMTS 1900 (UL) GSM 1800 (UL) CDMA/EV-DO 1900 (UL)	LTE 1900 (DL) UMTS 1900 (DL) GSM 1900 (DL) UMTS 2100 (DL) GSM 2100 (DL) CDMA/EV-DO 1900 (DL)	<i>[AWS Band DL]</i> LTE 2100 (DL) UMTS 2100 (DL) GSM 2100 (DL) CDMA/EV-DO 2100 (DL)	LTE 2600 (UL) Mobile WiMAX 2.5	LTE 2600 (DL) Mobile WiMAX 2.5 LTE 2600 (TDD)
E20	LTE 700 (DL)	LTE 800 (UL/DL/TDD) LTE 850 (DL) UMTS 850 (UL/DL) GSM 850 (UL/DL)	LTE 900 (TDD0/DL) UMTS 900 (DL) GSM 900 (DL)	LTE 1700 (DL) LTE1800 (TDD0/DL) GSM 1800 (DL)	LTE 2100 (DL) UMTS 2100 (DL) CDMA/ EV-DO 2100 (DL)	LTE 2600 (TDD0/DL)	Mobile WiMAX 2.5	LTE 2600 (UL)

The following table lists the frequency ranges supported across the eight-band receivers:

W1314A Options	Band 1 (MHz)	Band 2 (MHz)	Band 3 (MHz)	Band 4 (MHz)	Band 5 (MHz)	Band 6 (MHz)	Band 7 (MHz)	Band 8 (MHz)
E08	819 – 854	864 – 899	876 – 917	921 – 962	1705 – 1790	1800 – 1885	1895-1990	2100 – 2180
E09	—	698 – 806	819 – 854	864 – 899	1705 – 1790	1845 – 1915	1925 – 1995	2100 – 2180
E10	824 – 875	864 – 899	1460 – 1525	1800 – 1885	2005 – 2030	2100 – 2180	2495 – 2595	2570 – 2690
E12	698 – 806	780 – 899	900 – 962	1460 – 1525	1800 – 1885	1925 – 1995	2100 – 2180	2570 – 2690
E13	780 – 899	900 – 962	1800 – 1885	1845 – 1920	1895 – 1990	2000 – 2100	2300 – 2400	2570 – 2690
E14	900 – 962	1800 – 1885	1845 – 1920	1895 – 1990	2000 – 2100	2300 – 2400	2495 – 2595	2570 – 2690
E15	780 – 899	900 – 962	1800 – 1885	1895 – 1990	2100 – 2180	2300 – 2400	2495 – 2595	2570 – 2690
E16	—	450 – 496	780 – 899	900 – 962	1800 – 1885	2100 – 2180	2300 – 2400	2570 – 2690
E17	780 – 899	900 – 962	1800 – 1885	1925 – 1995	2100 – 2180	2570 – 2690	3400 – 3500	3500 – 3600
E18	780 – 899	900 – 962	1525 – 1559	1626.5 – 1660.5	1845 – 1920	1925 – 1995	2495 – 2595	2570 – 2690
E19	698 – 806	780 – 899	1705 – 1790	1845 – 1920	1925 – 1995	2100 – 2180	2495 – 2595	2570 – 2690
E20	698 – 806	780 – 899	900 – 962	1460 – 1525	1800 – 1885	2100 – 2180	2495 – 2595	2590 – 2690

Receiver Application: Measurement Support

The following table outlines the measurements supported by each receiver option:

W1314A Option	Spectrum Analyzer	CW/Channel Power Analyzer	GSM Broadcast Channel Analyzer	GSM Interference Analyzer	UMTS Scrambling Code Analyzer	cdma2000/EV-DO Pilot Analyzer	cdma2000 CDP Analyzer	CDMA CDP Analyzer	iDEN Channel Analyzer	iDEN Interference Analyzer	WiMAX Channel Analyzer	LTE Channel Analyzer
110	X	X	X	X	X	X	X	X				X
151	X	X	X	X	X	X	X	X				X
803	X	X				X						X
V01	X	X	X	X	X	X	X	X				X
V02	X	X	X	X	X	X	X	X				X
V03	X	X	X	X	X	X	X	X				X
V04	X	X	X	X	X	X	X	X	X			X
V05	X	X	X	X	X	X	X	X	X			X
V06	X	X	X	X	X	X	X	X	X			X
V07	X	X	X	X	X	X	X	X				X
E08	X	X	X	X	X	X	X	X				X
E09	X	X	X	X	X	X	X	X				X
E10	X	X	X	X	X	X	X	X			X	X
E12	X	X	X	X	X	X	X	X	X		X	X
E13	X	X	X	X	X	X	X	X	X		X	X
E14	X	X	X	X	X	X	X	X	X		X	X
E15	X	X	X	X	X	X	X	X	X		X	X
E16	X	X	X	X	X	X	X	X	X		X	X
E17	X	X	X	X	X	X	X	X	X		X	X
E18	X	X	X	X	X	X	X	X	X		X	X
E19	X	X	X	X	X	X	X	X	X		X	X
E20	X	X	X	X	X	X	X	X	X		X	X

E12 - Limited WiMAX band coverage

General Receiver Specifications

The following table lists the specifications that are applicable to all receiver options:

Frequency	Frequency accuracy	±2 ppm
	Aging of TCXO	±1 ppm/year
	IF bandwidth (nominal)	1.25, 1.4, 3, 5, 7, 8.75, 10, 15, and 20 MHz
Amplitude*	Accuracy	±1.5 dB typical (0° to 55°C) ±1.0 typical (20° to 30°C)
	Noise figure	8.0 dB < 2.3 GHz typical 9.5 dB > 2.3 GHz typical
	Maximum safe input level	+10 dBm, 20 VDC, characteristic
	1 dB compression point	-15 dBm, typical
	Adjacent channel rejection	55 dB nominal
	Internally generated spurious, input referred	-120 dBm
	Input/Output	RF input
Connectors	Computer	USB 2.0 high speed (480 MBps)
	GPS	SMA female
	Power	9 – 34 VDC, DC power jack 100 mils, positive center
	USB 4-port hub (W1314A only)	USB 2.0 high speed (480 MBps) 1.5 amps for one or two ports maximum 3 amps for four ports maximum
Miscellaneous	Operating temperature range	0° to 55°C
	Maximum relative humidity	80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C
	Storage temperature range	-40° to +70°C
	Dimensions	15.24 x 7.67 x 22.90 cm 6 x 3 x 9 in
	Weight	5.2 lb (2.4 kg)
	Power	9 to 34 VDC, 18 W, nominal
	AC Power	100 – 240 VAC, 50 – 60 Hz
GPS	Integrated internal GPS	50 Enhanced channel type

*Amplitude specifications apply in center of measurement where measurement widths are less than 75% of IFBW.

**Generic Receiver Performance:
CW and Spectrum Analyzer**

These characteristics outline generic receiver measurements for the CW and spectrum analyzer:

Examples:

CW (30 kHz RBW)	Number of Measurements	Typical Duration
1 RF carrier	500 channels/s	2 ms
Multiple RF carriers	400 channels/s	2.5 ms

Channel Power (width 30 kHz)	Number of Measurements	Typical Duration
1 RF carrier	300 channels/s	3.3 ms
Multiple RF carriers	250 channels/s	4.0 ms

Note: There is no averaging used for these measurements.

Spectrum Analyzer (30 kHz RBW)*	Updates/s
Span (4 MHz, IFBW 5 MHz)	25
Span (10 MHz, IFBW 5 MHz)	14
Span (25 MHz, IFBW 5 MHz)	6
Span (50 MHz, IFBW 5 MHz)	3

*Amplitude specifications apply in center of measurement where measurement widths are less than 75% of IFBW.

Characteristic GSM and UMTS Performance

These characteristics outline receiver performance for GSM and UMTS measurements:

UMTS	High-Speed Carrier	High-Sensitivity Mode	Duration
1 RF carrier	26 measurements per carrier/s	5 measurements per carrier/s	1 s
6 RF carriers	1 measurement per carrier/s	1 measurement per carrier/s	1.2 s
12 RF carriers	1 measurement per carrier/s	1 measurement per carrier/s	2.5 s

Dynamic Range		
Ec/Io (typ)	0 to -20.0 dB	0 to -26.0 dB

Note: Indicated UMTS performance is for 8 active Node Bs; speed is improved for fewer active nodes.

GSM	Capability	Typical Duration
Power Scan	1400 channels/s (contiguous)	720 μs
BSIC Decode	Minimum 9, up to 45 channels/s	

Typical GSM example measurements:

Multi-Band Measurement Examples	Typical Duration
One RF band with 200 channels, 15 – 20 BSIC decodes	260 ms
Two RF bands each with 200 channels and 15 – 20 BSIC decodes	510 ms

Characteristic cdma2000 and 1xEV-DO Performance

These characteristics outline receiver performance for cdma2000 and 1xEV-DO measurements:

High-Speed Mode	cdma2000	1xEV-DO
1 RF carrier	21 measurements per carrier/s	29 measurements per carrier/s
8 RF carriers	2 measurements per carrier/s	2 measurements per carrier/s
15 RF carriers	1 measurement per carrier/s	1 measurement per carrier/s

Dynamic Range

Ec/Io (typ)	0 to -25.5 dB	0 to -15.5 dB
-------------	---------------	---------------

High-Accuracy Mode	cdma2000	1xEV-DO
1 RF carrier	6 measurements per carrier/s	2 measurements per carrier/s
8 RF carriers	2 measurements per carrier/s	2 measurements per carrier/s
15 RF carriers	1 measurement per carrier/s	1 measurement per carrier/s

Dynamic Range

Ec/Io (typ)	0 to -25.5 dB	0 to -18.5 dB
-------------	---------------	---------------

cdma2000 CDP

1 RF carrier	10 measurements per carrier/s
8 RF carriers	1 measurement per carrier/s
15 RF carriers	1 measurement per carrier/s

Dynamic Range

Ec/Io (typ)	0 to -25 dB
-------------	-------------

Typical cdma2000/1xEV-DO example measurements:

Multi-Band Measurement Examples	Typical Duration
One EV-DO carrier	35 ms
One cdma2000 carrier	48 ms
Four cdma2000 carriers	210 ms
Two cdma2000 and two EV-DO carriers	240 ms
Four cdma2000 CDP carriers	450 ms

Characteristic iDEN Performance

These characteristics outline receiver performance for iDEN measurements:

iDEN	Capability
Power scan	3000 channels/s (contiguous)
DCC decode	Minimum of 12 up to 70 channels/s

Typical iDEN example measurements:

Multi-Band Measurement Examples	Typical Duration
One RF band with 160 channels, 15 – 20 DCC decodes	170 ms
Two RF bands each with 160 channels and 15 – 20 DCC decodes	350 ms

Characteristic Mobile WiMAX™ Performance

These characteristics outline receiver performance for Mobile WiMAX™ measurements:

Mobile WiMAX	Capability
Power scan (preamble-RSSI)	7 channels/s (10 MHz BW)
Power scan (preamble-RSSI)	15 channels/s (5 MHz BW)
Preamble decoded	Minimum 7 up to 15 decodes/s
Preamble decode sensitivity	-95 dBm

Can be multiple preamble decodes for each RF carrier.

Characteristic LTE Performance

These characteristics outline receiver performance for LTE measurements:

Signal Measurement	Sensitivity
RSRP	-128.0 dBm
PSCH	-105.5 dBm
SSCH	-112.9 dBm

Power Scan	Update Rate (updates/s)	Channels
5 MHz	43	15
10 MHz	36	8

	Number of Carriers	Decode Rate (updates/s)
LTE - 1.4 MHz BW	1	10
LTE - 3 MHz BW	1	10
LTE - 5 MHz BW	1	10
LTE - 10 MHz BW	1	10
LTE - 15 MHz BW	1	9
LTE - 20 MHz BW	1	9

Multiple Technology Performance

The following are typical examples of measurements and configurations used by operators.

UMTS Multi-RAT**Example Configuration**

UMTS	GSM 900	GSM 1800	Typical duration 750 ms
UMTS 2100	125 channels	384 channels	
Single RF carrier	Top N = 10	Top N = 10	
High dynamic range	BSIC detection ON	BSIC detection ON	
15 timeslots	Speed mode = 10	Speed mode = 10	
Speed mode = 4			

UMTS and cdma2000**Example Configuration**

UMTS	cdma2000	Typical duration 200 ms
UMTS 1900	cdma2000 1900	
Single RF carrier	Single RF carrier	
High dynamic range	High dynamic range	
Carrier tracking = Off	Carrier tracking = Off	

cdma2000, 1xEV-DO, and iDEN**Example Configuration**

cdma2000	1xEV-DO	iDEN 800/900	Typical duration 510 ms
Four RF carriers	Single RF carrier	350 channels each band	
High dynamic range	High dynamic range	Two RF band	
Carrier tracking = Off	Carrier tracking = Off	Top N = 20	
		Speed mode = 10 DCC detection = 0n	

Frequency-Band Reference Table

The following table provides a cross-reference of frequency bands.

Band	Name	Bandwidth (MHz)	Uplink (MHz)		Downlink (MHz)		Equivalent UMTS band
			Low Earfcn	High Earfcn	Low Earfcn	High Earfcn	
1	IMT 2.1 GHz	60	1920 18000	1980 18599	2110 0	2170 599	1
2	PCS 1900	60	1850 18600	1910 19199	1930 600	1990 1199	2
3	DCS 1800	75	1710 19200	1785 19949	1805 1200	1880 1949	3
4	AWS	45	1710 19950	1755 20399	2110 1950	2155 2399	4
5	850 MHz	25	824 20400	849 20649	869 2400	894 2649	5
6	UTRA only	10	830 20650	840 20749	875 2650	885 2749	6
7	2.6 GHz	70	2500 20750	2570 21449	2620 2750	2690 3449	7
8	GSM 900	35	880 21450	915 21799	925 3450	960 3799	8
9	1700 MHz	35	1749.9 21800	1784.9 22149	1844.9 3800	1879.9 4149	9
10	Extended AWS	60	1710 22150	1770 22749	2110 4150	2170 4749	10

Frequency-Band Reference Table (continued)

Band	Name	Bandwidth (MHz)	Uplink (MHz)		Downlink (MHz)		Equivalent UMTS band
			Low Earfcn	High Earfcn	Low Earfcn	High Earfcn	
11	1.5 GHz Lower	20	1427.9 22750	1447.9 22949	1475.9 4750	1495.9 4949	11
12	700 MHz Lower, A+B+C	17	699 23010	716 23179	729 5010	746 5179	12
13	700 MHz Upper	10	777 23180	787 23279	746 5180	756 5279	13
14	Public Safety	10	788 23280	798 23379	758 5280	768 5379	14
17	700 MHz Lower, B+C	12	704 23730	716 23849	734 5730	746 5849	
18	Japan 800 MHz lower	15	815 23850	830 23999	860 5850	875 5999	
19	Japan 800 MHz upper	15	830 24000	845 24149	875 6000	890 6149	19
20	800 MHz EDD	30	832 24150	862 24449	791 6150	821 6449	20
21	1.5 GHz Upper	15	1447.9 24450	1462.9 24599	1495.9 6450	1510.9 6599	21
22	3.5 Ghz	80	3410 24600	3490 25399	3510 6600	3590 7399	22
23	2 GHz S-Band	20	2000 25500	2020 25699	2180 7500	2200 7699	
24	L Band	34	1626.5 25700	1660.5 26039	1525 7700	1559 8039	
25	PCS 1900 + G Block	65	1850 26040	1915 26689	1930 8040	1995 8689	25
26	800 MHz iDEN	35	814 26690	849 27039	859 8690	894 9039	26
27	850 MHz lower	17	807 27040	824 27209	852 9040	869 9209	
28	700 MHz APAC	45	703 27210	748 27659	758 9210	803 9659	
33	TDD 2000	20			1900 36000	1920 36199	
34	TDD 2000	15			2010 36200	2025 36349	
35	TDD 1900	60			1850 36350	1910 36949	
36	TDD 1900	60			1930 36950	1990 37549	
37	TDD PCS	20			1910 37550	1930 37749	
38	TDD 2.6 GHz	50			2570 37750	2620 38249	
39	TDD 1.9 GHz	40			1880 38250	1920 38649	
40	TDD 2.3 GHz	100			2300 38650	2400 39649	
41	TDD 2.5 GHz	194			2495 39650	2690 41589	
42	TDD 3.4 GHz	200			3400 41590	3600 43589	
43	TDD 3.6 GHz	200			3600 43590	3800 45589	
44	700 MHz APAC	100			703 45590	803 46589	

Test & Measurement Regional Sales

NORTH AMERICA TOLL FREE: 1 855 ASK-JDSU 1 855 275-5378	LATIN AMERICA TEL: +1 954 688 5660 FAX: +1 954 345 4668	ASIA PACIFIC TEL: +852 2892 0990 FAX: +852 2892 0770	EMEA TEL: +49 7121 86 2222 FAX: +49 7121 86 1222	WEBSITE: www.jdsu.com/test
---	--	---	---	--