

JD748A

Signal Analyzer

Introduction

The Signal Analyzers, JD7108B and JD748A, are the optimal test tool for installation and maintenance of cell sites.

The Signal Analyzers contain all the features and capabilities required to perform field testing of cell sites of all wireless technologies, from 2G to 4G.

The Signal Analyzers are equipped with onebutton standard based measurements for wireless signals and offers the full scope of BTS conformance test.

The Signal Analyzers have integrated all the necessary functions to effectively test BTS. Its combined functionality includes spectrum analysis, cable and antenna analysis, power meter, interference analysis, channel scanner, E1/T1 analysis, and signal analysis.

Its new platform extends its spectrum analysis frequency range while increasing sensitivity, dynamic range, and improving measurement speed.

The standard features of the Signal Analyzers include the following:

- Spectrum Analyzer
- Power Meter

The Signal Analyzers were designed with a flexible platform that can support any of the following functions.

- Interference Analysis
- Channel Scanner
- GPS Receiver
- Built-In Bias Tee
- Signal Analysis of cdmaOne/CDMA2000, EV-DO, GSM/ GPRS/ EDGE, WCDMA/HSDPA, TD-SCDMA, Mobile WiMAX, and LTE

The Signal Analyzers are the ideal field testing solution that combines portability, due to its lightweight design and battery extended operation, and performance, with its multifunction capability.

The Signal Analyzers have a strong enclosure design for harsh environments and its backlight key panel makes nocturnal main-tenance tasks possible.



JD7108B

Spectrum Analyzer: 100 kHz to 7.2 GHz

Power Meter: 10 MHz to 7.2 GHz

JD748A

100 kHz to 4 GHz

10 MHz to 4 GHz



JD7108B – Signal Analyzer



JD7108B – Backlight Panel

2

Features

Easy User Interface

The Signal Analyzers have a consistent and intuitive interface through its multiple functions providing a common menu structure that is easy to use.

The Signal Analyzers have a built-in help capability which guides users through each measurement task.

A screenshot of any functions can be saved as a graphic file for report generation and traces can be saved for post-analysis process into the instrument's internal memory or external USB memory device. The stored data can be easily transferred to a PC using the USB 10/100 Ethernet ports.

For file name editing, a rotary knob is integrated with an enter button providing convenience to choose and select alphanumeric characters easily.



Field Useable Design

The Signal Analyzers are compact and lightweight especially convenient for users performing field measurements.

Its bright 8" color display provides visibility in daylight. And its backlight keys provide visibility on the dark.

The Signal Analyzers have an operating temperature range from -10 to 55 Celsius; and its rugged bumper was designed to protect the instrument from drops or other external impacts exceeding the MIL-PRF-28800F class 2 specification.

Automatic Measurements

The Signal Analyzers Auto Measure function allows a complete signal profiling covering RF characterization and modulation quality parameters of up to 10 different carriers, particularly useful on the base stations are transmitting in different frequencies.

The Auto Measure can be easily executed and the instrument will automatically configure and test every aspect of all the carriers regardless of their frequency band or modulation type.

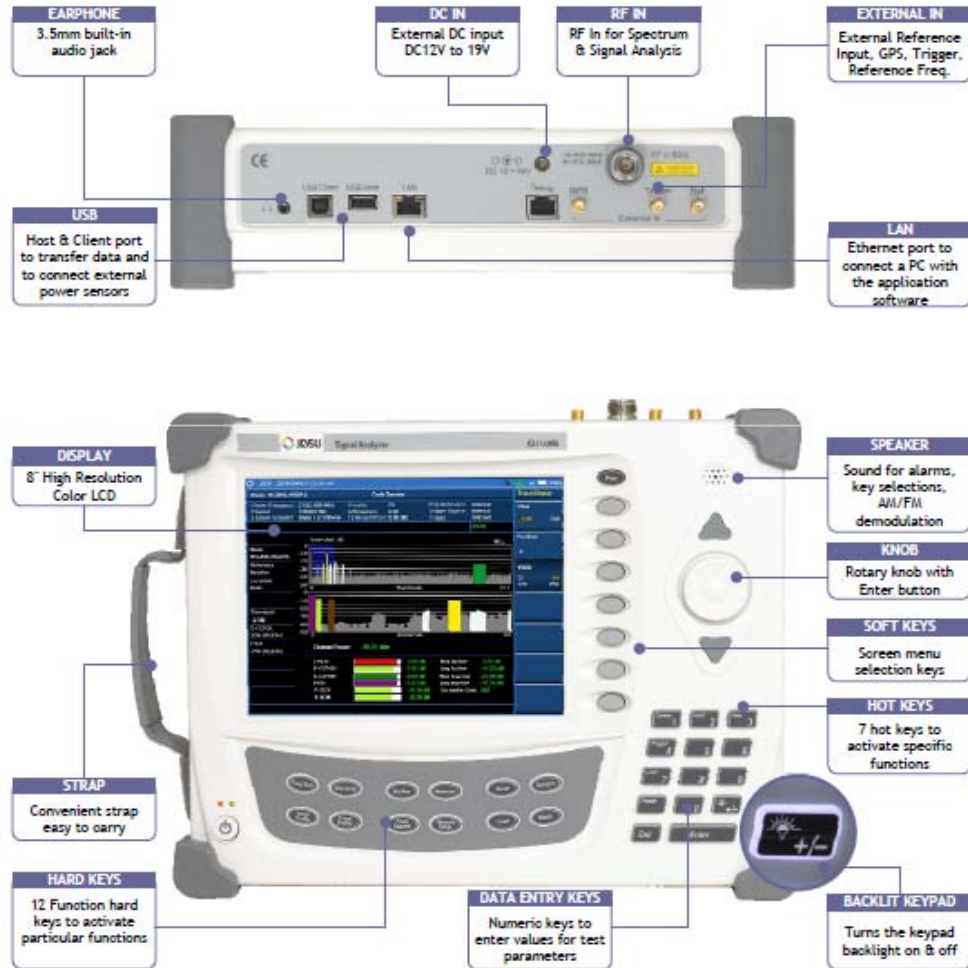
The Signal Analyzers configurable channel scanner can track the power level of 20 carriers in a single measurement screen, tracking the power level of each carrier.

Multi language user interface

The instrument's architecture allows the graphical user interface to adapt into different languages, permitting localization around the world.

3

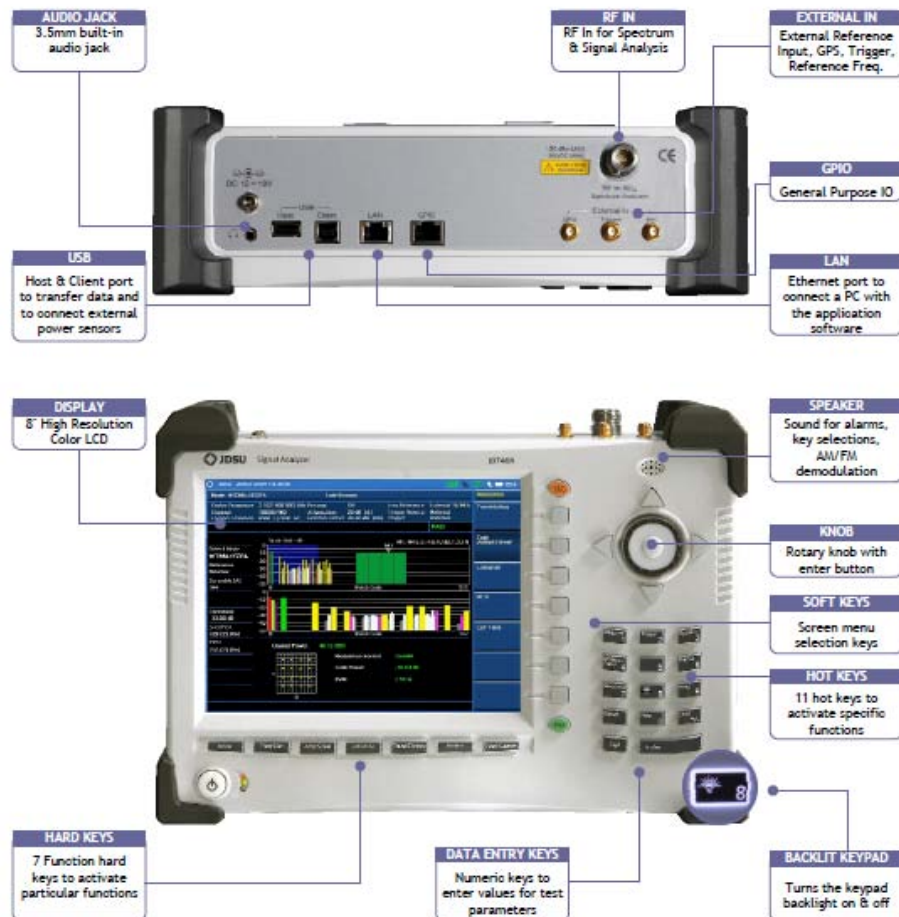
JD7108B Integrated Functionality



JD708B Integrated Functionality

Spectrum Analyzer 100 kHz to 7.2 GHz	Locates and identifies various signals over a frequency range up to 7.2 GHz.
Built in Pre-amplifier	Detects signal as low as -160 dBm with phase noise -100 dBc/Hz at 30 kHz offset and measurement accuracy better than 1dB.
Zero Span with Gate Sweep	Triggers pulse or burst signal such as WiMAX, GSM, and TD-SCDMA.
GPS Receiver and Antenna (option 010)	Provides geographical location and highly accurate frequency and time base enabling precise frequency measurements.
Interference Analyzer (option 011)	Provides the parameters of spectrogram and a multi-signal RSSI required to properly monitor, identify, and located interference signals. In addition it is capable of generating an audible variable tone accordingly to the signal strength.
Channel Scanner (option 012)	Intuitive graphical representation of the signal's power for each of the 20 user-definable carriers (frequencies or channels) allowing a fast identification of improper power levels.
Signal Analyzer (option 020 to 028)	Provides 3GPP/3GPP2/IEEE802.16 conformance for testing for power and spectrum, as well as modulation analysis from 2G to 4G wireless technologies.
Over The Air Analyzer (option 040 to 048)	Characterizes the transmission quality at any location providing reflective measurements and identifying signals providing from different sites.

JD748A Integrated Functionality



JD748A Integrated Functionality

Spectrum Analyzer 100 kHz to 4 GHz	Locates and identifies various signals over a frequency range up to 4 GHz.
Built in Pre-amplifier	Detects signal as low as -155 dBm with phase noise -90 dBc/Hz at 30 kHz offset and measurement accuracy better than 1 dB.
Zero Span with Gate Sweep	Triggers pulse or burst signal such as WiMAX, GSM, and TDSCDMA.
GPS Receiver and Antenna (option 010)	Provides geographical location and highly accurate frequency and time base enabling precise frequency measurements.
Interference Analyzer (option 011)	Provides the parameters of spectrogram and a multi-signal RSSI required to properly monitor, identify, and located interference signals. In addition it is capable of generating an audible variable tone accordingly to the signal strength.
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Over The Air Analyzer (option 040 to 048)	Characterizes the transmission quality at any location providing reflective measurements and identifying signals providing from different sites.

Spectrum Analyzer

The Signal Analyzers have a general purpose spectrum analyzer which is the most flexible test tool for RF analysis including spectrum monitoring and analysis. The spectrum analysis function provides the capability of one-button standards based power measurements for wireless signals.

- Channel Power
- Adjacent Channel Power
- Occupied Bandwidth
- Spurious Emissions
- Spectrum Emission Mask
- Field Strength

Specifications

The Signal Analyzers have one of the best sensitivity and selectivity specifications. With its built-in preamplifier, measurements can be done as low as -160 dBm¹ with a 1 Hz RBW.

Its low SSB phase noise allows detecting very low level spurs or noise signals which are close to the carrier. Its narrow (1 Hz) bandwidth ensures the identification of signals that are very close in frequency.

In addition, the narrow RBW means that the displayed noise level can be reduced improving sensitivity.

Its Auto Sweep time and Auto RBW/VBW allows an easy set up for a fast sweep time while ensuring accurate measurement.

- Frequency Range:
100 kHz to 7.2 GHz (JD7108B)
100 KHz to 4.0 GHz (JD748A)
- DANL (RBW 1 Hz, $f_c < 1$ GHz)
 -145 dBm¹
 -160 dBm with preamp¹
- Sweep Time
10 ms to 1000 s
6 μ s to 200 s in zero span
- RBW: 1 Hz to 3 MHz
- VBW: 1 Hz to 3 MHz
- SSB Phase Noise
 -100 dBc/Hz @ 30 kHz¹
 -102 dBc/Hz @ 100 kHz¹
 -115 dBc/Hz @ 1 MHz¹

Capabilities

- Built-in Preamplifier
Zero Span with Gated Sweep
AM/FM Audio Demodulation
- Multiple Detectors;
Normal, RMS, Sample
Negative, Peak

- Advanced Marker
Frequency counter
Noise marker
- Limit Line
Up to 6 markers and 6 traces

Measurements

Channel power measures the power level, spectral density and peak to average ratio (PAR) of the signal in a specified channel bandwidth, showing a “Pass” or “Fail” condition according to the defined power.



Channel Power

Occupied bandwidth measures the frequency bandwidth that contains the specified percentage of the power, the total integrated power and the occupied power, showing a “Pass” or “Fail” condition according to the defined bandwidth.



Occupied Bandwidth

6

Adjacent channel power (ACP) measures the amount of interference, or power, in an adjacent frequency channels and its ratios, showing a "Pass" or "Fail" condition according to the defined test condition.



Adjacent Channel Power

Spectrum emission mask (SEM) compares the total power level within the defined carrier bandwidth and offset frequencies according to the defined mask limits with "Pass" or "Fail" result.



Spectrum Emission Mask

Spurious emissions identifies and determines the power level of spurious emissions in certain frequency bands, showing a "Pass" or "Fail" condition according to the defined mask limits.



Spurious Emissions

Field strength offers quick and convenient field strength measurement and analysis with the userdefinable user-definable multi segment line. The field strength measurement is easy to make once the antenna factors are specified in the analyzer.

AM/FM audio demodulation allows an easy identification of interfering signals. The AM/FM signal can be demodulated into the instrument's built-in speaker or through a headset.

Spectrum Analyzer can be simultaneously operated with CW Signal Generator (option 003). It is easily fulfilling the guideline of >100 dB required for repeater and antenna isolation measurement.

Power Meter

The Signal Analyzers perform two different methods of power measurement; the first is an internal power measurement for standard power testing without the assistance of external power sensors and the second is interfacing with an external power sensor for high accuracy power measurements.

Internal power measurement	External power measurement	
Frequency range	Terminating power sensor	Directional (through line) power sensor
• 10 MHz to 7.2 GHz ¹	JD732A	JD731A/JD733A
Dynamic range	• Average power	• Forward average power
• -120 to +30 dBm ¹	JD734A	• Forward peak power
Measurement type	• Peak power	• Reverse average power
• RMS	JD736A	• VSWR
• Peak	• Average and peak power	

The Power Meter function also provides a Pass/Fail condition with user-definable limits. The test results are displayed in dBm and Watts. The power measurement can be set as an absolute measurement displayed in dBm or as a relative measurement displayed in dB.

The JD7108B and JD748A display the power level in two formats, as a real-time power level value in an analog meter, and as a power level trend through time in a histogram chart.

For high-precision power measurements the JD7108B and JD748A interface with external power sensors through a USB connection. There are two types of power sensors:

- **Termination power:** Power sensor JD732A, JD734A, or JD736B. For out-of-service testing.
- **Directional power or through line:** Power sensors JD731A or JD733A. Having the advantage to perform in-service power testing.



Internal Power Measurement



External Power Measurement

Interference Analyzer

The Interference Analyzer (option 11) is the most effective way to locate and identify periodic or intermittent RF interferences. The presence of interference signals are derived from licensed or unlicensed transmitters of many kinds causing dropped calls and poor quality service.

Measurements

The **spectrum analyzer** with an audible indicator is especially useful during the process of locating the interferer source with a directional antenna.

The **audible tone** is proportional to the signal power strength. In addition a built-in AM/FM audio demodulator it provides a convenient identification of AM/FM signals.

Interference ID allows an automatic classification of the interfering signal providing a list of possible signal types corresponding to the signal selected.



The **spectrogram** captures spectrum activity over time indicating the power levels of the spectrum with different color identification.

The spectrogram is an effective measurement to identify periodic or intermittent signals. Postprocessing analysis can be done for each measurement over time using a time cursor.



Spectrogram

Received signal strength indicator (RSSI) is a multiple signal tracking metric that is particularly useful for measuring power level variations over time.

The RSSI measurement also allows the assignment of power limit lines for each signal generating an audible alarm and increasing an alarm counter every time any signal goes beyond the limit line.

For long-term analysis the RSSI measurement can be automatically saved into an external USB memory. Post-analysis can be done with the application software JDViewer.



Received Signal Strength Indicator

Signal Analyzer

The signal analyzer performs 3GPP/3GPP2/IEEE802.16 standard compliance testing for power and spectrum, as well as modulation analysis; making RF parametric analysis as well as modulation quality performance of modern wireless communication systems. It performs standard-based measurements with a single-button action, indicating a Pass/Fail condition according to the standard-based or userdefined limits.

The Auto Measure capability in Signal Analyzer creates easily set up testing scenarios, including the programming of measurement schedules such as starting time, duration, intervals and measurement parameters. Based on the user defined conditions, the JD7108B and JD748A perform the tests of up to 10 carriers and automatically store the results.

The Over The Air (OTA) Analyzer function provides over the air measurements for quick performance characterization of the base station. This measurement capability is especially useful in testing cell sites which are not easily accessible or the cell site proactively without interrupting service.

The Signal Analyzer provides following measurement capabilities:

- Spectrum analysis
- RF analysis
- Modulation analysis
- Auto measure



The modulation analysis can be performed in any of the following wireless technologies:

- cdmaOne/CDMA2000 (option 020)
- EV-DO (option 021)
- GSM/GPRS/EDGE (option 022)
- WCDMA/HSDPA (option 023 and 024)
- TD-SCDMA (option 025)
- Mobile WiMAX (option 026)
- LTE (option 028)

Available Over The Air (OTA) analysis are:

- cdmaOne/CDMA2000 (option 040)
- EV-DO (option 041)
- GSM/GPRS/EDGE (option 042)
- WCDMA/HSDPA (option 043)
- TD-SCDMA (option 045)
- Mobile WiMAX (option 046)
- LTE (option 048)



GSM/GPRS/EDGE Signal Analyzer

The GSM/GPRS/EDGE Signal Analyzer performs power and spectrum measurements as well as modulation analysis in a simple and easy manner with just a few key strokes.

It makes conformance testing according to the specifications (3GPP TS 51.021) providing a simple Pass/Fail indication on each test.

RF and modulation analysis (option 22) OTA analysis (option 42)

Channel power	Power vs time	Channel scanner
Occupied bandwidth	• Slot	Frequency scanner
Spectrum emission mask	• Frame	Multipath profile
Spurious emissions	Constellation	Modulation analyzer
	Auto Measure	

Measurements

Channel power measures the total RF power, spectral density and peak to average ratio (PAR) of the signal in a GSM channel bandwidth.

Occupied bandwidth measures the frequency bandwidth that contains 99% of the power, measuring the total integrated power and the occupied power.

Spectrum emission mask (SEM) compares the total power level within the defined carrier bandwidth and the given offset frequencies on both sides of the carrier frequency to levels allowed by the standards.

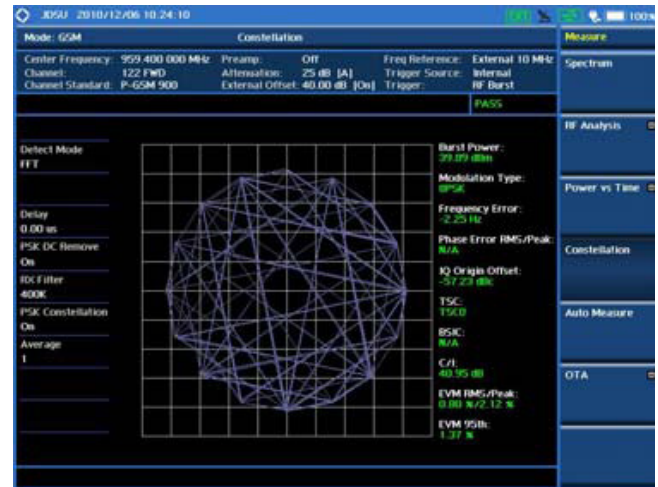


GSM Spectrum Emission Mask

Spurious emissions identifies and determines the power level of spurious emissions in certain frequency bands.

Power vs. time (slot) measures the modulation envelope in the time domain showing the signal rise and fall shape of GSM format.

I-Q constellation verifies the modulation quality including phase errors and I-Q origin offsets characterizing the modulation quality of GSM.



GSM Constellation

Over the air analyzer provides signal performance metrics at any point in the area served by the base station, including **multipath profile** indicating the strength of reflected signals; as well as **carrier over interference histogram** indicating the signal strength variation.



GSM OTA Modulation Analyzer

WCDMA/HSDPA Signal Analyzer

The WCDMA/HSDPA Signal Analyzer perform power and spectrum measurements, as well as modulation analysis in a simple and easy manner with just a few key strokes.

It performs conformance testing according to the following standards providing a simple Pass/Fail indication on each test.

- 3GPP TS 25.104. Base Station radio transmission and reception (FDD)
- 3GPP TS 25.141. Base Station (BS) conformance test (FDD)
- 3GPP TS 25.211. Physical channel and mapping of transport channels onto physical channels (FDD)
- 3GPP TS 25.212. Multiplexing and channel coding (FDD)
- 3GPP TS 25.213. Spreading and modulation (FDD)

RF and modulation analysis (option 23, 24)

Channel power
Occupied bandwidth
Spectrum emission mask
ACLR
Multi-ACLR
Spurious emissions

OTA analysis (option 43)

Constellation
Code domain power
Scramble scanner
Codogram
Multipath profile
Code domain power
RCSI
CDP table
Auto measure
Power statistics CCDF

Measurements

Channel power measures the total RF power, spectral density and peak to average ratio (PAR) of the signal in a WCDMA channel bandwidth.



WCDMA Channel Power

Occupied bandwidth measures the frequency bandwidth that contains 99% of the power, measuring the total integrated power and the occupied power.

Spectrum emission mask (SEM) compares the total power level within the defined carrier bandwidth and the given offset frequencies on both sides of the carrier frequency to levels allowed by the standards

Adjacent channel leakage power ratio (ACLR) measures the amount of interference, or power, in adjacent frequencies and its ratios specified by the standards.



WCDMA Multi-ACLR

Spurious emissions identifies and determines the power level of spurious emissions in certain frequency bands.

WCDMA/HSDPA Signal Analyzer

The **constellation** measurement displays the I-Q constellation diagram with modulation metrics to characterize the transmitter's modulation performance.



WCDMA Constellation

Code domain power (CDP) measures power levels of the spread code channels across WCDMA RF channel, normalized to the total WCDMA power.

CDP shows the physical channels of the WCDMA signal, and identifies the various spread factors by different color types, making it easy to differentiate traffic types carried in the WCDMA signal.



WCDMA Code Domain Power

The **codogram** displays the power variation for every code over time, presenting a clear view of the traffic load per channels at any given time.



WCDMA Codogram

Received code strength indicator (RCSI) shows the power variation over time of WCDMA control channels: CPICH, P-CCPCH, S-CCPCH, PICH, P-SCH, and S-SCH.

For long-term analysis the codogram and RCSI measurements can be automatically saved into an external USB memory. Post-analysis can be done with the application software JDViewer.

The **complementary cumulative distribution function (CCDF)** characterizes the statistical power level distribution of WCDMA at any given time.

The **over the air (OTA) analyzer** covers four key parameters: channel scanner, scramble scanner, multipath profile, and code domain power.

The code domain power in OTA analyzer shows not only modulation performance metrics but also amplifier capacity and code utilization metrics.



WCDMA OTA Code Domain Power

CDMAONE/CDMA2000 Signal Analyzer

The cdmaOne/CDMA2000 Signal Analyzer performs power and spectrum measurements, as well as modulation analysis in a simple and easy manner with just a few key strokes.

It performs conformance testing according to the following standards providing a simple Pass/Fail indication on each test.

- 3GPP2 C.S0002. Physical Layer Standard for CDMA2000 Spread Spectrum Systems
- 3GPP2 C.S0010. Recommended Minimum Performance Standards for CDMA2000 Spread Spectrum Base Station

RF and modulation analysis (option 20)

Channel power
Occupied bandwidth
Spectrum emission mask
ACPR
Multi-ACPR
Spurious emissions

OTA analysis (option 40)

Constellation
Code domain power
Scramble scanner
Multipath profile
RCSI
Code domain power
CDP table
Auto measure
Power statistics CCDF

Measurements

Channel power measures the total RF power, spectral density and peak to average ratio (PAR) of the signal in a cdmaOne or CDMA2000 channel bandwidth.

Occupied bandwidth measures the frequency bandwidth that contains 99% of the power, measuring the total integrated power and the occupied power.



CDMA Occupied Bandwidth

Spectrum emission mask (SEM) compares the total power level within the defined carrier bandwidth and the given offset frequencies on both sides of the carrier frequency to levels allowed by the standards.

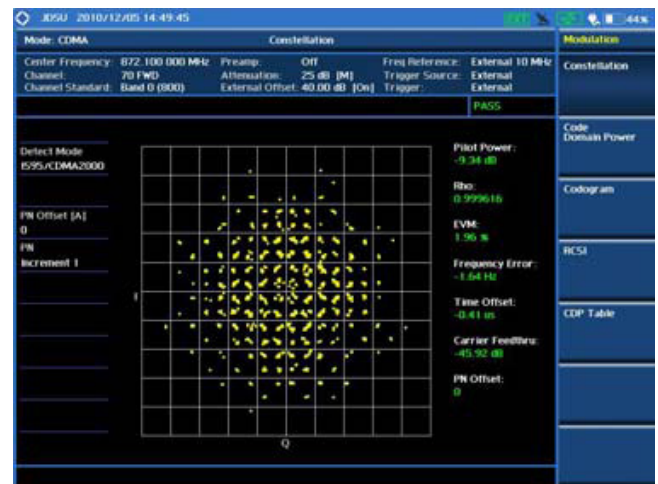


CDMA Spectrum Emission Mask

Adjacent channel power ratio (ACPR) measures the amount of interference, or power, in adjacent frequencies and its ratios specified by the standards.

Spurious emissions identifies and determines the power level of spurious emissions in certain frequency bands. The Constellation measurement displays the I-Q constellation diagram with modulation metrics to characterize the transmitter's modulation performance.

The **constellation** measurement displays the I-Q constellation diagram with modulation metrics to characterize the transmitter's modulation performance.

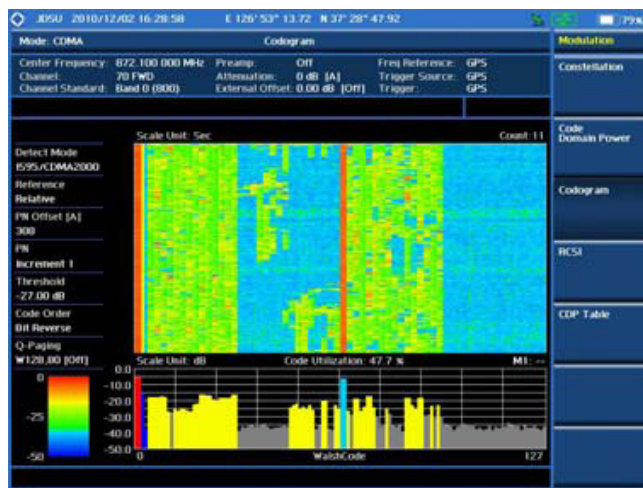


CDMA Constellation

Code domain power (CDP) measures power levels of the spread code channels across cdmaOne or CDMA2000 RF channel, normalized to the total CDMA power.

CDP shows the physical channels of the cdmaOne or CDMA2000 and identifies the various spread factors by different color types, making it easy to differentiate traffic types carried in the CDMA signal.

The **codogram** displays the power variation for every code over time, presenting a clear view of the traffic load per channels at any given time.



CDMA Codogram

Received code strength indicator (RCSI) shows the power variation over time of cdmaOne or CDMA2000 control channels: Pilot, Page, Sync, and Quick Page.

For long-term analysis the codogram and RCSI measurements can be automatically saved into an external USB memory. Post-analysis can be done with the application software JDViewer.



CDMA RCSI

The **complementary cumulative distribution function (CCDF)** characterizes the statistical power level distribution of cdmaOne or CDMA2000 at any given time.

The **over the air (OTA) analyzer** covers four key parameters: channel scanner, PN scanner, multipath profile, and code domain power.

The code domain power in OTA analyzer shows not only modulation performance metrics but also amplifier capacity and code utilization metrics.



CDMA OTA Channel Scanner

EV-DO Signal Analyzer

The EV-DO Signal Analyzer performs power and spectrum measurements, as well as modulation analysis in a simple and easy manner with just a few key strokes.

It performs conformance testing according to the following standards providing a simple Pass/Fail indication on each test.

- 3GPP2 C.S0024-B. CDMA2000 High Rate Packet Data Air Interface Specification
- 3GPP2 C.S0032-B. Recommended Minimum Performance Standards for CDMA2000 High Rate Packet Data Access Network

RF and modulation analysis (option 21)

Channel power
Occupied bandwidth
Spectrum emission mask
ACPR
Multi-ACPR
Spurious emissions
Power vs Time
• Idle Slot
• Active Slot

OTA analysis (option 41)

Channel scanner
Scramble scanner
Multipath profile
Code domain power
Channel power
Composite 64,
Composite 128
Pilot, MAC 64, MAC
128, Data
Code domain power
Pilot, MAC 64, MAC
128, Data
MAC Codogram
MAC CDP table
Auto measure
Power statistics CCDF

Measurements

Channel power measures the total RF power, spectral density and peak to average ratio (PAR) of the signal in an EV-DO channel bandwidth.



EV-DO Channel Power

Occupied bandwidth measures the frequency bandwidth that contains 99% of the power, measuring the total integrated power and the occupied power.

Spectrum emission mask (SEM) compares the total power level within the defined carrier bandwidth and the given offset frequencies on both sides of the carrier frequency to levels allowed by the standards.

Adjacent channel power ratio (ACPR) measures the amount of interference, or power, in adjacent frequencies and its ratios specified by the standard.



EV-DO ACPR

Spurious emissions identifies and determines the power level of spurious emissions in certain frequency bands.

Power vs. time measures the modulation envelope in the time domain showing the signal rise and fall shape of EV-DO format.



EV-DO Power vs. Time (Idle Slot)

The **constellation** measurement displays the I-Q constellation diagram with modulation metrics to characterize the transmitter's modulation performance.

Code domain power (CDP) measures power levels of the spread code channels across EV-DO channels, normalized to the total EV-DO power.



EV-DO Data Code Domain

CDP pilot/MAC displays the power of various demodulated codes in the pilot/MAC channel.

CDP data displays the power of the 16 sub-channels of the data channel separately.

The **MAC codogram** displays the power variation for every code over time, presenting a clear view of the traffic load per channels at any given time.

Received code strength indicator (RCSI) shows the power variation over time of EV-DO channels: Pilot, MAC and Data.

For long-term analysis the Codogram and RCSI measurements can be automatically saved into an external USB memory. Post-analysis can be done with the application software JDViewer.



EV-DO RCSI

The **complementary cumulative distribution function (CCDF)** characterizes the statistical power level distribution of EV-DO at any given time.

The **over the air (OTA) analyzer** covers four key parameters: channel scanner, pilot scanner, multipath profile, and code domain power.



EV-DO OTA PN Scanner

TD-SCDMA Signal Analyzer

The TD-SCDMA Signal Analyzer performs power and spectrum measurements, as well as modulation analysis in a simple and easy manner with just a few key strokes.

It performs conformance testing according to the following standards providing a simple Pass/Fail indication on each test.

- 3GPP TS 25.105. Base Station radio transmission and reception (TDD)
- 3GPP TS 25.142. Base Station conformance testing (TDD)
- 3GPP TS 25.222. Multiplexing and channel coding (TDD)
- 3GPP TS 25.223. Spreading and modulation (TDD)

RF and modulation analysis (option 25)

Channel power
Occupied bandwidth
Spectrum emission mask
ACLR
Multi-ACLR
Spurious emissions
Power vs time
• Slot, frame
• Mask, timogram

OTA analysis (option 45)

Sync-DL ID scanner
Sync-DL ID vs Tau
Sync-DL ID Multipath
Sync-DL ID analyzer

Measurements

Channel power measures the total RF power, spectral density and peak to average ratio (PAR) of the signal in a TD-SCDMA channel bandwidth.

Occupied bandwidth measures the frequency bandwidth that contains 99% of the power, measuring the total integrated power and the occupied power.



TD-SCDMA Occupied BW

Spectrum emission mask (SEM) compares the total power level within the defined carrier bandwidth and the given offset frequencies on both sides of the carrier frequency to levels allowed by the standards.



TD-SCDMA SEM

Adjacent channel leakage power ratio (ACLR) measures the amount of interference, or power, in adjacent frequencies and its ratios specified by the standards.

Spurious emissions identifies and determines the power level of spurious emissions in certain frequency bands.

Power vs. time verifies that the transmitter output power has the correct amplitude, shape, and timing for TD-SCDMA format.

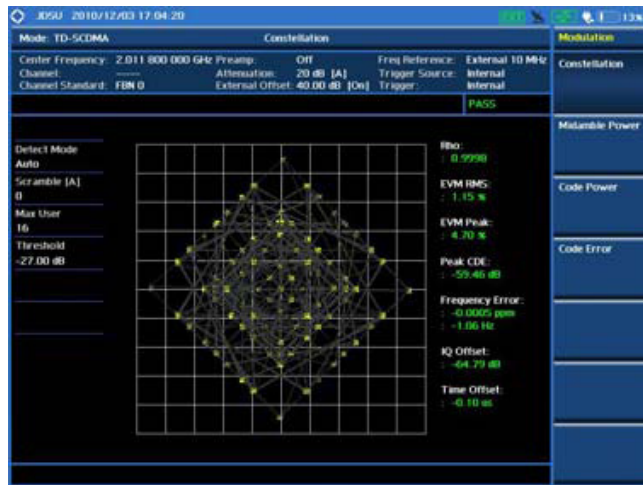


TD-SCDMA Power vs. Time (Frame)

18

The **timogram** displays and shows how power level changes over time making it easier to see UpPTS and DwPTS activity over time, identifying interference on UpPTS by the DwPTS transmitted from adjacent base stations.

The **constellation** measurement displays the I-Q constellation diagram with modulation metrics to characterize the transmitter's modulation performance.



TD-SCDMA Constellation

Code power provides the power data for an individual code channel and layer for a specified time slot. It displays the power of the 16 codes of a TD-SCDMA signal.



TD-SCDMA Code Power

Code error shows the power data and error data for an individual code channel and layer for a specified time simultaneously.

The **over the air (OTA) analyzer** provides four essential measurements: ID scanner, ID vs Tau, ID multipath, and ID analyzer.

Over the air analyzer provides signal performance metrics at any point in the area served by the base station, including **multipath profile** indicating the strength of reflected signals; as well as **carrier over ID histogram** indicating the signal strength variation.



TD-SCDMA OTA Sync-DL ID Analyzer

MOBILE WIMAX SignalAnalyzer

The Mobile WiMAX Signal Analyzer performs power measurements and spectrum measurements, as well as modulation analysis in a simple and easy manner with just a few key strokes.

It performs conformance testing according to the following standards providing a simple Pass/Fail indication on each test.

- IEEE 802.16e-2005
- WiBro (Korean Mobile WiMAX OFDMA Service)

RF and modulation analysis (option 26)

Channel power
Occupied bandwidth
Spectrum emission mask
Spurious emissions
Power vs time (frame)

OTA analysis (option 46)

Preamble scanner
Multipath profile
Preamble power Trend
Code power
Code error
Auto measure

Measurements

Channel power measures the total RF power, spectral density and peak to average ratio (PAR) of the signal in a Mobile WiMAX channel bandwidth.



WiMAX Channel Power

Occupied bandwidth measures the frequency bandwidth that contains 99% of the power, measuring the total integrated power and the occupied power.

Spectrum emission mask (SEM) compares the total power level within the defined carrier bandwidth and the given offset frequencies on both sides of the carrier frequency to levels allowed by the standards. Spurious Emissions identifies and determines the power level of spurious emissions in certain frequency bands.



WiMAX Spectrum

Spurious emissions identifies and determines the power level of spurious emissions in certain frequency bands.

Power vs. time (frame) verifies that the transmitter output power has the correct amplitude, shape, and timing according to the standards.



WiMAX Power vs. Time (Frame)

The **constellation** measurement displays the I-Q constellation diagram with modulation metrics to characterize the transmitter's modulation performance.



WiMAX Constellation

Spectral flatness measures the flatness energy of the constellation according to the Standards.



WiMAX Spectral Flatness

EVM vs. subcarrier shows the error vector magnitude representing the average constellation error of WiMAX OFDMA subcarriers.

EVM vs. symbol shows the error vector magnitude representing the average constellation error of WiMAX OFDMA symbols.

The **complementary cumulative distribution function (CCDF)** characterizes the statistical power level distribution of WiMAX at any given time.

The **over the air (OTA) analyzer** provides three essential measurements: preamble scanner, multipath profile, and preamble Power Trend.

Over the air analyzer provides cell ID, sector ID and preamble at any point in the area served by the base station, including **multipath profile** indicating the strength of reflected signals; as well as **carrier over interference histogram** indicating the signal strength variation.



WiMAX OTA Preamble Scanner

LTE Signal Analyzer

The LTE Signal Analyzer performs power measurements and spectrum measurements, as well as modulation analysis in a simple and easy manner with just a few key strokes.

It performs conformance testing according to the following standards providing a simple Pass/Fail indication on each test.

- 3GPP TS 36.104. Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) Radio Transmission and Reception
- 3GPP TS 36.141. Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) Conformance Testing
- 3GPP TS 36.211. Evolved Universal Terrestrial Radio Access (E-UTRA); Physical Channels and Modulation
- 3GPP TS 36.212. Evolved Universal Terrestrial Radio Access (E-UTRA); Multiplexing and Channel Coding

RF and modulation analysis (option 28)

Channel power
Occupied bandwidth
Spectrum emission mask
ACLR
Spurious emissions
Power vs time (frame)

OTA analysis (option 48)

Data Channel Summary
Control Channel
Summary
Subframe Summary
Frame Summary
Auto Measure
Power Statistics CCDF

Measurements

Channel power measures the total RF power, spectral density, and peak to average ratio (PAR) of the signal in a LTE channel bandwidth.



LTE Channel Power

Occupied bandwidth measures the frequency bandwidth that contains 99% of the power, measuring the total integrated power and the occupied power.

Spectrum emission mask (SEM) compares the total power level within the defined carrier bandwidth and the given offset frequencies on both sides of the carrier frequency to levels allowed by the standards.

Adjacent channel leakage power ratio (ACLR) measures the amount of interference, or power, in adjacent frequencies and its ratios specified the standards.



LTE ACLR

Spurious emissions identifies and determines the power level of spurious emissions in certain frequency bands.

Power vs. time (frame) measures the modulation envelope in the time domain, showing the power of each time slot in an LTE signal.

Data channel summary measures the constellation for the specified resource block as well as the modulation accuracy of each PDSCH's at the specified subframe.



LTE Data Channel Summary

22

Control channel summary measures the constellation for the specified control channels as well as modulation accuracy of the control channels at the specified subframe.



LTE Control Channel Summary

Subframe summary measures the modulation accuracy of all the data and control channels at the specified subframe.

Frame summary measures the modulation accuracy of all the data and control channels at of the frame.



LTE Frame Summary

The **complementary cumulative distribution function (CCDF)** characterizes the statistical power level distribution of LTE at any given time.

Over the air analyzer provides signal performance metrics at any point in the area served by the base station, including **multipath profile** indicating the strength of reflected signals; as well as **RS histogram** indicating the signal strength variation.



LTE OTA Control Channel

Channel Scanner

The Channel Scanner function (option 12) is capable of measuring up to 20 independent channels, of any cellular technology, at any frequency channel or frequency.

The channel scanner function provides a simple view of the power level of each signal type.



Channel Scanner

GPS Receiver and Antenna

The GPS Receiver (option 11) provides position location (latitude, longitude and altitude), as well as timing for highly accurate frequency measurement, allowing an independent verification of base station timing.



JD7108B with GPS Antenna

Application Software

The JD7108B and JD748A communicate with the PC application software JDViewer to retrieve measurements and perform post-processing analysis and reporting.

Features

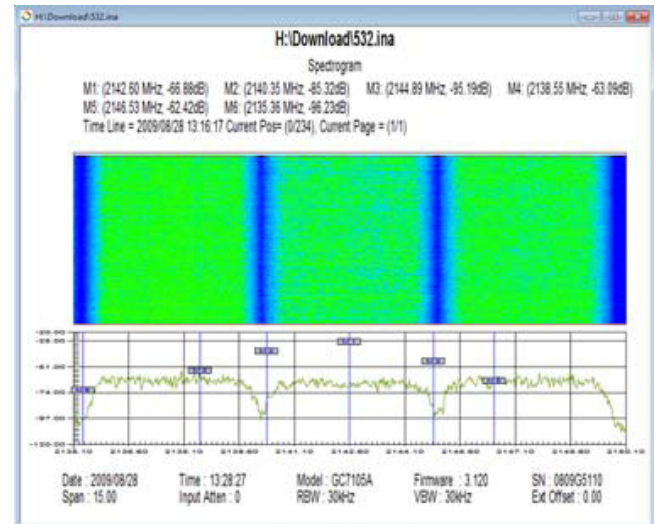
- Communicates with the JD7108B and JD748A via LAN or USB.
- Retrieves measured or saved measurements.
- Exports measurement results.
- Generates and prints configurable reports.
- Edits measurement charts.
- Creates a composite file of multiple spectrogram traces.
- Analyzes measurement results allowing the assignment of multiple markers and limit lines.
- Creates user defined settings for channel power, occupied BW, spectrum emission mask, and adjacent channel power measurements.
- Creates or edits multi-segment lines for insertion gain and loss measurements.
- Creates Auto Measure scenarios for multi-carrier signal analysis.



JDViewer Spectrum, Spectrogram and RSSI

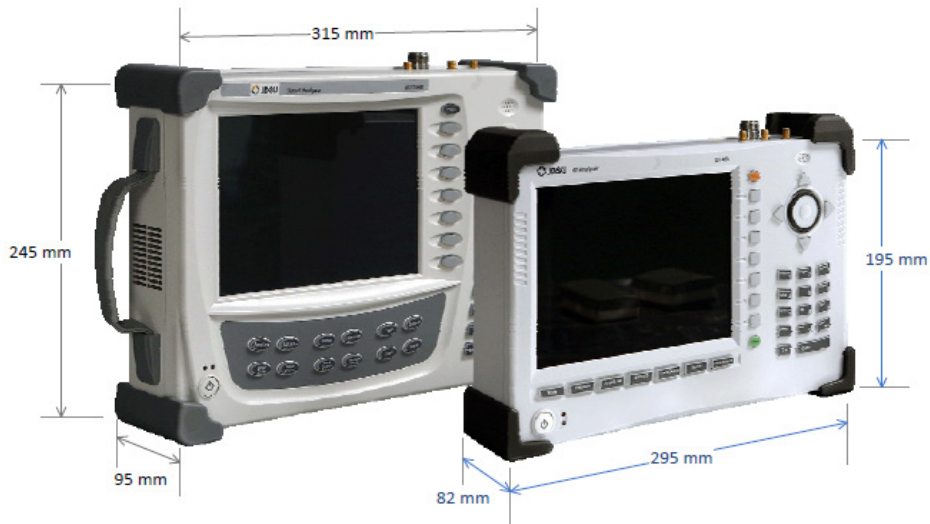


JDViewer Spectrum, Demodulation



JDViewer Spectrogram, RSSI

JDSU Signal Analyzer Family



Features	JD7108B	JD748A
Spectrum analyzer	100 kHz to 7.2 GHz	100 kHz to 4.0 GHz
Power meter		
RF power meter (Internal)	Standard	Standard
RF power meter (External)	Required external power sensors	Required external power sensors
GPS receiver and antenna	Option 010	Option 010
Interference analyzer	Option 011	Option 011
Channel scanner	Option 012	Option 012
Signal analyzer		
Demodulation hardware	20 MHz, standard	10 MHz option

26

Ordering information

JD7108B

Spectrum Analyzer	100 kHz to 7.2 GHz	
Power Meter	10 MHz to 7.2 GHz	Internal mode

Options

NOTE: Upgrade options for the JD7108B use the designation JD7108BU before the respective last two digit option number.

JD7108B010	GPS Receiver and Antenna	
JD7108B011	Interference Analyzer ^{1,2}	
JD7108B012	Channel Scanner	
JD7108B020	cdmaOne/CDMA2000 Signal Analyzer	
JD7108B021	EV-DO Signal Analyzer	(Requires option 20)
JD7108B022	GSM/GPRS/EDGE Signal Analyzer	
JD7108B023	WCDMA Signal Analyzer	
JD7108B024	HSDPA Signal Analyzer	(Requires option 23)
JD7108B025	TD-SCDMA Signal Analyzer	
JD7108B026	Mobile WiMAX Signal Analyzer	
JD7108B028	LTE Signal Analyzer	
JD7108B040	cdmaOne/CDMA2000 OTA Analyzer ²	(Requires options 10 and 20)
JD7108B041	EV-DO OTA Analyzer ²	(Requires options 10 and 21)
JD7108B042	GSM/GPRS/EDGE OTA Analyzer ²	(Requires options 10 and 22)
JD7108B043	WCDMA/HSDPA OTA Analyzer ²	(Requires options 10 and 23/24)
JD7108B045	TD-SCDMA OTA Analyzer ²	(Requires options 10 and 25)
JD7108B046	Mobile WiMAX OTA Analyzer ²	(Requires options 10 and 26)
JD7108B048	LTE OTA Analyzer ²	(Requires options 10 and 028)

¹Highly recommends adding JD7108B010

²Highly recommends adding G70005035x and/or G70005036x

Standard Accessories

JD71050341	Soft Carrying Case ³
G710550322	AC/DC Power Adapter ³
G710550335	Cross LAN Cable (1.5 m) ³
GC73050515	USB A to B Cable (1.8 m) ³
GC72450518	> 1 G Byte USB Memory ³
G710550325	Rechargeable Lithium Ion Battery ³
G710550323	Automotive Cigarette Lighter 12 VCD Adapter ³
JD7108B361	D7108B User's Manual and Application Software – CD

³Standard accessories can be purchased separately.

Ordering information

JD748A

Spectrum Analyzer	100 kHz to 4 GHz
Power Meter Internal mode	10 MHz to 4 GHz

Options

NOTE: Upgrade options for the JD748A use the designation JD748AU before the respective last three digit option number.

JD748A009	10 MHz Demodulation Hardware	
JD748A010	GPS Receiver and Antenna	
JD748A011	Interference Analyzer ^{1,2}	
JD748A012	Channel Scanner	
JD748A020	cdmaOne/CDMA2000 Signal Analyzer	(Requires option 9)
JD748A021	EV-DO Signal Analyzer	(Requires option 9 and 20)
JD748A022	GSM/GPRS/EDGE Signal Analyzer	(Requires option 9)
JD748A023	WCDMA Signal Analyzer	(Requires option 9)
JD748A024	HSDPA Signal Analyzer	(Requires option 9 and 23)
JD748A025	TD-SCDMA Signal Analyzer	(Requires option 9)
JD748A026	Mobile WiMAX Signal Analyzer	(Requires option 9)
JD748A028	LTE Signal Analyzer	(Requires option 9)
JD748A040	cdmaOne/CDMA2000 OTA Analyzer ²	(Requires options 10 and 20)
JD748A041	EV-DO OTA Analyzer ²	(Requires options 10 and 21)
JD748A042	GSM/GPRS/EDGE OTA Analyzer ²	(Requires options 10 and 22)
JD748A043	WCDMA/HSDPA OTA Analyzer ²	(Requires options 10 and 23/24)
JD748A045	TD-SCDMA OTA Analyzer ²	(Requires options 10 and 25)
JD748A046	Mobile WiMAX OTA Analyzer ²	(Requires options 10 and 26)
JD748A048	LTE OTA Analyzer ²	(Requires options 10 and 028)

¹Highly recommends adding JD748A010

²Highly recommends adding G70005035x and/or G70005036x

Standard Accessories

G710550322	AC/DC Power Adapter ³
G710550335	Cross LAN Cable (1.5 m) ³
GC73050515	USB A to B Cable (1.8 m) ³
GC72450518	> 1 G Byte USB Memory ³
G710550325	Rechargeable Lithium Ion Battery ³
G710550323	Automotive Cigarette Lighter 12 VCD Adapter ³
JD748A361	JD748A User's Manual and Application Software – CD

³Standard accessories can be purchased separately.

Ordering information

Optional Power Sensors

JD731A	Directional Power Sensor (peak and average power) Frequency: 300 MHz to 3.8 GHz Power: Average 0.15 to 150 W, Peak 4 to 400 W
JD733A	Directional Power Sensor (peak and average power) Frequency: 150 MHz to 3.5 GHz Power: Average/Peak 0.25 to 20 W
JD732A	Terminating Power Sensor (average power) Frequency: 20 MHz to 3.8 GHz Power: -30 to 20 dBm
JD734A	Terminating Power Sensor (peak power) Frequency: 20 MHz to 3.8 GHz Power: -30 to 20 dBm
JD736A	Terminating Power Sensor (peak and average power) Frequency: 20 MHz to 3.8 GHz Power: -30 to 20 dBm

Optional RF Cables

G710050531	1.5 m (4.92 ft) Precision RF Cable, DC to 18 GHz, N(m)-N(f), 50 Ω
G710050532	3.0 m (9.84 ft) Precision RF Cable, DC to 18 GHz, N(m)-N(f), 50 Ω

Optional Omni Antennas

G700050351	RF Omni Antenna 400 MHz to 450 MHz
G700050352	RF Omni Antenna 450 MHz to 500 MHz
G700050353	RF Omni Antenna 806 MHz to 896 MHz
G700050354	RF Omni Antenna 870 MHz to 960 MHz
G700050355	RF Omni Antenna 1710 MHz to 2170 MHz

Optional Yaggi Antennas

G700050364	RF Yaggi Antenna 806 MHz to 896 MHz
G700050365	RF Yaggi Antenna 866 MHz to 960 MHz
G700050363	RF Yaggi Antenna 1750 MHz to 2390 MHz

Optional Adapters

G710050571	Adapter N(m) to DIN(f), DC to 4 GHz, 50 Ω
G710050572	Adapter DIN(m) to DIN(m), DC to 4 GHz, 50 Ω
G710050573	Adapter N(m) to SMA(f), DC to 18 GHz, 50 Ω
G710050574	Adapter N(m) to BNC(f), DC to 1.5 GHz, 50 Ω
G710050575	Adapter N(f) to N(f), DC to 4 GHz, 50 Ω
G710050576	Adapter N(m) to DIN(m), DC to 4 GHz, 50 Ω
G710050577	Adapter N(f) to DIN(f), DC to 4 GHz, 50 Ω
G710050578	Adapter N(f) to DIN(m), DC to 4 GHz, 50 Ω
G710050579	Adapter DIN(f) to DIN(f), DC to 4 GHz, 50 Ω

Ordering information
Miscellaneous

G710050581	Attenuator 40 dB, 100 W, DC to 4 GHz (Unidirectional)
JD74050341	JD740 Soft Carrying Case
JD71050342	Hard Carrying Case
JD71050343	Backpack Carrying Case
G710550324	External Battery Charger
JD7108B362	JD7108B User's Manual – Printed Version
JD748A362	JD748A User's Manual – Printed Version

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