JD7105B
Base Station Analyzer

Introduction

The Base Station Analyzer JD7105B is the optimal test tool for installation and maintenance of cell sites.

The JD7105B contains all the features and capabilities required to perform field testing of cell sites of all wireless technologies, from 2G to 4G.

The JD7105B includes all measurements required to properly characterize the cell site infrastructure and verify the overall base station performance. Its new platform extends its spectrum analysis frequency range while increasing sensitivity, dynamic range and improving measurement speed.

The standard features of the JD7105B include the following:

- Spectrum analyzer: 100 kHz to 7.2 GHz
- Cable and antenna analyzer: 25 MHz to 4 GHz
- Power meter: 10 MHz to 7.2 GHz

The JD7105B was designed with a flexible platform that can support any of the following functions.

- Interference analysis
- Channel scanner
- E1 and/or T1 analysis
- Signal analysis of CDMA2000, EV-DO, GSM, GPRS, EDGE, WCDMA, HSDPA, TDSCDMA, Mobile-WiMAX, and LTE

The JD7105B is the ideal field testing solution that combines portability, due to its lightweight design and battery extended operation; and performance, with its multifunction capability. The JD7105B has a strong enclosure design for harsh environments, and its back-light key panel makes nocturnal maintenance tasks possible.

JD7105B – Base Station Analyzer

JD7105B – Back-light Panel

Features

Easy User Interface

The JD7105B has a consistent and intuitive interface through its multiple functions providing a common menu structure that is easy to use.

The JD7105B has a built-in help capability which guides users through each measurement task.

Convenience

The JD7105B has a built-in Bias-Tee providing the capability to remotely power active devices in the base station such as tower mounted amplifiers.

The JD7105B was designed with a field operations approach in a compact and lightweight architecture with a color display viewable on daylight, and a back-light panel allowing measurements at night-time.

The JD7105B can be taken on a soft carry-case or on an ergonomically designed backpack for better manoeuvrability and storage capability.

Reduced Measurement Time

The JD7105B makes systematic measurements faster allowing the storage of measurement settings and results into the instrument's internal memory or an external USB memory drive. In addition, the instrument settings can be locked preventing unintentional modifications.

The JD7105B is capable of performing single button measurements such as channel power, occupied bandwidth, Spectrum emission mask and adjacent channel power ratio.

The JD7105B offers a multiple-signal strength indicator, providing in a single measurement the power measurement through time of userdefinable signals based on frequency (RSSI) or control channels (RCSI).

Automatic Measurements

The JD7105B auto-measure function allows a complete signal profiling covering RF characterization and modulation quality parameters of up to 20 different carriers, particularly useful on an overlay architecture where base stations are transmitting in different frequencies and different signal types.

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.

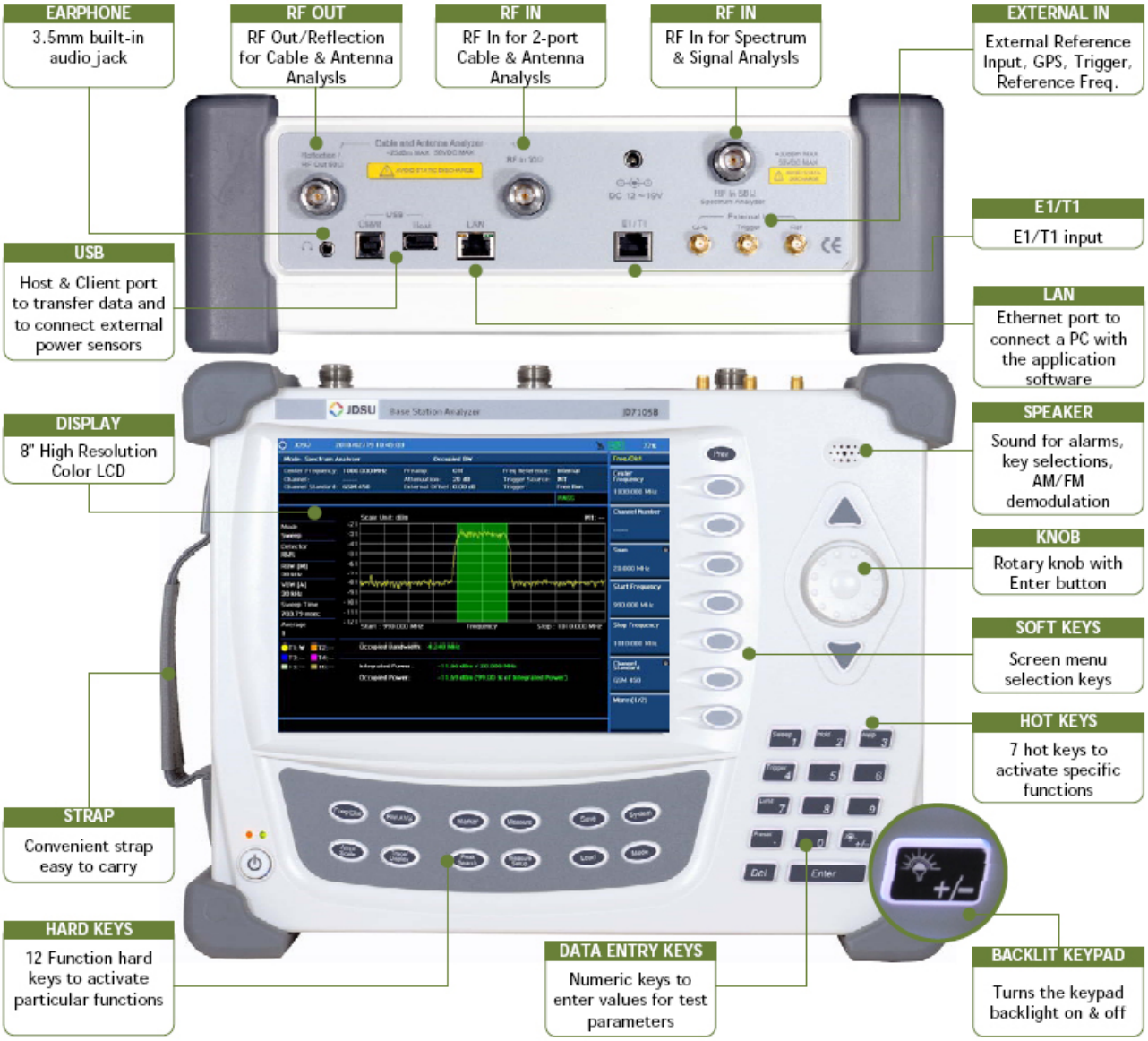
The JD7105B configurable channel scanner can track the power level of 20 carriers in a single measurement screen, tracking the power level of each carrier.

Easy to Upgrade

The JD7105B comes with software activated options, allowing in-field activation enabling users to have new options instantly.

This benefit provides the convenience of configuring the JD7105B for today's needs and an easy upgrade path for future requirements.

Integrated Functionality



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 -150 dBm with phase noise -100 dBc/Hz at 30 kHz offset and measurement accuracy better than 1dB.
Zero Span with Gate Sweep CW Signal Source	Provides a sine wave or continuous wave (CW) source allowing measurements such as repeater's isolation.
Cable and Antenna Analyzer	
25 MHz to 4 GHz	Provides cable and antenna characterization for proper power transfer from the radio to the antenna.
Reflection-VSWR/ Return Loss DTF – VSRW/Return Loss	Locates failures points for an effective troubleshooting.
Cable Loss	Verifies cable conformance specifications.
Insertion Gain/Loss Smith Chart 1 Port Phase 2 Port Phase	Performance verification of passive and active devices such as filters and amplifiers.
Power Meter	Integrated power meter eliminates the need of a separate instrument and provides power measurement with or without power sensors.
E1/T1 Analyzer (Option 002,003)	Comprehensive backhaul testing that isolates problems related to the incoming traffic from the fixed network.
GPS Receiver and Antenna (Option 010)	Provides geographical location and highly accurate frequency and time base enabling precise frequency and phase 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 (frequency or channels) allowing a fast identification of improper power levels.
Bias Tee (option 013)	Supplies up to 32 VDC built-in bias to active devices, such as amplifiers.
Signal Analyzer (option 020 to 029)	Provides 3GPP/3GPP2/IEEE802.16 conformance testing and modulation quality analysis from 2G to 4G wireless technologies.
Over The Air Analyzer (option 040 to 049)	Characterize the transmission quality at any location providing reflective measurements and identifying signals providing from different sites.

Spectrum Analyzer

The JD7105B has 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.

One-button RF measurements:

- Channel power
- Occupied Bandwidth
- Spectrum emission mask
- Adjacent channel power
- Spurious Emissions

Specifications

The JD7105B has one of the best sensitivity and selectivity specifications. With its built-in preamplifier, measurements can be done as low as -158 dBm with a 1Hz 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
- DANL (RBW 1 Hz, 1 GHz < fc < 2 GHz)
  -143 dBm
  -158 dBm with preamp
- Sweep Time
  -10 ms to 1000 s
  -6 µs 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 kHz
  -102 dBc/Hz @ 100 kHz
  -115 dBc/Hz @ 1 MHz

Capabilities

Built-in preamplifier

Zero Span with gated sweep

AM/FM Audio Demodulation

CW RF Source

Multiple Detectors

- Normal
- RMS
- Sample
- Negative
- Peak

Advanced Marker

- Frequency counter
- Noise marker

Limit Line

Up to 6 markers and 6 traces

Spectrum Analyzer

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

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

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 Emssions

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.

Cable and Antenna Analyzer

The JD7105B Cable and Antenna Analyzer performs cable and antenna measurements for the verification of base station’s infrastructure including feed-lines, connectors, antennas, cables, jumpers, amplifiers, and filters.

The JD7105B distance-to-fault (DTF) function is capable of locating -transmission problems up to 1,500 m (4,921 ft), at a measurements speed of 2 ms/data.

The JD7105B offers a superior analysis tools including a trace overlay feature allowing a comparison analysis of up to 6 traces, and supporting up to 6 individual markers allocated to any trace.

In addition, it includes a user-configurable marker bands enabling visual identification of uplink and downlink frequencies for compliance verification with a single measurement trace.

Capabilities

Reflection
- VSWR
- Return Loss

DTF
- VSWR
- Return Loss

Cable Loss (1 port)

Insertion
- Loss
- High Gain
- Low Gain

1 Port Phase

2 Port Phase

Smith Chart

Cable and Antenna Analyzer

Measurements

Reflection — VSWR measures the complete cellsite transmission line impedance performance across the frequency range of interest in Voltage Standing Wave Ratio (VSWR) or Return Loss.

Reflection-VSWR

Distance-to-Fault (DTF) measures fault locations in the transmission system of the cell-site indicating signal discontinuities in VSWR or Return Loss. Use this measurement to precisely pinpoint the location of damaged or degraded antennas, connectors, amplifiers, filters and duplexers, etc.

DTF-Return Loss

Cable loss (1 port) measures the signal loss through a cable or other devices over a defined frequency range. It is sufficient to connect one end of the cable to the base station analyzer measurement port. The other end of the cable is terminated with a short or left open.

Cable Loss (1 port)

Insertion Gain/Loss measures the characteristics of passive and active devices such as filters, jumpers, splitters, and amplifiers as well as verifies antenna isolation or sector to sector isolation.

Insertion Loss

The optional built-in bias tee supplies power to active devices through the instrument's RF-In port eliminating the need of an external power supplies.

Smith charts and phase measures impedance and 1-port and 2-port phase for proper tuning of RF devices.

Smith charts can be used to display impedance matching characteristics in cable and antenna system as well as filter and duplexers devices.

1-port phase measures S11 phase in order to tune antennas and phase match cables.

The 2-port phase measures S21 phase in order to characterise transmitted device.

Smith Chart

1-Port Phase

Power Meter

The JD7105B performs 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 • 10 MHz to 7.2 GHz Dynamic Range • -120 to +30 dBm Measurement Type • RMS • Peak	Terminating Power Sensor JD732A • Average Power JD734A • Peak Power JD736A • Average and Peak Power	Directional (Through Line) Power Sensor JD731A/JD733A • Forward Average Power • Forward Peak Power • Reverse Average Power • VSWR

The JD7105B 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 JD7105B displays 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 JD7105B 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 JD7105B 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.

The Interference Analyzer has four key measurements:

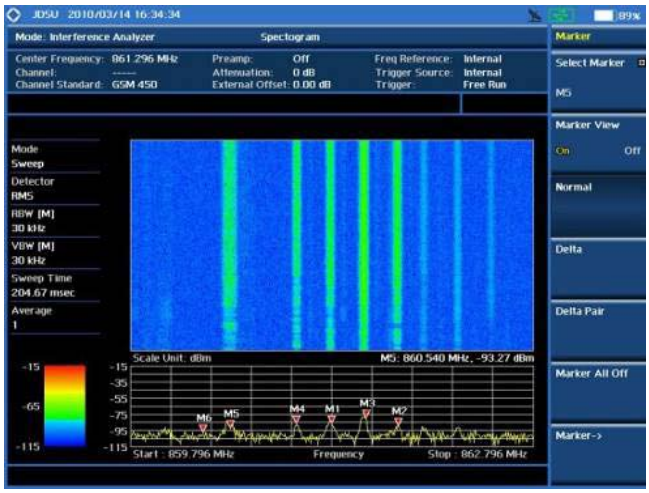
- Spectrum Analyzer with audible indicator.
- Spectrogram.
- RSSI (Received Signal Strength Indicator).
- Interference ID*

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.

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

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

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.

Received Signal Strength Indicator

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 .

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

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 user-defined 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 JD7105B performs the tests of up to 20 carriers and automatically stores 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 JD7105B 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/HSDPA (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 046)

GSM/GPRS/Edge Signal Analyzer

The JD7105B GSM/GPRS/EDGE Analyzer performs power and spectrum measurements as well as modulation analysis in a simple and easy manner with just a few key strokes.

The JD7105B 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	GSM Channel Scanner
Occupied Bandwidth	• PvsT – Slot	GSM Frequency Scanner
Spectrum Emission Mask	• PvsT – Frame	Multipath Profile
Spurious Emissions	Constellation	Modulation Analyzer
	Auto Measure*	

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.

The **spectrum emission mask (SEM)** compares the total power level within the defined carrier bandwidth and the given offset channels according to 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) verifies that the transmitter output power has the correct amplitude, shape, and timing according to the standards.

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 **multi-path 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 JD7105B WCDMA/HSDPA analyzer performs power and spectrum measurements, as well as modulation analysis in a simple and easy manner with just a few key strokes.

The JD7105B WCDMA/HSDPA analyzer 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 (option23/24)		OTA Analysis (option 23)
Channel Power	Constellation	Scramble Scanner
Occupied Bandwidth	Code Domain Power	Multipath Profile
Spectrum Emission Mask	Codogram	Code Domain Power
ACLR	RCSI	
Multi-ACLR	CDP Table	
Spurious Emissions		
	Auto Measure*	

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

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

WCDMA Channel Power

The **spectrum emission mask (SEM)** compares the total power level within the defined carrier bandwidth and the given offset channels according to the standard.

Adjacent channel leakage power ratio (ACLR) measures the amount of interference, or power, in an adjacent frequency channel according to the standards.

WCDMA ACLR

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.

WCDMA Constellation

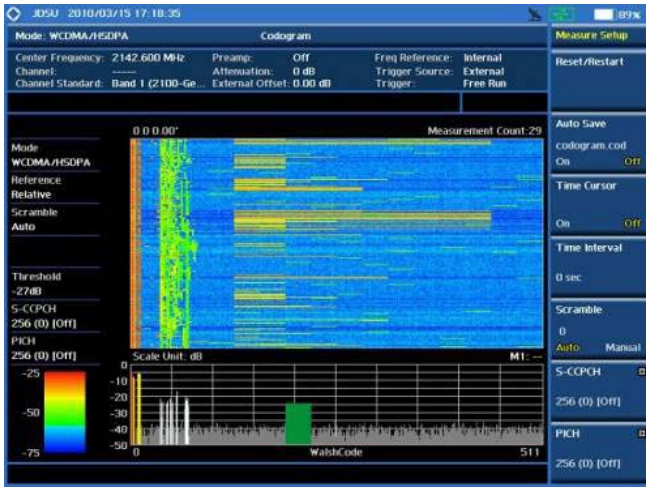
WCDMA/HSDPA Signal Analyzer

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 signal indicator (RCSI) shows the power variation over time of WCDMA control channels: CPICH, PCCPCH, SCCPCH, PICH, PSCH, and SSCH.

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 **Over the Air (OTA) Analyzer** covers three key parameters: scramble scanner, multipath profile and code domain power.

WCDMA OTA Code Domain Power

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

CDMAONE, CDMA2000 Signal Analyzer

The JD7105B cdmaOne, CDMA2000 analyzer performs power and spectrum measurements, as well as modulation analysis in a simple and easy manner with just a few key strokes.

The JD7105B cdmaOne, CDMA2000 analyzer 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 (option20)		OTA Analysis (option 40)
Channel Power	Constellation	Power Statistics CCDF
Occupied Bandwidth	Code Domain Power	PN Scanner
Spectrum Emission Mask	Codogram	Channel Scanner
ACPR	RCSI	Multipath Profile
Multi-ACPR	CDP Table	Code Domain Power
Spurious Emissions		
	Auto Measure*	

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 frequency.

CDMA Occupied Bandwidth

The **spectrum emission mask (SEM)** compares the total power level within the defined carrier bandwidth and the given offset channels according to the standards.

Adjacent channel power ratio (ACPR) measures the amount of interference, or power, in an adjacent frequency channel according to the standards.

CDMA ACPR

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.

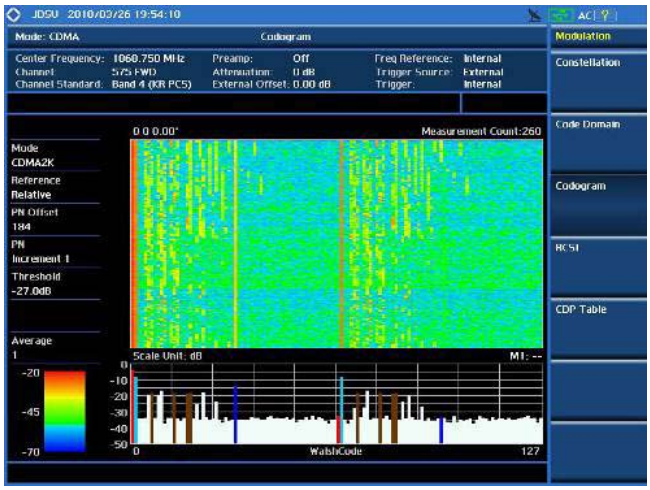
CDMA Constellation

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.

CDMAONE, CDMA2000 Signal Analyzer

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

CDMA Power Statistics CCDF

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

CDMA RCSI

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 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.

EV-DO Signal Analyzer

The JD7105B EV-DO analyzer performs power and spectrum measurements, as well as modulation analysis in a simple and easy manner with just a few key strokes.

The JD7105B EV-DO analyzer 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 (option21)		OTA Analysis (option 41)
Channel Power	PvsT-Slot	PN Scanner
Occupied Bandwidth	Constellation (Pilot, MAC 64/128, Data, Composite 64/128)	Channel Scanner
Spectrum Emission Mask		Multipath Profile
ACPR	Code Domain Power (Pilot, MAC 64/128, Data)	Code Domain Power
Multi-ACPR	MAC Codogram	
Spurious Emissions	RCSI	
	MAC CDP Table	
	Power Statistics	
	CCDF	
	Auto Measure*	

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

EV-DO Occupied Bandwidth

The **spectrum emission mask (SEM)** compares the total power level within the defined carrier bandwidth and the given offset channels according to the standards.

Adjacent channel power ratio (ACPR) measures the amount of interference, or power, in an adjacent frequency channel specified by the standard.

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

Power vs. Time (Slot) verifies that the transmitter output power has the correct amplitude, shape, and timing for EV-DO format.

EV-DO Power vs. Time (Slot)

EV-DO Signal Analyzer

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

EV-DO Constellation

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

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

CDP Data displays the power of the 16 subchannels of the data channel separately.

EV-DO Data Code Domain

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 Signal Indicator (RCSI) shows the power variation over time of EV-DO channels: Pilot, MAC, Data, and Slot.

EV-DO RCSI

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 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.

TD-SCDMA Signal Analyzer

The JD7105B TS-SCDMA analyzer performs power and spectrum measurements, as well as modulation analysis in a simple and easy manner with just a few key strokes.

The JD7105B TS-CDMA analyzer 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)		OTA Analysis (option 45)
Channel Power	PvsT	Sync-DL ID Scanner
Occupied Bandwidth	• Slot	Sync-DL ID vs Tau
Spectrum Emission Mask	• Frame	Sync-DL ID Multipath
ACPR	• Timogram	Sync-DL ID Analyzer
Multi-ACPR	Constellation	
Spurious Emissions	Midamble Power	
	Code Power	
	Code Error	
	Auto Measure*	

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

TD-SCDMA Channel Power

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

The **spectrum emission mask (SEM)** compares the total power level within the defined carrier bandwidth and the given offset channels according to the standards.

Adjacent channel power ratio (ACPR) measures the amount of interference, or power, in an adjacent frequency channel according to the standards.

TD-SCDMA ACPR

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

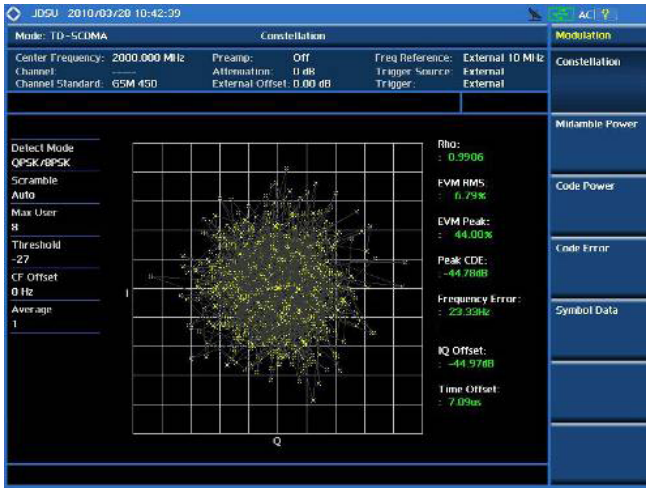
Power vs. Time verifies that the transmitter output power has the correct amplitude, shape, and timing for TD-SCDMA format.

TD-SCDMA Power vs. Time (Frame)

The spectrogram displays and show 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.

TD-SCDMA Signal Analyzer

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



TD-SCDMA Constellation

Code domain power (CDP) provides the power data and error data for an individual code channel and layer for a specified time.

TD-SCDMA Code Error

The **Over the Air (OTA) Analyzer** provides four essential measurements: Sync-DL ID Scanner, Sync-DL ID multipath and Sync-DL ID Analyzer.

TD-SCDMA OTA Sync-DL ID Analyzer

MOBILE WIMAX Signal Analyzer

The JD7105B Mobile WiMAX analyzer performs power measurements and spectrum measurements, as well as modulation analysis in a simple and easy manner with just a few key strokes.

The JD7105B Mobile WiMAX analyzer 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	PvsT – Frame	Auto Measure*
Occupied Bandwidth	Constellation	
Spectrum Emission Mask	Flatness	
Spurious Emissions	EVM vs Carrier	
	EVM vs Symbol	
	Power Statistics CCDF	

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

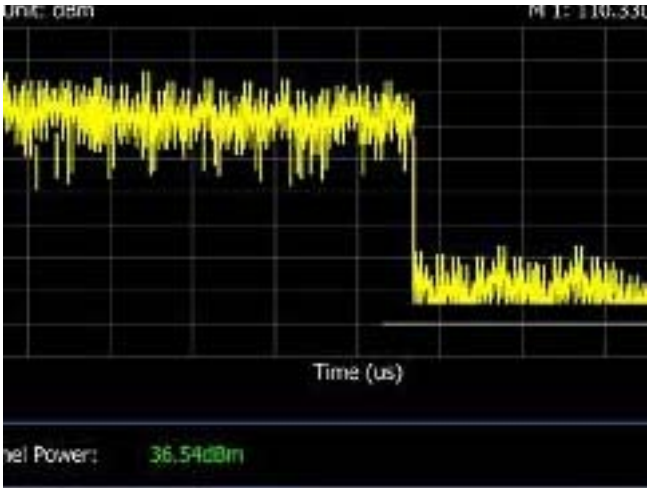
Occupied bandwidth measures the frequency bandwidth that contains 99% of the power, measuring the total integrated power and the occupied power.

The **spectrum emission mask (SEM)** compares the total power level within the defined carrier bandwidth and the given offset channels according to the standards.

WiMAX Spectrum Emission Mask

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 signal rise and fall shape of various bursts of the Mobile WiMAX 802.16 OFDMA signal.



WiMAX Power vs. Time (Frame)

Mobile WiMAX Signal Analyzer

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 WiMAX specification IEEE-816e.

EVM vs. Sub-Carrier shows the error vector magnitude representing the average constellation error of WIMAX OFDMA subcarriers.

WiMAX Spectral Flatness

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

WiMAX EVM vs. Symbol

The **Complementary Cumulative Distribution Function (CCDF)** characterizes the statistical power level distribution of WiMAX at any given time.

LTE Signal Analyzer

The JD7105B LTE analyzer performs power measurements and spectrum measurements, as well as modulation analysis in a simple and easy manner with just a few key strokes.

The JD7105B LTE analyzer 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.
- 3GPP TS 36.213 V8.2.0. Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer procedures.

RF and Modulation Analysis (option 28)		
Channel Power	PvsT – Frame	Auto Measure*
Occupied Bandwidth	Data Channel Summary	
Spectrum Emission Mask	Control Channel Summary	
ACLR	Sub Frame Summary	
Spurious Emissions	Frame Summary	
	Power Statistics CCDF	

Channel power measures the power level and spectral density 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 frequency.

LTE Occupied Bandwidth

The **spectrum emission mask (SEM)** compares the total power level within the defined carrier bandwidth and the given offset channels according to the standards.

Adjacent channel leakage power ratio (ACLR) measures the amount of interference, or power, in an adjacent frequency channel according to the standards.

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.

LTE Power vs. Time (Frame)

LTE Signal Analyzer

Data Channel Summary measures the constellation for the specified resource block as well as the modulation accuracy of each PDSCHs' at the specified sub-frame.

LTE Data Channel Summary

Control Channel Summary measures the constellation for the specified control channel as well as modulation accuracy of the control channel at the specified sub-frame.

LTE Control Channel Summary

Sub-Frame Summary measures the modulation accuracy of all the data and control channels at the specified sub frame.

LTE Sub-frame Summary

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

The **Complementary Cumulative Distribution Function (CCDF)** characterizes the statistical power level distribution of LTE at any given time.

E1/T1 Analyzer

The JD7105B performs a simple E1/T1 testing solution for the cell site's circuit-based backhaul.

The E1/T1 Analyzer provides enough flexibility to configure the PDH signal including its framing and coding, as well as the pattern that the instrument will be transmitting.

In addition, the JD7105B is capable of automatically logging events.

E1 Analyzer (Option 002)	T1 Analyzer (Option 003)
Monitoring • Signal, Sync Loss • Alarm • Error BERT (PCM 31 only)	Monitoring • Signal, Sync Loss • Alarm • Error RX Signal Level BERT Loop

E1 Monitoring

E1 BERT

T1 Monitoring

T1 RX Signal Level

Channel Scanner

The JD7105B 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 JD7105B 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.

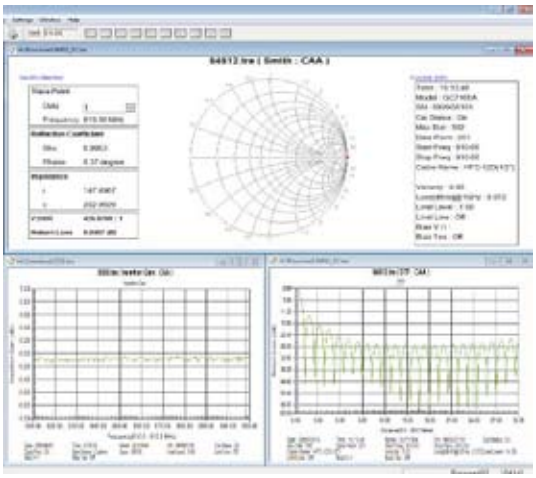
JD7105B w GPS Antenna

Application Software

The JD7105B communicates with the PC application software JDViewer to retrieve measurements and perform post-processing analysis and reporting.

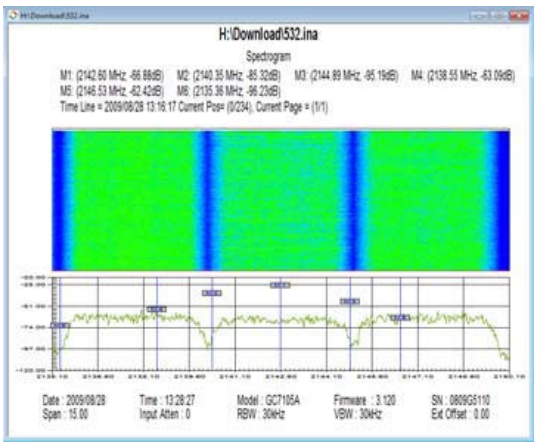
Features

- Communicates with the JD7105B 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.
- Registers or edits user definable cable types into the instrument's custom cable lists.
- Registers or edits user definable frequency bands into the instrument's custom bands lists.
- Creates or edits multi-segment lines for insertion gain and loss measurements.
- Superimposes up to 4 traces on one measurement graph.
- Creates Auto-Measure scenarios for multicarrier signal analysis.



JDViewer, VSWR, DTF, Smith Chart

JDViewer Spectrum, Demodulation



JDViewer Spectrogram, RSSI

Ordering information

Mainframe

Base Station Analyzer incl. Spectrum Analyzer, Cable and Antenna Analyzer and Power Meter (internal mode)

Options

JD7105B002	E1 Analyzer[2]
JD7105B003	T1 Analyzer[2]
JD7105B010	GPS Receiver and Antenna
JD7105B011	Interference Analyzer[3,4]
JD7105B012	Channel Scanner
JD7105B013	Bias Tee
JD7105B020	CDMA2000 Signal Analyzer
JD7105B021	EV-DO Signal Analyzer (Requires option 20)
JD7105B022	GSM/GPRS/EDGE Signal Analyzer
JD7105B023	WCDMA Signal Analyzer
JD7105B024	HSDPA Signal Analyzer (Requires option 23)
JD7105B025	TD-SCDMA Signal Analyzer
JD7105B026	Mobile WiMAX Signal Analyzer
JD7105B028	LTE Signal Analyzer
JD7105B040	CDMA2000 OTA Analyzer4 (Requires options 10 and 20)
JD7105B041	EV-DO OTA Analyzer4 (Requires options 10 and 21)
JD7105B042	GSM/GPRS/EDGE OTA Analyzer4 (Requires options 10 and 22)
JD7105B043	WCDMA/HSDPA OTA Analyzer4 (Requires options 10 and 23/24)
JD7105B045	TD-SCDMA OTA Analyzer4 (Requires options 10 and 25)
JD7105B046	Mobile WiMAX OTA Analyzer4 (Requires options 10 and 26)

[1]Requires Calibration Kit

[2]Requires Test Cable

[3]Highly recommends adding JD7105B010

[4]Highly recommends adding G70005035x or/and G7000-5036x

Standard Accessories

Soft Carrying Case
AC/DC Power Adapter
Cross LAN Cable (1.5m)
USB A to B Cable (1.8m)
>1 GByte USB Memory
Rechargeable Lithium Ion Battery
Automotive Cigarette Lighter 12 VCD Adapter
JD7105B User's Manual and Application Software –CD
2 years warranty

Ordering information

Optional Power Sensors

JD731A	Directional power sensor (peak and average power) Frequency: 300 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 to 3.5 GHz Power: Average/Peak 0.25 to 20 W
JD732A	Terminating power sensor (average power) Frequency: 20 to 3.8 GHz Power: 0 to 1 W
JD734A	Terminating power sensor (peak power) Frequency: 20 to 3.8 GHz Power: 0 to 1 W
JD736A	Terminating power sensor (peak and average power) Frequency: 20 to 3.8 GHz Power: 0 to 1 W

Optional Calibration Kits

JD72450509	One port N type Calibration Kit Open/Short/Load N(m), 40 dB, 4 GHz, 50 Ω
JD72450510	One port DIN type Calibration Kit Open/Short/Load DIN(m), 40 dB, 4 GHz, 50 Ω
JD71050507	Dual port N type Calibration Kit, 50 Ω • Open/Short/Load N(m), 40 dB, 4 GHz, 50 Ω • Two Adapters N(f) to N(f), DC to 4 GHz, 50 Ω • Two 1 m (3.28 ft) RF Test Cables, N(m) to N(m), DC to 4 GHz, 50 Ω
JD71050508	Dual port DIN type Calibration Kit 50 Ω • Open/Short/Load DIN(m), 40 dB, 4 GHz, 50 Ω • Two 1m (3.28 ft) RF Test Cables, N(m) to N(m), DC to 4 GHz, 50 Ω • Adapter N(f) to DIN(f), DC to 4GHz, 50 Ω • Adapter N(f) to DIN(m), DC to 4 GHz, 50 Ω • Adapter DIN(f) to DIN(f), DC to 4 GHz, 50 Ω • Adapter DIN(m) to DIN(m), DC to 4 GHz, 50 Ω

Optional RF Cables

GC72450531	1.5 m (4.92ft) RF Cable DC to 4 GHz N(m)-N(f), 50 Ω
GC72450532	3.0 m (9.84ft) RF Cable DC to 4 GHz N(m)-N(f), 50 Ω
G710050531	1.5 m (4.92ft) 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
G710050577	Adapter N(f) to DIN(f), DC to 4GHz, 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

Optional E1/T1 Test Cables

G710050317	RJ45 to Y Bantam Cable
G710050318	RJ45 to Y BNC Cable
G710050319	RJ45 to 4 Alligator Clips

Miscellaneous

G710050581	Attenuator 40 dB, 100W DC to 4 GHz (Unidirectional)
JD71050342	Hard carrying-case
JD71050343	Back Pack carrying-case
G710550324	External battery charger

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