

JD745A

CellAdvisor™ Base Station Analyzer



Spectrum Analyzer: 100 kHz to 4 GHz

Cable and Antenna Analyzer: 5 MHz to 4 GHz

Power Meter: 10 MHz to 4 GHz

Specification* Conditions

The JD745A specifications apply under these conditions:

- The instrument has been turned on for at least 15 minutes
- The instrument is operating within a valid calibration period
- Data with no tolerance are considered typical values
- Cable and antenna measurements apply after calibration to the OSL standard
- Typical and nominal values are defined as:
 - Typical: expected performance of the instrument operating under 20° to 30°C after being at this temperature for 15 minutes
 - Nominal: a general, descriptive term or parameter

Spectrum Analyzer (Standard)

Frequency	
Frequency range	100 kHz to 4 GHz
Internal 10 MHz Frequency Reference	
Accuracy	±0.05 ppm + aging (0 to 50°C)
Aging	±0.5 ppm/year
Frequency Span	
Range	0 Hz (zero span) 10 Hz to 4 GHz
Resolution	1 Hz
Resolution Bandwidth (RBW)	
-3 dB bandwidth	1 Hz to 3 MHz 1-3-10 sequence
Accuracy	±10% (nominal)
Video Bandwidth (VBW)	
-3 dB bandwidth	1 Hz to 3 MHz 1-3-10 sequence
Accuracy	±10% (nominal)

Single Sideband (SSB) Phase Noise	
Fc 1 GHz, RBW 10 kHz, VBW 1 kHz, RMS detector	
Carrier offset:	
30 kHz	<-90 dBc/Hz (typical)
100 kHz	<-95 dBc/Hz (typical)
1 MHz	<-102 dBc/Hz (typical)
Measurement Range	
DANL to +20 dBm	
Input attenuator range	0 to 50 dB, 5 dB steps
Maximum Input Level	
Average continuous power	+20 dBm
DC voltage	±50 VDC
Displayed Average Noise Level (DANL)	
1 Hz RBW, 1 Hz VBW, 50 Ω termination, 0 dB attenuation, RMS detector	
Preamplifier Off:	
10 MHz to 2.3 GHz	-140 dBm (-146 dBm, typical)
>2.3 GHz to 3 GHz	-138 dBm (-144 dBm, typical)
>3 GHz to 4 GHz	-135 dBm (-140 dBm, typical)
Preamplifier On:	
10 MHz to 2.3 GHz	-155 dBm (-160 dBm, typical)
>2.3 GHz to 3 GHz	-153 dBm (-158 dBm, typical)
>3 GHz to 4 GHz	-150 dBm (-156 dBm, typical)

*All specifications are subject to change without notice.

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Display Range

Log scale and units (10 divisions displayed)	1 to 20 dB/division in 1 dB steps dBm, dBV, dBmV, dBμV
Linear scale and units (10 divisions displayed)	V, mV, mW, W
Detectors	Normal, positive peak, sample, negative peak, RMS
Number of traces	6
Trace functions	Clear/write, maximum hold, minimum hold, capture, load view on/off

Total Absolute Amplitude Accuracy

Preamplifier off, power level > -50 dBm, auto-coupled (20 to 30°C)		
5 MHz to 4 GHz	±1.25 dB, ±0.5 dB (typical)	Attenuation <40 dB
	±1.55 dB, ±1.0 dB (typical)	Attenuation ≥40 dB

Reference Level

Setting range	-120 to +100 dBm
Setting resolution	
Log scale	0.1 dB
Linear scale	1% of reference level

Markers

Marker types	Normal, delta, delta pair, noise, frequency count marker
Number of markers	6
Marker functions	Peak, next peak, peak left, peak right, minimum search marker to center/start/stop

RF Input VSWR

20 MHz to 4 GHz	1.5:1 (typical)
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Second Harmonic Distortion

Mixer level = -25 dBm	
10 MHz to 1.3 GHz	<-65 dBc (typical)
>1.3 GHz to 4 GHz	<-70 dBc (typical)

Third-order Inter-modulation (Third-order Intercept: TOI)

200 MHz to 2 GHz	+10 dBm (typical)
>2 GHz to 4 GHz	+12 dBm (typical)

Spurious

Inherent residual response	
Input terminated, 0 dB attenuation, preamplifier off, RBW at 10 kHz	
20 MHz to 3 GHz	-90 dBm (nominal)
>3 GHz to 4 GHz	-85 dBm (nominal)
Exceptions	<-80 dBm @ 311.94 MHz <-84 dBm @ 415.92 MHz <-85 dBm @ 519.90, 1599.00, and 2497.80 MHz
Input related spurious	<-70 dBc (nominal)

Dynamic Range

2/3 (TOI-DANL) in 1 Hz RBW	>95 dB
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Sweep Time

Range	80 ms to 1000 s	
	24 μs to 200 s	Span = 0 Hz (zero span)
Sweep mode	Continuous, single	

Gated Sweep

Trigger source	External, video, and GPS
Gate length	1 μs to 100 ms
Gate delay	0 to 100 ms

Trigger

Trigger source	Free run, video, external
Trigger delay	
Range	0 to 200 s
Resolution	6 μs

Measurements*

Channel power
Occupied bandwidth
Spectrum emission mask
Adjacent channel power
Spurious emissions
Field strength
AM/FM audio demodulation
Route map
PIM detect
Dual spectrum

* CW signal generator (Option 003) can be set up simultaneously.

Cable and Antenna Analyzer (Standard)**Frequency**

Range	5 MHz to 4 GHz
Resolution	10 kHz
Accuracy	±25 ppm

Data Points

	126, 251, 501, 1001
Measurement speed	1.65 ms/point (nominal)

Measurement Accuracy

Corrected directivity	40 dB (typical)
Reflection uncertainty	±(0.3 + 20log(1+10 ^{-EP/20})) (typical) EP = directivity - measured return loss

Output Power

High	0 dBm (typical)
Low	-30 dBm (typical)

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Dynamic Range	
Reflection	60 dB

Maximum Input Level	
Average continuous power	+25 dBm (nominal)
DC voltage	±50 VDC

Interference immunity	
On channel	+17 dBm @ >1.4 MHz from carrier frequency (nominal)
On frequency	0 dBm within ±10 kHz from the carrier frequency (nominal)

Measurements	
Reflection (VSWR)	
VSWR range	1 to 65
Return loss range	0 to 60 dB
Resolution	0.01
Distance to Fault (DTF)	
Vertical VSWR range	1 to 65
Vertical return loss range	1 to 60 dB
Vertical resolution	0.01
Horizontal range	0 to (# of data points – 1) x Horizontal Resolution Maximum = 1500 m (4921 ft)
Horizontal resolution	$(1.5 \times 10^8) \times (V_p) / (\text{delta}) \times (0.95)$ V_p = propagation velocity Delta = stop freq. – start freq. (Hz)
Cable Loss (1-port)	
Range	0 to 30 dB
Resolution	0.01 dB
1-port Phase	
Range	–180° to +180°
Resolution	0.01°
Smith Chart	
Resolution	0.01

RF Power Meter (Standard)

General Parameters	
Display range	–100 to +100 dBm
Offset range	0 to 60 dB
Resolution	0.01 dB or 0.1xW (x = m, u, p)

Internal RF Power Sensor	
Frequency range	10 MHz to 4 GHz
Span	100 kHz to 100 MHz
Dynamic range	–120 to +20 dBm
Maximum power	+20 dBm
Accuracy	Same as spectrum analyzer

External RF Power Sensors	
Directional power sensor JD731B	
Frequency range	300 MHz to 3.8 GHz
Dynamic range	0.15 to 150 W (average) 4 to 400 W (peak)
Connector type	Type-N female on both ends
Measurement type	Forward/reverse average power, forward peak power, VSWR
Accuracy	±(4% of reading + 0.05 W) ^{1,2}
Directional power sensor JD733A	
Frequency range	150 MHz to 3.5 GHz
Dynamic range	0.1 to 50 W (average) 0.1 to 50 W (peak)
Connector type	Type-N female on both ends
Measurement type	Forward/reverse average power, forward peak power, VSWR
Accuracy	±(4% of reading + 0.05 W) ^{1,2}
Terminating power sensor JD732B	
Frequency range	20 MHz to 3.8 GHz
Dynamic range	–30 to +20 dBm
Connector type	Type-N male
Measurement type	Average
Accuracy	±7% ¹
Terminating power sensor JD734B	
Frequency range	20 MHz to 3.8 GHz
Dynamic range	–30 to +20 dBm
Connector type	Type-N male
Measurement type	Peak
Accuracy	±7% ¹
Terminating power sensor JD736B	
Frequency range	20 MHz to 3.8 GHz
Dynamic range	–30 to +20 dBm
Connector type	Type-N male
Measurement type	Average and Peak
Accuracy	±7% ¹

1. CW condition at 25°C ±10°C.

2. Forward power.

Optical Power Meter (Option 13)

Optical Power Meter	
Display range	–100 to +100 dBm
Offset range	0 to 60 dB
Resolution	0.01 dB or 0.1 mW

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External Optical Power Sensors

Optical power sensor	MP-60
Wavelength range	780 to 1650 nm
Max permitted input level	+10 dBm
Connector input	Universal 2.5 and 1.25 mm
Accuracy	±5 %
Optical power sensor	MP-80
Wavelength range	780 to 1650 nm
Max permitted input level	+23 dBm
Connector input	Universal 2.5 and 1.25 mm
Accuracy	±5%

2-Port Transmission Measurements (Option 001)**Frequency**

Frequency range	5 MHz to 4 GHz
Frequency resolution	10 kHz

Output Power

High	0 dBm (typical)
Low	-30 dBm (typical)

Measurement Speed

Vector	2.2 ms/point (nominal)
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Dynamic Range

Vector	5 MHz to 3 GHz, 80 dB >3 GHz to 4 GHz, 75 dB
Scalar	5 MHz to 4 GHz, >100 dB

Measurements**Insertion Loss/Gain**

Range	-120 to 100 dB
Resolution	0.01 dB

2-Port Phase

Range	-180° to +180°
Resolution	0.01°

Bias-Tee (Option 002)**Voltage**

Voltage range	+12 to +32 V
Voltage resolution	0.1 V

Power

8 W Max

CW Signal Generator (Option 003)**Frequency**

Frequency range	25 MHz to 4 GHz
Frequency reference	<±25 ppm
Frequency resolution	10 kHz

Output Power

Range	0 dBm, -30 to -80 dBm
Step	1 dB
Accuracy	±1.5 dB (15 to 35°C)

GPS Receiver and Antenna (Option 010)**GPS Indicator**

Latitude, longitude, altitude

High-Frequency Accuracy

Spectrum, interference, and signal analyzer

GPS lock	±25 ppb
Hold over (for 3 days)	±50 ppb (0 to 50°C) 15 minutes after satellite locked

Connector	SMA, female
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Interference Analyzer (Option 011)**Measurements**

Spectrum analyzer	Sound indicator, AM/FM audio demodulation, interference ID, spectrum recorder
Spectrogram	Collect up to 72 hours of data
RSSI	Collect up to 72 hours of data
Interference finder	
Spectrum replayer	
Dual spectrogram	

Channel Scanner (Option 012)**Frequency Range**

10 MHz to 4 GHz

Measurement Range

-110 to +20 dBm

Measurements

Channel scanner	1 to 20 channels
Frequency scanner	1 to 20 frequencies
Custom scanner	1 to 20 channels or frequencies

GSM/GPRS/EDGE Signal Analyzer (Option 022)**General Parameters**

Frequency range	450 MHz to 500 MHz 820 MHz to 965 MHz 1.705 GHz to 1.995 GHz	
Input signal range	-40 to +20 dBm	
Burst power	±1.0 dB	
Frequency error	±10 Hz + ref freq accuracy	99% confidence level
GMSK modulation quality		
Phase RMS accuracy	±1.0 degrees	(0 < Phase RMS < 8)
Residual error	0.7 degrees (typical)	
Phase peak accuracy	±2.0 degrees	(0 < Phase peak < 30)
8 PSK modulation quality		
EVM accuracy	±1.5%	(2% < EVM < 8%)
Residual error	2.5%	
RF power vs. time	±0.25 symbol	

Measurements

	Option 022		Option 042
Channel power	Constellation	Auto measure	Channel/frequency scanner
Channel power	Burst power	Channel power	Channels or frequencies
Spectral density	Modulation type	Occupied bandwidth	Absolute power
Peak to average power	Frequency error	Spectrum emission mask	Group (traffic, control)
Occupied bandwidth	Phase error RMS	Spurious emission mask	BSIC (NCC, BCC)
Occupied bandwidth	Phase error peak	Burst power	Multipath profile
Integrated power	I/Q origin offset*	PvsT – Mask	(10 strongest)
Occupied power	TSC	Frame average power	Frame average power
Spectrum emission mask	BSIC	Frequency error	SNR, delay
Reference power	C/I*	Phase error RMS	Modulation analyzer
Peak level at defined range	EVM RMS*	Phase error peak	Frame avg power trend
Spurious emissions	EVM Peak*	EVM RMS*	C/I trend
Peak frequency at defined range	EVM 95 th *	EVM Peak*	Frame average power
Peak level at defined range		I/Q origin offset	BSIC, frame no. and time
Power vs. time (Slot)		C/I*	C/I, frequency error
Burst power			Burst power
Max/min point			Modulation type
Power vs. time (Frame)			
Frame average power			
Burst power (Slot 0 to 7)			
TSC (Slot 0 to 7)			

Longitude, latitude, and satellite in all screens

* Measurements performed for 8PSK modulation signals (edge) only.

WCDMA/HSPA+ Signal Analyzer (Option 023)

General Parameters		
Frequency range	Band 1 to 14, 19 to 22, 25, 26	
Input signal range	-40 to +20 dBm	
RF channel power accuracy	±1.0 dB, ±0.7 dB (typical)	
Occupied bandwidth accuracy	±100 kHz	
Adjacent channel leakage ratio (ACLR)	<-56 dB, ±0.7 dB at 5 MHz offset <-58 dB, ±0.8 dB at 10 MHz offset	
WCDMA modulation	QPSK	
HSPA+ modulations	QPSK, 16 QAM, 64 QAM	
Frequency error	±10 Hz + ref freq accuracy	99% confidence level
EVM accuracy	±2.0%	2% ≤ EVM ≤ 20%
Residual EVM	2.5% (typical)	
Code domain power	±0.5 dB relative power ±1.5 dB absolute power	Code channel power >-25 dB Code channel power >-25 dB
CPICH power accuracy	±0.8 dB (typical)	
Measurements		
	Option 023	Option 043
Channel power	Constellation	Codogram
Channel power	CPICH power	Code utilization
Spectral density	Rho, EVM	RCSI
Peak to average power	Peak CDE	CPICH, P-CCPCH, S-CCPCH, PICH, P-SCH, S-SCH
Occupied bandwidth	Frequency error	CDP table
Occupied bandwidth	Time offset	Reference power
Integrated power	Carrier feed-through	Code utilization
Occupied power	Scramble code	Code, spreading factor
Spectrum emission mask	Code domain power	Allocation (channel type)
Reference power	Abs/Rel code power	EVM, modulation type
Peak level at defined range	Individual code EVM and its constellation	Relative, absolute power
ACLR	Channel power	Auto measure
Reference power	Power bar graph	Channel power
Abs power at defined range	(Abs/Rel/Delta power)	Occupied bandwidth
Rel power at defined range	CPICH, P-CCPCH, S-CCPCH PICH, P-SCH, S-SCH	Spectrum emission mask
Multi-ACLR	Max, avg active power	ACLR
Lowest reference power	Max, avg inactive power	Multi-ACLR
Highest reference power	Scramble code	Spurious emission mask
Abs power at defined range	Relative code domain error	Frequency error
Rel power at defined range	Abs/Rel code power	EVM
Spurious emissions	Code error	Peak CDE
Peak frequency at defined range	Individual code EVM, RCDE and its constellation	Carrier feed-through
Peak level at defined range	Channel power	CPICH absolute power
	Power bar graph	CPICH relative power
	(Abs/Rel/Delta power)	Max inactive power
	CPICH, P-CCPCH, S-CCPCH, PICH, P-SCH, S-SCH	Scramble code
	AVG RCDE QPSK, 16 QAM, 64 QAM	Power statistics CCDF
		Route map
		CPICH power, Ec/Io

Longitude, latitude, and satellite in all screens

cdmaOne/cdma2000® Signal Analyzer (Option 020)

General Parameters		
Frequency range	Band 0 to 10	
Input signal level	-40 to +20 dBm	
RF channel power accuracy	±1.0 dB (typical)	
CDMA compatibility	cdmaOne and cdma2000	
Frequency error	±10 Hz + ref freq accuracy	99% confidence level
Rho accuracy	±0.005	0.9 < Rho < 1.0
Residual Rho	>0.995 (typical)	
PN offset	1 x 64 chips	
Code domain power	±0.5 dB relative power ±1.5 dB absolute power	Code channel power >-25 dB Code channel power >-25 dB
Pilot power accuracy	±1.0 dB (typical)	
Time offset	±1.0 μs, ±0.5 μs (typical)	External trigger

Measurements

	Option 020		Option 040
Channel power	Constellation	Auto measure	Channel scanner (up to 6)
Channel power	Pilot power	Channel power	Frequencies or channels
Spectral density	Rho	Occupied bandwidth	Channel power, PN offset
Peak to average power	EVM	Spectrum emission mask	Pilot power, Ec/Io
Occupied bandwidth	Frequency error	ACPR	PN scanner (up to 6)
Occupied bandwidth	Time offset	Multi-ACPR	Channel power
Integrated power	Carrier feed-through	Rho	Pilot dominance
Occupied power	PN offset	Frequency error	PN offset
Spectrum emission mask	Code domain power	Time offset	Ec/Io, pilot power, delay
Reference power	Abs/Rel code power	Carrier feed-through	Multipath profile
Peak level at defined range	Channel power	Pilot power	Channel power
ACPR	Power bar graph (Abs/Rel)	Max inactive power	Multipath power
Reference power	Pilot, Paging, Sync, Q-Paging	PN offset	Ec/Io, delay
Abs power at defined range	Max, avg active power	Power statistics CCDF	Code domain power
Rel power at defined range	Max, avg inactive power		Abs/Rel code power
Multi-ACPR	PN offset		Channel power
Lowest reference power	Codogram		PN offset
Highest reference power	Code utilization		Pilot, Paging, Sync, Q-Paging power
Abs power at defined range	RCSI		Max, avg active power
Rel power at defined range	Pilot, Paging, Sync, Q-Paging		Max, avg inactive power
Spurious emissions	CDP table		Frequency error
Peak freq at defined range	Reference power		Time offset, Rho, EVM
Peak level at defined range	Code utilization		Carrier feed-through
	Code, spreading factor		Amplifier capacity
	Allocation (channel type)		Peak amplifier capacity
	Relative, absolute power		Average amplifier capacity
			Code utilization
			Peak utilization
			Average utilization
			Route map
			Pilot power
			Ec/Io

Longitude, latitude, and satellite in all screens

EV-DO Signal Analyzer (Option 021)

General Parameters		
Frequency range	Band 0 to 10	
Input signal level	-40 to +20 dBm	
RF channel power accuracy	±1.0 dB (typical)	
EV-DO compatibility	Rev 0, Rev A and Rev B	
Frequency error	±10 Hz + ref freq accuracy	99% confidence level
Rho accuracy	±0.005	0.9 < Rho < 1.0
Residual Rho	>0.995 (typical)	
PN offset	1 x 64 chips	
Code domain power	±0.5 dB relative power ±1.5 dB absolute power	Code channel power >-25 dB Code channel power >-25 dB
Pilot power accuracy	±1.0 dB (typical)	
Time offset	±1.0 μs, ±0.5 μs (typical)	External trigger

Measurements	Option 021	Option 041
Channel power	Constellation	MAC codogram
Channel power	(Composite 64/128)	Code utilization
Spectral density	Channel power	RCSI
Peak to average power	Rho, EVM, Peak CDE	Slot, pilot, MAC, data
Occupied bandwidth	Frequency error	MAC CDP table
Occupied bandwidth	Time offset	Reference power
Integrated power	Carrier feed-through	Code utilization
Occupied power	PN offset	Code, spreading factor
Spectrum emission mask	Pilot, MAC, data power	Allocation (channel type)
Reference power	Pilot, MAC, data EVM	Relative, absolute power
Peak level at defined range	Constellation	Auto measure
ACPR	(Pilot, MAC 64/128, and data)	Channel power
Reference power	Channel power	Occupied bandwidth
Abs power at defined range	Rho, EVM, peak CDE	Spectrum emission mask
Rel power at defined range	Frequency error	ACPR
Multi-ACPR	Time offset	Multi-ACPR
Lowest reference power	Carrier feed-through	Pilot, MAC, data power
Highest reference power	PN offset	On/off ratio
Abs power at defined range	Modulation type*	PvsT mask (idle slot) or
Rel power at defined range	Code Domain Power	PvsT mask (active slot)
Spurious emissions	(Pilot and MAC 64/128)	Frequency error
Peak frequency at defined range	Pilot/MAC channel power	Time offset
Peak level at defined range	Slot average power	Carrier feed-through
Power vs. Time	Max active I/Q power	Max active I/Q power
(Idle and Active Slot)	Avg active I/Q power	Avg active I/Q power
Slot average power	Max inactive I/Q power	Code utilization
On/off ratio	Avg inactive I/Q power	Peak utilization
Idle activity	PN offset	Average utilization
Pilot, MAC, data power	Code Domain Power (Data)	Route Map
	Data channel power	Pilot power
	Slot average power	Ec/Io
	Max, avg active power	
	Max, avg inactive power	
	PN offset	

Longitude, latitude, and satellite in all screens

*Measurement is performed in Data Constellation only.

TD-SCDMA Signal Analyzer (Option 025)

General Parameters

Frequency range	1.785 GHz to 2.22 GHz	
Input signal level	-40 to +20 dBm	
Channel power (RRC) accuracy	±1.0 dB (typical)	
Modulations	QPSK, 8 PSK, 16 QAM, 64 QAM	
Frequency error	±10 Hz + ref freq accuracy	99% confidence level
Residual EVM (RMS)	2.0% (typical)	P-CCPCH slot and 1 channel
Time error (Tau)	±0.2 μs (typical)	External trigger
Spreading factor	Auto (DL, UL), 1, 2, 4, 8, 16	

Measurements

	Option 025		Option 045
Channel power	Midamble power	Code error	Sync-DL ID scanner (32)
Channel power	(TS [0 to 6], DwPTS, UpPTS)	Code power and error	Scramble code group
Spectral density	Data power right	Individual code EVM	Ec/Io, Tau
Peak to average power	(TS [0 to 6], DwPTS, UpPTS)	and its constellation	DwPTS power
Occupied bandwidth	Time offset	Data format	Pilot dominance
Occupied bandwidth	(TS [0 to 6], DwPTS, UpPTS)	Slot, DwPTS power	Sync-DL ID vs. Tau (up to 6)
Integrated power	Power vs. time (mask)	No. of active code	ID, power, Ec/Io, Tau
Occupied power	Slot power	Scramble code	DwPTS power
Spectrum emission mask	On/off slot ratio	Max active code power	Pilot dominance
Reference power	Off power	Avg active code power	Sync-DL ID multipath
Peak level at defined range	Timogram	Max inactive code power	Ec/Io, Tau
ACLR	Constellation	Avg inactive code power	DwPTS power
Reference power	Rho	Peak CDE and peak active CDE	Pilot dominance
Abs power at defined range	EVM RMS, EVM peak	Auto measure	Sync-DL ID analyzer
Rel power at defined range	Peak CDE	Channel power	DwPTS power, Ec/Io trend
Multi-ACLR	Frequency error	Occupied bandwidth	DwPTS power
Lowest reference power	I/Q origin offset	Spectrum emission mask	Pilot dominance
Highest reference power	Time offset	ACLR	EVM, frequency error
Abs power at defined range	Midamble power	Multi-ACLR	Ec/Io, CINR
Rel power at defined range	Slot power	Slot power	Route Map
Spurious emissions	DwPTS power	DwPTS power	DwPTS Power
Peak frequency at defined range	Midamble power (1 to 16)	UpPTS power	
Peak level at defined range	Code power	On/off slot ratio	
Power vs. time (slot)	Abs/Rel code power	Frequency error	
Slot power	Individual code EVM	EVM RMS	
DwPTS power	and its constellation	Peak CDE	
UpPTS power	Data format	Max inactive power	
On/off slot ratio	Slot power, DwPTS power	Scramble code	
Slot PAR	No. of active code		
DwPTS code	Scramble code		
Power vs. time (frame)	Max active code power		
Slot power	Avg active code power		
(TS [0 to 6], DwPTS, UpPTS)	Max inactive code power		
Data power left	Avg inactive code power		
(TS [0 to 6], DwPTS, UpPTS)			

Mobile WiMAX Signal Analyzer (Option 026)

General Parameters

Frequency range	2.1 GHz to 2.7 GHz 3.4 GHz to 3.85 GHz	
Input signal level	-40 to +20 dBm	
Channel power accuracy	±1.0 dB (typical)	
Supported bandwidth	7 MHz, 8.75 MHz, and 10 MHz	
Frequency error	±10 Hz + ref freq accuracy	99% confidence level
Residual EVM (RMS)	1.5% (typical)	

Measurements

	Option 026		Option 046
Channel power	Constellation	Auto measure	Preamble scanner (up to 6)
Channel power	Channel power	Channel power	Total preamble power
Spectral density	RCE RMS, RCE peak	Occupied bandwidth	Preamble, relative power
Peak to average power	EVM RMS, EVM peak	Spectrum emission mask	Cell ID, sector ID
Occupied bandwidth	Frequency error	Spurious emission mask	Time offset
Occupied bandwidth	Time offset	Preamble power	Multipath profile
Integrated power	Segment ID, cell ID	DL burst power	Total preamble power
Occupied power	Preamble index	UL burst power	Multipath power
Spectrum emission mask	Spectral flatness	Frame average power	Relative power, delay
Reference power	Average subcarrier power	Time offset	Preamble power trend
Peak level at defined range	Subcarrier Pwr variation	I/Q origin offset	Preamble power trend
Spurious emissions	Max, min, avg power	Spectral flatness	Relative power trend
Peak frequency at defined range	EVM vs. subcarrier	Frequency error	Preamble power
Peak level at defined range	RCE RMS, RCE peak	RCE RMS	Frame avg power
Power vs. time (frame)	EVM RMS, EVM peak	RCE peak	Relative power
Channel power	Segment ID, cell ID	EVM RMS	C/I
Frame average power	Preamble index	EVM peak	Preamble
Preamble power	EVM vs. symbol	Power statistics CCDF	Cell ID, sector ID
DL burst power	RCE RMS, RCE peak		Time offset
UL burst power	EVM RMS, EVM peak		Route map
I/Q origin offset	Segment ID, cell ID		Preamble power
Time offset	Preamble index		

Longitude, latitude, and satellite in all screens

LTE-FDD Signal Analyzer (Option 028)

General Parameters	
Frequency range	Band 1 to 14, 17 to 26
Input signal level	-40 to +20 dBm
Channel power accuracy	±1.0 dB (typical)
Supported bandwidths	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, and 20 MHz
Frequency error	±10 Hz + ref freq accuracy 99% confidence level
Residual EVM (RMS)	2.0% (typical) Data EVM

Measurements	
	Option 028
Channel power	I/Q diagram
Channel power	RB power
Spectral density	Modulation format
Peak to average power	I/Q origin offset
Occupied bandwidth	EVM RMS, EVM peak
Occupied bandwidth	Control channel
Integrated power	Control channel summary
Occupied power	(P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS, MBSFN*)
Spectrum emission mask	EVM, relative or absolute power, modulation type
Reference power	Each control channels'
Peak level at defined range	I/Q diagram
ACLR	Modulation format
Reference power	Frequency error
Abs power at defined range	I/Q origin offset
Rel power at defined range	EVM RMS, EVM peak
Multi-ACLR	Subframe
Lowest reference power	MBSFN*
Highest reference power	Subframe summary table
Abs power at defined range	(P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS, MBSFN*, PDSCH/Data* QPSK, PDSCDH/Data* 16 QAM, PDSCH/Data* 64 QAM)
Rel power at defined range	EVM, relative or absolute power, modulation type
Spurious emissions	Subframe power
Peak frequency at defined range	OFDM symbol power
Peak level at defined range	Frequency, time error
Power vs. time (frame)	Data EVM RMS, peak
Frame average power	RS EVM RMS, peak
Subframe power	Cell, group, sector ID
First slot power	Frame
Second slot power	MBSFN*
Cell ID, I/Q origin offset	Frame summary table
Time offset	(P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS, MBSFN*, PDSCH/Data* QPSK, PDSCDH/Data* 16 QAM, PDSCH/Data* 64 QAM)
Constellation	EVM, relative or absolute power, modulation type
MBSFN*	Frame average power
RS TX power	OFDM symbol power
PDSCH/Data* QPSK EVM	Frequency error
PDSCH/Data* 16 QAM EVM	
PDSCH/Data* 64 QAM EVM	
Data EVM RMS	
Data EVM peak	
Frequency error	
Time error	
Data channel	
MBSFN*	
Resource block power	
	Option 048
	ID scanner (up to 6)
	RSRP/RSRQ dominance
	S-SS RSSI dominance
	S-SS Ec/Io dominance
	Cell, group, sector ID
	RSRP/RSRQ
	RS-SINR/S-SS RSSI
	P-SS/S-SS Power
	S-SS Ec/Io
	Multipath profile
	Cell, group, sector ID
	Ant 0 RS Ec/Io, delay
	Ant 1 RS Ec/Io, delay
	Ant 0 Sync Ec/Io, delay
	Ant 1 Sync Ec/Io, Delay
	Control channel
	RS power trend
	Cell, group, sector ID
	Control channel table
	(P-SS, S-SS, PBCH, PCFICH, RS 0, RS 1)
	Absolute power
	Relative power
	EVM RSM, phase
	Frequency error
	Time alignment error
	Time offset
	Datagram
	Datagram
	Resource block power
	Data utilization
	Route Map
	RSRP
	RSRQ
	RS-SINR
	S-SS RSSI
	P-SS, S-SS power
	S-SS Ec/Io
	Time alignment error
	Time alignment error trend
	Time alignment error
	RS power difference
	Antenna 0 RS power
	Antenna 0 RS EVM
	Antenna 1 RS power
	Antenna 1 RS EVM
	Cell, group, sector ID
	Data allocation map
	Data allocation vs frame
	Resource block power
	OFDM symbol power
	Data utilization
	Data allocation vs subframe
	Resource block power
	Data utilization
	Auto measure
	Channel power
	Occupied bandwidth
	Spectrum emission mask
	ACLR
	Multi-ACLR
	Spurious emission mask
	Frame average power
	Time alignment error
	Frequency error
	MBSFN*
	PDSCH/Data* QPSK EVM
	PDSCH/Data* 16 QAM EVM
	PDSCH/Data* 64 QAM EVM
	Data EVM RMS, peak
	RS, P-SS, S-SS EVM
	RS, P-SS, S-SS power
	PBCH power
	Subframe power
	OFDM power
	Time error
	I/Q origin offset
	Power statistics CCDF

Longitude, latitude, and satellite in all screens

* Measurement is performed when MBMS is enabled.

LTE-TDD Signal Analyzer (Option 029)

General Parameters

Frequency range	Band 33 to 43	
Input signal level	-40 to +20 dBm	
Channel power accuracy	±1.0 dB (typical)	
Supported bandwidth	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, and 20 MHz	
Frequency error	±10 Hz + ref freq accuracy	99% confidence level
Residual EVM (RMS)	2.0% (typical)	Data EVM

Measurements

	Option 029	Option 049
Channel power	Data EVM RMS	ID scanner (up to 6)
Channel power	Data EVM peak	RSRP/RSRQ dominance
Spectral density	Frequency error	S-SS RSSI dominance
Peak to average power	Time error	S-SS Ec/Io dominance
Occupied bandwidth	Data channel	Cell, group, sector ID
Occupied bandwidth	MBSFN*	RSRP/RSRQ
Integrated power	Resource block power	RS-SINR/S-SS RSSI
Occupied power	I/Q diagram	P-SS/S-SS power
Spectrum emission mask	RB power	S-SS Ec/Io
Reference power	Modulation format	Multipath profile
Peak level at defined range	I/Q origin offset	Cell, group, sector ID
ACLR	EVM RMS, EVM peak	Ant 0 RS Ec/Io, delay
Reference power	Control channel	Ant 1 RS Ec/Io, delay
Abs power at defined range	Control channel summary	Ant 0 Sync Ec/Io, Delay
Rel power at defined range	(P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS, MBSFN*)	Ant 1 Sync Ec/Io, Delay
Multi-ACLR	EVM, relative or absolute power, modulation type	Control channel
Lowest reference power	Each control channels'	RS power trend
Highest reference power	I/Q diagram	Cell, group, sector ID
Abs power at defined range	Modulation format	Control channel table
Rel power at defined range	Frequency error	(P-SS, S-SS, PBCH, PCFICH, RS 0, RS 1)
Spurious emissions	I/Q origin offset	Absolute power
Peak frequency at defined range	EVM RMS, EVM peak	Relative power
Peak level at defined range	Subframe	EVM RSM, phase
Power vs. time (frame)	MBSFN*	Frequency error
Frame average power	Subframe summary table	Time alignment error
Subframe power	(P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS, MBSFN*, PDSCCH/Data*	Time offset
First slot power	QPSK, PDSCDH/Data* 16 QAM, PDSCCH/Data* 64 QAM)	Datagram
Second slot power	EVM, relative or absolute power, modulation type	Datagram
Cell ID, I/Q origin offset	Subframe power	Resource block power
Time offset	OFDM symbol power	Data utilization
Power vs. time (slot)	Frequency, time error	Route Map
Slot average power	Data EVM RMS, peak	RSRP
Transient period length	RS EVM RMS, peak	RSRQ
Off power	Cell, group, sector ID	RS-SINR
Constellation		S-SS RSSI
MBSFN*		P-SS, S-SS power
RS TX power		S-SS Ec/Io
PDSCH/Data* QPSK EVM		
PDSCH/Data* 16 QAM EVM		
PDSCH/Data* 64 QAM EVM		

* Measurement is performed when MBMS is enabled.

Longitude, latitude, and satellite in all screens

13

E1 Analyzer (Option 004)**Electrical Interface**

Connectors RX/TX	RJ45 (120 Ω)
Output	0 dB, -6 dB (ITU-T Rec.G.703)
Line code	AMI, HDB3
Impedance	Term, monitor 120 Ω, bridge >1000 Ω

Input

Term/bridge/monitor	0 to -20 dB
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Transmitter and Receiver

Framing	PCM-30, PCM-30 with CRC PCM-31, PCM-31 with CRC
Channel formats	Full E1
Test pattern	1-4, 1-8, ALL1, ALL0, 0101

Additional Functions

Reference clock	Received or internal
Event log capability	Internal memory
Error insertion	1, 1E-3, 1E-4, 1E-5
Error rate count	CRC, Frame, Code, Bit

Measurements**Monitoring**

Indicators
E1 signal
Frame sync
Pattern sync
Code sync
FAS RAI
AIS
HDB3
Bit error ²

Error count/rate

Frame error
Code error
Bit error ²

Alarm count

FAS
AIS

Loss count

Frame sync
Pattern sync

BERT

Indicators
E1 signal
Frame sync
Pattern sync
Code sync
FAS RAI
AIS
HDB3
Bit error ²

Error count/rate

CRC error ¹
Frame error
Code error
Bit error ²

Alarm count

FAS
AIS

Loss count

Frame sync
Pattern sync

1. When CRC-4 is set to On.
2. When PCM31 is set to On.

T1 Analyzer (Option 005)**Electrical Interface**

Connectors RX/TX	RJ45 (120 Ω)
Output	0 dB, -7.5 dB, -15 dB
Line code	AMI, B8ZS
Impedance	100 Ω or 1000 Ω (bridge)

Input

Term/bridge/monitor	0 to -20 dB
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Transmitter and Receiver

Framing	D4, ESF
Channel formats	Full T1
Test pattern	1-8, 1-16, ALL1, ALL0, 0101 2E-24, QRSS, 2E-23, 2E-15, 2E-23 inverse, 2E-15 inverse

Additional Functions

Reference clock	Received or internal
Event log capability	Internal memory
Error insertion	1, 1E-3, 1E-4, 1E-5
Alarm insertion	AIS, RAI
Error/alarm count	Bit RAI, AIS, BPV, BER
Loopback modes	Self, CSU, NIU, line, network

Measurements**Monitoring/BERT/loop test**

Indicators
T1 signal
Frame sync
Pattern sync
B8ZS
Red alarm
RAI (yellow alarm)
AIS (blue alarm)
BPV indicator

Loss count

Signal loss
Frame sync loss
Pattern sync loss

RX signal level

Indicators
T1 signal
Frame sync
Pattern sync
B8ZS
Red alarm
RAI (yellow alarm)
AIS (blue alarm)
BPV indicator

Vp-p

Vp-p Max
Vp-p Min
dB _{dsx}

Alarm count

RAI
AIS
BPV

Error rate

Bit error rate
Bit error count

General Information

Inputs and Outputs

RF in	Spectrum analyzer
Connector	Type-N, female
Impedance	50 Ω (nominal)
Damage level	>+40 dBm, > \pm 50 VDC (nominal)

Reflection/RF out

Connector	Type-N, female
Impedance	50 Ω (nominal)
Damage level	>+37 dBm, > \pm 50 VDC (nominal)

RF in

Connector	Type-N, female
Impedance	50 Ω (nominal)
Maximum level	>+25 dBm, > \pm 50 VDC (nominal)

External trigger, GPS

Connector	SMA, female
Impedance	50 Ω (nominal)

External ref

Connector	SMA, female
Impedance	50 Ω (nominal)
Input frequency	10 MHz, 13 MHz, 15 MHz
Input range	-5 to +5 dBm

USB

USB host ¹	Type A, 1 port
USB client ²	Type B, 1 port

LAN	RJ45, 10/100Base-T
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E1/T1	RJ45
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Audio jack	3.5 mm headphone jack
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External power	5.5 mm barrel connector
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Speaker	Built-in speaker
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Display

Type	Resistive touch screen (as of serial number BEK11791)
Size	8 inch, LED backlight
Resolution	800 x 600

Power

External DC input	12 to 19 VDC
Power consumption	32.5 W 45 W maximum (when charging battery)

Battery

Type	10.8 V, 7800 mA/hr (Lithium ion)
Operating time	>3 hours (typical)
Charge time	2.5 hours (80%), 4 hours (100%)
Charging temperature	0° to 45 °C (32° to 113 °F) \leq 85% RH
Discharging temperature	-10° to 60 °C (14° to 140 °F) \leq 85% RH
Storage temperature ³	-20° to 50 °C (-4° to 122 °F) \leq 85% RH (non-condensing)

Data Storage

Internal ⁴	Minimum 20 MB
External ⁵	Limited by size of USB flash drive

Environmental

Operating temperature

AC Power	0° to 40°C (32° to 104°F) with no derating
Battery	0° to 40°C (32° to 104°F) @charging -10° to 55°C (14° to 131°F) @discharging

Maximum humidity	\leq 85% RH (non-condensing)
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Shock and vibration	MIL-PRF-28800F Class 2
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Storage temperature ⁶	-55° to 71°C (-67° to 160°F)
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EMC

EN 61326-2-1	Complies with European EMC
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Size and Weight (Standard configuration)

Weight (with battery)	<4 kg (8.8 lb)
Size (W x H x D)	295 x 195 x 82 mm (11.6 x 7.7 x 3.2 in)

Warranty

2 years

Calibration Cycle

1 year

1. Connects flash drive and power sensor.
2. Connects to PC for data transfer.
3. 20 to 85% RH, store battery pack in low-humidity environment.
Extended exposure to temperature above 45°C could significantly degrade battery performance and life.
4. Up to 700 traces.
5. Supports USB 2.0 compatible memory devices.
6. With the battery pack removed.

Ordering Information

Standard

JD745A	100 kHz to 4 GHz Spectrum Analyzer 5 MHz to 4 GHz Cable and Antenna Analyzer ¹ 10 MHz to 4 GHz RF Power Meter (Internal mode)
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Options

NOTE: Upgrade options for the JD745A use the designation JD745AU before the respective last three-digit option number.

JD745A001	2-Port Transmission Measurement ²	
JD745A002	Bias-Tee	(Requires option 01)
JD745A003	CW Signal Generator	
JD745A004	E1 Analyzer ³	
JD745A005	T1 Analyzer ³	
JD745A010	GPS Receiver and Antenna	
JD745A011	Interference Analyzer ^{4,5}	
JD745A012	Channel Scanner	
JD745A013	Optical Power Meter ⁶	
JD745A020	cdmaOne/cdma2000 Signal Analyzer	
JD745A021	EV-DO Signal Analyzer	(Requires option 20)
JD745A022	GSM/GPRS/EDGE Signal Analyzer	
JD745A023	WCDMA/HSPA+ Signal Analyzer	
JD745A025	TD-SCDMA Signal Analyzer	
JD745A026	Mobile WiMAX Signal Analyzer	
JD745A028	LTE-FDD Signal Analyzer	
JD745A029	LTE-TDD Signal Analyzer	
JD745A040	cdmaOne/cdma2000 OTA Analyzer ⁵	(Requires option 10)
JD745A041	EV-DO OTA Analyzer ⁵	(Requires option 10)
JD745A042	GSM/GPRS/EDGE OTA Analyzer ⁵	(Requires option 10)
JD745A043	WCDMA/HSPA+ OTA Analyzer ⁵	(Requires option 10)
JD745A045	TD-SCDMA OTA Analyzer ⁵	(Requires option 10)
JD745A046	Mobile WiMAX OTA Analyzer ⁵	(Requires option 10)
JD745A048	LTE-FDD OTA Analyzer ⁵	(Requires option 10)
JD745A049	LTE-TDD OTA Analyzer ⁵	(Requires option 10)

Standard Accessories

G710550326	AC/DC power adapter ⁷
G710550335	Cross LAN cable (1.5 m) ⁷
GC73050515	USB A to B cable (1.8 m) ⁷
GC72450518	>1 G Byte USB memory ⁷
G710550325	Rechargeable lithium ion battery ⁷
G710550323	Automotive cigarette lighter 12 VDC adapter ⁷
G710550316	Stylus pen ⁷
JD740A361	JD740A Series User's Manual and Application Software — CD

1. Requires calibration kit.
2. Requires dual-port calibration kit.
3. Requires test cable.
4. Highly recommend adding JD745A010.
5. Highly recommend adding G70005035x and/or G70005036x.
6. Requires MP-60 or MP-80.
7. Standard accessories can be purchased separately.

Optional Calibration Kits

JD72450509	Y-Calibration Kit, Type-N(m), DC to 4 GHz, 50 Ω
JD72450510	Y-Calibration Kit DIN(m), DC to 4 GHz, 50 Ω
JD71050507	Dual-Port Type-N Calibration Kit, 50 Ω <ul style="list-style-type: none"> • Y-Calibration Kit, Type-N(m), DC to 4 GHz, 50 Ω • Two Adapters Type-N(f) to Type-N(f), DC to 4 GHz, 50 Ω • Two 1 m RF Test Cables, Type-N(m) to Type-N(m), DC to 18 GHz, 50 Ω
JD71050508	Dual-Port DIN Calibration Kit, 50 Ω <ul style="list-style-type: none"> • Y-Calibration Kit DIN(m), DC to 4 GHz, 50 Ω • Two 1 m RF Test Cables, Type-N(m) to Type-N(m), DC to 18 GHz, 50 Ω • Adapter Type-N(f) to DIN(f), DC to 4 GHz, 50 Ω • Adapter Type-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

G710050530	1.0 m (3.28 ft) RF Cable, DC to 18 GHz, Type-N(m) to Type-N(m), 50 Ω
G710050531	1.5 m (4.92 ft) RF Cable, DC to 18 GHz, Type-N(m) to Type-N(f), 50 Ω
G710050532	3.0 m (9.84 ft) RF Cable, DC to 18 GHz, Type-N(m) to Type-N(f), 50 Ω
G710050533	1.5 m (4.92 ft) RF Cable, DC to 18 GHz, Type-N(m) to SMA(m), 50 Ω
G710050534	1.5 m (4.92 ft) RF Cable, DC to 18 GHz, Type-N(m) to QMA(m), 50 Ω
G710050535	1.5 m (4.92 ft) RF Cable, DC to 18 GHz, Type-N(m) to SMB(m), 50 Ω

Ordering Information (cont'd)
Optional Omni Antennas

G700050351	RF Omni Antenna Type-N(m), 400 MHz to 450 MHz
G700050352	RF Omni Antenna Type-N(m), 450 MHz to 500 MHz
G700050353	RF Omni Antenna Type-N(m), 806 MHz to 896 MHz
G700050354	RF Omni Antenna Type-N(m), 870 MHz to 960 MHz
G700050355	RF Omni Antenna Type-N(m), 1.71 GHz to 2.17 GHz
G700050356	RF Omni Antenna Type-N(m), 720 MHz to 800 MHz
G700050357	RF Omni Antenna Type-N(m), 2.3 GHz to 2.7 GHz

Optional Yagi Antennas

G700050364	RF Yagi Antenna Type-N(f), 806 MHz to 896 MHz, 10.2 dBd
G700050365	RF Yagi Antenna Type-N(f), 866 MHz to 960 MHz, 10.2 dBd
G700050363	RF Yagi Antenna Type-N(f), 1.75 GHz to 2.39 GHz, 9.8 dBd
G700050366	RF Yagi Antenna SMA(f), 700 MHz to 4 GHz, 1.85 dBd

Optional RF Power Sensors

JD731B	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 0.1 to 50 W
JD732B	Terminating Power Sensor (average power) Frequency: 20 MHz to 3.8 GHz Power: -30 to +20 dBm
JD734B	Terminating Power Sensor (peak power) Frequency: 20 MHz to 3.8 GHz Power: -30 to +20 dBm
JD736B	Terminating Power Sensor (peak and average power) Frequency: 20 MHz to 3.8 GHz Power: -30 to +20 dBm
G700050366	RF Omni Antenna Type-N(m), 2.3 GHz to 2.7 GHz

Optional Optical Power Sensors

MP-60	Miniature USB 2.0 Optical Power Sensor Wavelength Range: 780 to 1650 nm 1300, 1310, 1490, 1550 nm: -50 to +10 dBm 850 nm: -45 to +10 dBm
MP-80	Miniature USB 2.0 Optical Power Sensor Wavelength Range: 780 to 1650 nm 1300, 1550 nm: -35 to +23 dBm 850 nm: -30 to +23 dBm

Optional RF Adapters

G710050570	Adapter Type-N(f) to Type-N(f), DC to 6 GHz, 50 W
G710050571	Adapter Type-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 Type-N(m) to SMA(f), DC to 18 GHz, 50 Ω
G710050574	Adapter Type-N(m) to BNC(f), DC to 1.5 GHz, 50 Ω
G710050575	Adapter Type-N(f) to Type-N(f), DC to 4 GHz, 50 Ω
G710050576	Adapter Type-N(m) to DIN(m), DC to 4 GHz, 50 Ω
G710050577	Adapter Type-N(f) to DIN(f), DC to 4 GHz, 50 Ω
G710050578	Adapter Type-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

Optional Miscellaneous

G710050581	Attenuator 40 dB, 100 W, DC to 4 GHz (Unidirectional)
JD74050341	Soft Carrying Case
JD71050342	Hard Carrying Case
JD74050343	Backpack Carrying Case
G710050585	RF Directional Coupler, 700 MHz to 4 GHz, 30 dB, Input/Output; Type-N(m) to Type-N(f), Tap Off; Type-N(f) ⁸
G710050586	RF Combiner, 700 MHz to 4 GHz, Type-N(f) to Type-N(m) ⁸
G71050324	External Battery Charger
JD740A362	JD740A Series User's Manual – Printed Version

8. Highly recommended for LTE testing.

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 3454668	ASIA PACIFIC TEL:+852 2892 0990 FAX:+852 2892 0770	EMEA TEL:+49 7121 86 2222 FAX:+49 7121 86 1222	www.jdsu.com/test
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