

JD745A

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 the following conditions.

- After instrument has been turned on for at least 15 minutes.
- The instrument is operating within a valid calibration period.
- Data with no tolerance is considered as typical values.
- The 'typical' or 'nominal' values are defined as follows:
 - 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.

*All specifications subject to change without notice.

Spectrum Analyzer (Standard)

JD745A		
Frequency range	100 kHz to 4 GHz	
Internal 10 MHz Frequency Reference		
Accuracy	±0.05 ppm (25°C ±25°C) + aging	
Aging	±0.5 ppm per/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		
RBW 10 kHz, VBW 1 kHz, RMS detector		
Carrier offset:		Typical
30 kHz	≤90 dBc/Hz	
100 kHz	≤95 dBc/Hz	
1 MHz	≤102 dBc/Hz	

2

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
>2.3 to 3.0 GHz	–138 dBm
>3.0 to 4.0 GHz	–135 dBm

Preamplifier On:

10 MHz to 2.3 GHz	–155 dBm
>2.3 to 3.0 GHz	–153 dBm
>3.0 to 4.0 GHz	–150 dBm

Display Range

Log scale and units	1 to 20 dB/division in 1 dB steps 10 divisions displayed dBm, dBV, dBmV, dB μ V
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 (25°C \pm 5°C)

5 MHz to 4 GHz	\pm 1.25 dB, \pm 0.5 dB (typical)	Attenuation < 40 dB
	\pm 1.55 dB, \pm 1.0 dB (typical)	Attenuation \geq 40 dB

Reference Level

Setting range	–120 dBm 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

1.5:1	Typical
20 MHz to 4.0 GHz	

Second Harmonic Distortion (Second Harmonic Intercept: SHI)

Mixer level = –25 dBm

10 MHz to 1.3 GHz	< –65 dBc	Typical
1.3 to 4.0 GHz	< –70 dBc	Typical

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

200 MHz to 2 GHz	+10 dBm	Typical
2 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 to 4 GHz	–85 dBm	Nominal
Exceptions	< –85 dBm at 2497.8 and 1599.0 MHz	
Input related spurious	< –70 dBc	

Dynamic Range

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

Sweep Time

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

Gated Sweep

Trigger source	External
Gate length	1 μ s 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 μ s

3

Measurements

Spectrum analysis with CW signal generator

Channel power

Occupied bandwidth

Spectrum emission mask

Adjacent channel power

Spurious emissions

Field strength

AM/FM audio demodulation

Cable and Antenna Analyzer (Standard)**General Parameters**

Range 5 MHz to 4 GHz

Resolution 10 kHz

Accuracy ± 25 ppm**Data Points**

126, 251, 501, 1001

Measurement speed

1 Port measurements 1.65 ms/point Nominal

Measurement Accuracy

Corrected directivity 40 dB (typical)

Reflection uncertainty $0.3 + |20 \log(1 + 10^{EP/20})|$ EP = Directivity – Measured return loss**Output Power**

High +0 dBm Typical

Low -30 dBm Typical

Dynamic Range

Reflection 60 dB

Maximum Input Level

Average continuous power +25 dBm Nominal

DC voltage ± 50 VDCInterference immunity +17 dBm on channel
0 dBm on 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 $(1.5 \times 10^8) \times (V_p) / (\Delta) \times (0.95)$ Vp = 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

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 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 Power Sensors**Directional power sensors**

	JD731A		JD733A	
Frequency range	300 to 3800 MHz		150 to 3800 MHz	
Dynamic range	Average	0.15 to 150 W	Average	0.1 to 50 W
	Peak	4 to 400 W	Peak	0.1 to 50 W
Connector type	Type N (f) on both ends			
Measurement type	Forward/reverse average power, forward peak power, VSWR			
Accuracy	$\pm 4\% + 0.05 \text{ W}^1$			

Terminating power sensors

	JD732A	JD734A	JD736A
Frequency range	20 to 3800 MHz	20 to 3800 MHz	20 to 3800 MHz
Dynamic range	-30 to 20 dBm	-30 to 20 dBm	-30 to 20 dBm
Connector type	Type N (m)	Type N (m)	Type N (m)
Measurement type	Average	Peak	Average and peak
Accuracy	$\pm 7\%^1$	$\pm 7\%^1$	$\pm 7\%^1$

Optical power meter

Display range	-100 to +100 dBm
Offset range	0 to 60 dB
Resolution	0.01 dB or 0.1 mW

External optical power sensors

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

¹CW condition at 25°C $\pm 10^\circ\text{C}$

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		
2.2 ms/point	Nominal	
Dynamic Range		
Vector:	5 MHz to 3 GHz, 80 dB > 3 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	10 MHz to 4 GHz

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

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	±50 ppb	15 minutes after locking to GPS
Connector	SMA, female	

Interference Analyzer (Option 011)

Measurements		
Spectrum analyzer	Sound indicator, AM/FM audio demodulator, interference ID, spectrum recorder	
Spectrogram	Collect data up to 72 hours	
RSSI	Collect data up to 72 hours	Received signal strength indicator
Interference finder		
Spectrum player		

Channel Scanner (Option 012)

Frequency Range	
100 kHz 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 to 500 MHz 820 to 965 MHz 1705 to 1995 MHz	
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	±1.0 degrees	(0 < Phase RMS < 8)
Phase RMS accuracy		
Residual error	0.7 degrees	Typical
Phase peak accuracy	±2.0 degrees	(0 < Phase peak < 30)
8 PSK modulation quality	±1.5%	(2% < EVM < 8%)
EVM accuracy		
Residual error	2.5%	
RF power vs time	±0.25 symbol	

Measurements

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

* The measurements are performed for 8 PSK modulation signals (EDGE) only.

Longitude, latitude, and satellite in all screens

WCDMA/HSDPA Signal Analyzer (Option 023 for WCDMA, Option 024 for HSDPA)**General Parameters**

Frequency range	Band I to Band XIV	
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	
HSDPA 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
CPICH accuracy (dBm)	±0.8 dB	Typical

Measurements

	Option 023 and 024		Option 043
Channel power	Constellation	Auto measure	Channel scanner (up to 6)
Channel power	CPICH power	Channel power	Frequencies or channels
Spectral density	Rho, EVM	Occupied bandwidth	Channel power, scramble
Peak to average power	Peak CDE	Spectrum emission mask	Code, CPICH power, Ec/Io
Occupied bandwidth	Frequency error	ACLR	Scramble scanner (up to 6)
Occupied bandwidth	Time offset	Multi-ACLR	Channel power
Integrated power	Carrier feed through	Frequency error	CPICH dominance
Occupied power	Scramble Code	EVM	Scramble code
Spectrum emission mask	Code domain power	Peak CDE	Ec/Io, CPICH power, delay
Reference power	Abs/Rel code power	Carrier feed through	Multipath profile
Peak level at defined range	Individual code EVM,	CPICH absolute power	Channel, multipath power
ACLR	Constellation	CPICH relative power	Ec/Io, delay
Reference power	Channel power	Max inactive power	Code domain power
Abs power at defined range	Power bar graph		Abs/Rel code power
Rel power at defined range	(Abs/Rel/delta power)	Power statistics CCDF	Individual code EVM
Multi-ACLR	CPICH, PCCPCH, SCCPCH		Channel power
Lowest reference power	PICH, P-SCH, S-SCH		Scramble code
Highest reference power	Max, avg active power		CPICH, PCCPCH, SCCPCH,
Abs power at defined range	Max, avg inactive power		PICH, P-SCH, S-SCH power
Rel power at defined range	Scramble code		Max, avg active power
Spurious emissions	Codogram		Max, avg inactive power
Peak Freq at defined range	Code utilization		Frequency error
Peak Level at defined range	RCSI		Time offset, Rho
	CPICH, P-CCPCH, S-CCPCH,		Carrier feed through
	PICH, P-SCH, S-SCH		(Composite) EVM
	CDP table		CPICH EVM, P-CCPCH EVM
	Code utilization		Amplifier capacity
	Code, spreading exactor		Peak amplifier capacity
	Allocation (channel type)		Average amplifier capacity
	EVM, modulation type		Code, peak utilization
	Relative, absolute power		Average utilization
	Longitude, latitude, and satellite in all screens		

cdmaOne/CDMA2000 Signal Analyzer (Option 020)

General Parameters			
Frequency range	Band 1 to Band 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		
Pilot power accuracy	±1.0 dB		
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	ACLR	PN scanner (up to 6)
Occupied bandwidth	Time offset	Multi-ACLR	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, sync		Ec/Io, delay
Abs power at defined range	Page, Q-page	Power statistics CCDF	Code domain power
Rel power at defined range	Max, avg active power		Abs/Rel code power
Multi-ACPR	Max, avg inactive power		Channel power
Lowest reference power	PN offset		Pn offset
Highest reference power	Codogram		Pilot, sync power
Abs power at defined range	Code Utilization		Page, Q-page power
Rel power at defined range	RCSI		Max, avg active power
Spurious emissions	Pilot, paging, sync, Q-page		Max, avg inactive power
Peak freq at defined range	CDP table		Frequency error
Peak level at defined range	Code utilization		Time offset, Rho, EVM
	Code, spreading factor		Carrier feed through
	Allocation (channel type)		Amplifier capacity
	Relative, absolute power		Peak amplifier capacity
			Average amplifier capacity
			Code, peak utilization
			Peak utilization
			Average utilization

Longitude, latitude, and satellite in all screens

EV-DO Signal Analyzer (Option 021)

General Parameters			
Frequency range	Band 1 to Band 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		
Pilot power accuracy	±1.0 dB		
Time offset	±1.0 µs, ±0.5 µs (typical)	External trigger	
Measurements			
	Option 021		Option 041
Channel power	Power vs. time	MAC codogram	Channel scanner (up to 6)
Channel power	(idle and active slot)	Code utilization	Frequencies or channels
Spectral density	Slot average power	RCSI	Pn offset
Peak to average power	On/Off Ratio	Slot, pilot, MAC, data	Pilot, MAC, data power
Occupied bandwidth	Idle activity	MAC CDP table	PN scanner (up to 6)
Occupied bandwidth	Pilot, MAC, data power	Code utilization	Channel power
Integrated power	Constellation	Code, spreading factor	Pilot dominance
Occupied power	(Composite 64/128, pilot,	Allocation (channel type)	PN offset
Spectrum emission mask	MAC 64/128, data)	Relative, absolute power	Ec/Io, pilot power, delay
Reference power	Channel power		Multipath profile
Peak level at defined range	Rho, EVM	Auto measure	Channel power
ACPR	Peak CDE	Channel power	Multipath power
Reference power	Frequency error	Occupied bandwidth	Ec/Io, delay
Abs power at defined range	Time offset	Spectrum emission mask	Code domain power
Rel power at defined range	Carrier feed through	ACLR	Slot average power
Multi-ACPR	PN offset	Multi-ACLR	PN offset
Lowest reference power	Data modulation type*	Pilot, MAC, data power	Pilot, MAC, data power
Highest reference power	Code domain power	On/Off ratio	Pilot, MAC, data Rho
Abs power at defined range	(Pilot and MAC 64/128)	Pvst mask (idle slot)	(composite) EVM
Rel power at defined range	Pilot power/MAC power	Pvst mask (active slot)	Frequency error
Spurious emissions	Slot average power	Frequency error	Time offset
Peak frequency at defined range	Max, Avg Active I/Q pwr	Time offset	Carrier feed through
Peak level at defined range	Max, Ave Inactive I/Q pwr	Carrier feed through	Max active I/Q power
	PN offset	Pilot, MAC, data Rho	Avg active I/Q power
	Code domain power (data)	PN offset	Code utilization
	Data power		Peak utilization
	Slot average power	Power statistics CCDF	Average utilization
	Max, avg active power		
	Max, avg inactive power		
	PN offset		
	Longitude, latitude, and satellite in all screens		

TD-SCDMA Signal Analyzer (Option 025)

General Parameters		
Frequency range	1785 to 2220 MHz	
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	Power vs. time (slot)	Code error	Sync-DL ID scanner (32)
Channel power	Slot power	Code power	Scramble code group
Spectral density	DwPTS power	Code error	Ec/Io, Tau
Peak to average power	UpPTS power	Individual code EVM	DwPTS power
Occupied bandwidth	On/Off slot ratio	Individual code constellation	Pilot dominance
Occupied bandwidth	Slot pAR	Data Format	Sync-DL ID vs. Tau (up to 6)
Integrated power	DwPTS code	Slot, DwPTS power	ID, power, Ec/Io, Tau
Occupied power	Power vs. time (frame)	No. of active code	DwPTS power
Spectrum emission mask	Slot power (TS 0 to 6)	Scramble code	Pilot dominance
Reference power	Data power left (TS 0 to 6)	Max active code power	Sync-DL ID multipath
Peak Level at defined range	Midamble power (TS 0 to 6)	Avg active code power	Ec/Io, Tau
ACLR	Data power right (TS 0 to 6)	Max inactive code power	DwPTS power
Reference power	Time offset (TS 0 to 6)	Avg inactive code power	Pilot dominance
Abs Power at defined range	Power vs. time (mask)	Peak CDE	Sync-DL ID analyzer
Rel Power at defined range	Slot power	Peak active CDE	DwPTS power, Ec/Io trend
Multi-ACLR	On/Off slot ratio		DwPTS power
Lowest reference power	Off power	Auto measure	Pilot dominance
Highest reference power	Timogram	Channel power	EVM, frequency error
Abs power at defined range	Constellation	Occupied bandwidth	Ec/Io, CINR
Rel power at defined range	Rho	Spectrum emission mask	
Spurious emissions	EVM RMS, EVM peak	ACLR	
Peak frequency at defined range	Peak CDE	Multi-ACLR	
Peak level at defined range	Frequency error	Slot power	
	IQ origin offset	DwPTS power	
	Time Offset	UpPTS power	
	Midamble power	On/Off slot ratio	
	Slot power	EVM RMS	
	DwPTS power	PCDE	
	Midamble power (1 to 16)	Frequency error	
	Code power	Max inactive power	
	Abs/Rel code power	Scramble code	
	Individual code EVM,		
	Individual code constellation		
	Data format		
	Slot power, DwPTS power		
	No. of active code		
	Scramble code		
	Max active code power		
	Avg active code power		
	Max inactive code power		
	Avg inactive code power		
	Longitude, latitude, and satellite in all screens		

Mobile WiMAX Signal Analyzer (Option 026)**General Parameters**

Frequency range	2100 to 2700 MHz 3400 to 3850 MHz	
Input signal level	–40 to +20 dBm	
Channel power accuracy	±1.0 dB	Typical
Supported bandwidth	7, 8.75, 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	Power vs. time (frame)	Auto measure	Preamble scanner (up to 6)
Channel power	Channel power	Channel power	Total preamble power
Spectral density	Frame average power	Occupied bandwidth	Preamble, relative power
Peak to average power	Preamble power	Spectrum emission mask	Cell ID, sector ID
Occupied bandwidth	DL burst power	Preamble power	Time offset
Occupied bandwidth	UL burst power	DL Burst power	Multipath profile
Integrated power	IQ origin offset	UL Burst power	Total preamble power
Occupied power	Time offset	Frame average power	Multipath power
Spectrum emission mask	Constellation	Time offset	Preamble power, delay
Reference power	Channel power	IQ origin offset	Preamble power trend
Peak level at defined range	RCE RMS, RCE peak	Spectral flatness	Preamble power trend
Spurious emissions	EVM RMS, EVM peak	Frequency error	Relative power trend
Peak frequency at defined range	Frequency error	RCE RMS	Preamble power
Peak level at defined range	Time offset	RCE peak	Frame avg power
	Segment ID, cell ID	EVM RMS	Relative power
	Preamble index	EVM peak	C/I
	Spectral flatness		Preamble
	Average subcarrier power	Power statistics CCDF	Cell ID, sector ID
	Subcarrier Pwr variation		Time offset
	Max, min, avg power		
	EVM vs. subcarrier		
	RCE RMS, RCE peak		
	EVM RMS, EVM peak		
	Segment ID, cell ID		
	Preamble index		
	EVM vs. symbol		
	RCE RMS, RCE peak		
	EVM RMS, EVM peak		
	Segment ID, cell ID		
	Preamble index		

Longitude, latitude, and satellite in all screens

LTE-FDD Signal Analyzer (Option 028)

General Parameters		
Frequency range	Band 1 to 19	
Input signal level	−40 to +20 dBm	
Channel power accuracy	±1.0 dB	Typical
Supported bandwidth	1.4, 3, 5, 10, 15, and 20 MHz	
Frequency error	±10 Hz + ref freq accuracy	99% Confidence level
Residual EVM (RMS)	2.0% typical	Data EVM

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

LTE-FDD Signal Analyzer (Option 029)

General Parameters			
Frequency range	Band 33 to band 40		
Input signal level	−40 to +20 dBm		
Channel power accuracy	±1.0 dB	Typical	
Supported bandwidth	1.4, 3, 5, 10, 15, 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	Constellation	Time alignment error	ID scanner (up to 6)
Channel power	RS TX power	Time alignment error trend	P-SS dominance
Spectral density	PDSCH QPSK EVM	Time alignment error	S-SS dominance
Peak to average power	PDSCH QPSK EVM	RS power difference	Cell, group, sector ID
Occupied bandwidth	PDSCH QPSK EVM	Antenna 0 RS power	P-SS, S-SS power
Occupied bandwidth	Data EVM RMS	Antenna 0 RS EVM	P-SS, S-SS Ec/Io
Integrated power	Data EVM peak	Antenna 1 RS power	Multipath profile
Occupied power	Frequency error	Antenna 1 RS EVM	Cell, group, sector ID
Spectrum emission mask	Time error		P-SS Ec/Io, delay
Reference power	Data channel	Auto measure	S-SS Ec/Io, delay
Peak level at defined range	Resource block power	Channel power	Control channel
ACLR	IQ diagram	Occupied bandwidth	RS power trend
Reference power	RB power	Spectrum emission mask	Cell, group, sector ID
Abs power at defined range	Modulation format	ACLR	Control channel table
Rel power at defined range	IQ origin offset	IQ origin offset	(P-SS, S-SS, PCFICH,
Spurious emissions	EVM RMS, EVM peak	Time error	RS, PBCH)
Peak frequency at defined range	Control channel	EVM RMS	Absolute power
Peak level at defined range	Control channel table	Data EVM peak	Relative power
	(P-SS, S-SS, PBCH,	Frequency error	EVM RSM, peak
	PCFICH, PHICH, PDCCH, RS)	RS power	Frequency error
Power vs. time (frame)	EVM, relative or absolute power	P-SS power	Datagram
Frame average power	modulation type	S-SS power	Datagram
Subframe power	Each control channels'	PBCH power	Resource block power
First slot power	IQ diagram	PCFICH power	Data utilization
Second slot power	Modulation format		
Cell ID, IQ origin offset	Frequency error	Power statistics CCDF	
Time offset	IQ origin offset		
Power vs. time (slot)	EVM RMS, EVM peak		
Slot average power	Subframe summary		
Transient period length	Summary table		
Off power	(P-SS, S-SS, PBCH, PCFICH, PHICH,		
	PDCCH, RS, PDSCH QPSK, 16, 64QAM)		
	EVM, relative or absolute power,		
	modulation type		
	Subframe power		
	OFDM symbol power		
	Frequency error		
	Time offset		
	Data EVM RMS, peak		
	RS EVM RMS, peak		
	Longitude, latitude, and satellite in all screens		

E1 Analyzer (Option 004)

Electrical Interface	
Connectors RX/TX	RJ48C (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
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	
Option 002	
Monitoring/error injection	
Indicators	
E1 signal	
Frame sync	
Pattern sync	
Code sync	
FAS RAI	
AIS	
HDB8	
Error count/rate	
CRC error	When CRC-4 is set to On
Frame error	
Code error	
Bit error	When PCM31 is set to On
Alarm count	
FAS	
AIS	
Loss count	
Frame sync	
Pattern sync	

T1 Analyzer (Option 005)

Electrical Interface	
Connectors RX/TX	RJ48C (120 Ω)
Output	0, -7.5 and -15 dB
Line code	AMI, HDB3
Impedance	100 Ω or 1000 Ω (Bridge)
Input	
Term/Bridge/Monitor	0 to -20 dB
Transmitter and Receiver	
Framing	D4, ESF
Channel formats	Full E1
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	
Option 003	
Monitoring/BERT/loop test	
Indicators	
T1 signal loss	Red alarm
Frame sync	RAI (yellow alarm)
Pattern sync	AIS (blue alarm)
B8ZS	BPV indicator
Loss count	
Signal loss	Pattern sync loss
Frame sync loss	
Alarm count	
RAI	BPV
AIS	
Error rate	
Bit error rate	Bit error count
RX signal level	
Indicators	
T1 signal loss	AIS (blue alarm)
Frame sync	BPV indicator
Pattern sync	Vp-p
B8ZS	Vp-p Max
Red alarm	Vp-p Min
RAI (yellow alarm)	dB _{dsx}

General Information

Inputs and Outputs

RF in	Spectrum analyzer
Connector	Type-N, female
Impedance	50 Ω (nominal)
Damage level	> +40 dBm, > ± 50 VDC
	Nominal
Reflection/RF out	Cable and antenna analyzer
Connector	Type-N, female
Impedance	50 Ω (nominal)
Damage level	> +37 dBm, > ± 50 VDC Nominal
RF in	Cable and antenna analyzer
Connector	Type-N, female
Impedance	50 Ω (nominal)
Maximum level	> +25 dBm, > ± 50 VDC
External trigger, GPS	
Connector	SMA, female
Impedance	50 Ω (nominal)
External ref	
Connector	SMA, female
Impedance	50 Ω (nominal)
Input frequency	10, 13, 15 MHz
Input range	-5 dBm to +5 dBm
USB	
USB host	Type A, 1 port
	Connects flash drive and power sensor
USB client	Type B, 1 port
	Connects to PC for data transfer
LAN	RJ45, 10/100 Base-T
	Connects to PC for data transfer
E1/T1	RJ48C
Audio jack	3.5 mm headphone jack
External power	5.5 mm barrel connector
Speaker	Built-in speaker

Display

Size	8 in, 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

	10.8 V, 7200 mA/hr	Lithium ion
Operating time	> 3 hours typical	
Charge time	A fully discharged battery takes about 2.5 hours to recharge to 80%, 4 hours to 100%	
Storage temperature	-10 to 60°C, ≤85% RH 14 to 140°F, ≤85% RH	Store battery pack in low-humidity environment. Extended exposure to temperatures above 45°C could degrade battery performance and life.

Data Storage

Internal	Minimum 20 MB	Up to 200 instrument states and trace
External		Supports USB 2.0 compatible memory devices

Environmental

Operating temperature	-10 to 55°C (14 to 131°F)
Maximum humidity	85%
Shock and vibration	MIL-PRF-28800F Class 2
Storage temperature (With the battery pack removed)	-55 to 71°C (-67 to 160°F)

EMC

EN 61326-2-1	Complies with European EMC
--------------	----------------------------

Safety

EN 61010-1 2nd

Size and Weight (Standard configuration)

Weight with battery	< 4 kg (8.8 lbs)
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

Ordering Information

JD745A Base Station Analyzer

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)

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 ^{3,4}
JD745A012	Channel Scanner
JD745A013	Optical Power Meter (Requires optical power sensor)
JD745A020	cdmaOne/CDMA2000 Signal Analyzer
JD745A021	EV-DO Signal Analyzer (Requires option 20)
JD745A022	GSM/GPRS/EDGE Signal Analyzer
JD745A023	WCDMA Signal Analyzer
JD745A024	HSDPA Signal Analyzer (Requires option 23)
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 (Requires option 10)
JD745A041	EV-DO OTA Analyzer (Requires option 10)
JD745A042	GSM/GPRS/EDGE OTA Analyzer (Requires option 10)
JD745A043	WCDMA/HSDPA OTA Analyzer (Requires option 10)
JD745A045	TD-SCDMA OTA Analyzer (Requires option 10)
JD745A046	Mobile WiMAX OTA Analyzer (Requires option 10)
JD745A048	LTE-FDD OTA Analyzer (Requires option 10)
JD745A049	LTE-TDD OTA Analyzer (Requires option 10)

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 Standard accessories can be purchased separately.

Standard Accessories

G710550322	AC/DC Power Adapter ⁶
G710550335	Cross LAN Cable (1.5 m) ⁶
GC73050515	USB A to B Cable (1.8 m) ⁶
GC72450518	> 1 G Byte USB Memory ⁶
G710550325	Rechargeable Lithium Ion Battery ⁶
G710550323	Automotive Cigarette Lighter 12 VDC Adapter ⁶
JD745A361	JD745A User's Manual and Application Software – CD

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 0.1 to 50 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 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

Ordering Information (cont'd)

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 <ul style="list-style-type: none"> 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 18 GHz, 50 Ω
JD71050508	Dual-Port DIN-Type Calibration Kit, 50 Ω <ul style="list-style-type: none"> Open/Short/Load DIN(m), 40 dB, 4 GHz, 50 Ω Two 1 m (3.28 ft) RF Test Cables, N(m) to N(m), DC to 18 GHz, 50 Ω Adapter N(f) to DIN(f), DC to 4 GHz, 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

G710050530	1.0 m (3.28 ft) RF Cable, DC to 18 GHz, N(m)-N(m), 50 Ω
G710050531	1.5 m (4.92 ft) RF Cable, DC to 18 GHz, N(m)-N(f), 50 Ω
G710050532	3.0 m (9.84 ft) 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
G700050356	RF Omni Antenna 720 to 800 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

Optional E1/T1 Test Cables

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

Optional Accessories

G710050581	Attenuator 40 dB, 100 W, DC to 4 GHz (Unidirectional)
JD74050341	Soft Carrying Case
JD71050342	Hard Carrying Case
JD71050343	Backpack Carrying Case
G710550324	External Battery Charger
JD745A362	JD745A User's Manual (Printed Version)
G710050585	RF Directional Coupler 700 to 4000 MHz, 30 dB, Input N(m), Output N(f), Tap N(f)
G710050586	RF Combiner, 700 to 4000 MHz, Input N(f), Output N(m)

Test & Measurement Regional Sales

NORTH AMERICA TEL: 1 866 228 3762 FAX: +1 301 353 9216	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
---	---	---	---	---