JD785A
CellAdvisor™ Base Station Analyzer

Spectrum Analyzer: 9 kHz to 8 GHz

Cable and Antenna Analyzer: 5 MHz to 6 GHz

Power Meter: 10 MHz to 8 GHz

Specification* Conditions

The JD785A 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	9 kHz to 8 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 8 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	–100 dBc/Hz (–102 dBc/Hz, typical)
100 kHz	–105 dBc/Hz (–112 dBc/Hz, typical)
1 MHz	–115 dBc/Hz (–120 dBc/Hz, typical)

Measurement Range

	DANL to +25 dBm
Input attenuator range	0 to 55 dB, 5 dB steps

Maximum Input Level

Average continuous power	+25 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 3 GHz	–140 dBm (–145 dBm, typical)
>3 GHz to 5 GHz	–138 dBm (–142 dBm, typical)
>5 GHz to 7 GHz	–135 dBm (–138 dBm, typical)
>7 GHz to 8 GHz	–132 dBm (–135 dBm, typical)

Preamplifier on:	
10 MHz to 3 GHz	–160 dBm (–165 dBm, typical)
>3 GHz to 5 GHz	–158 dBm (–162 dBm, typical)
>5 GHz to 7 GHz	–155 dBm (–158 dBm, typical)
>7 GHz to 8 GHz	–152 dBm (–155 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

1 MHz to 8 GHz	±1.3 dB (±0.5 dB typical) Add ±1.0 dB	20°C to 30°C −10°C to 55°C after 60-minute warm up

Reference Level

Setting range	−120 to +100 dBm
Setting resolution Log scale Linear scale	0.1 dB 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 MHz to 8 GHz	1.5:1 (typical)	Atten >20 dB

Second Harmonic Distortion

Mixer level = −25 dBm

50 MHz to 2.6 GHz	<−65 dBc (typical)
>2.6 GHz to 8 GHz	<−70 dBc (typical)

Third-Order Inter-Modulation (Third-order Intercept: TOI)

200 MHz to 3 GHz	+10 dBm (typical)
>3 GHz to 8 GHz	+12 dBm (typical)

Spurious

Inherent residual response
Input terminated, 0 dB attenuation, preamplifier off, RBW at 10 kHz

	−90 dBm (nominal)
Exceptions	−85 dBm @164.1 MHz, 1.95, 2.57264, 3.2, and 4.5 GHz −80 dBm @4.8/7.8 GHz
Input-related spurious	<−70 dBc (nominal)

Dynamic Range

2/3 (TOI-DANL) in 1 Hz RBW	>104 dB	@ 2 GHz

Sweep Time

Range	0.4 ms to 1000 s 24 µs to 200 s	Span = 0 Hz (zero span)
Accuracy	±2%	Span = 0 Hz (zero span)
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 Resolution	0 to 200 s 6 µs

Measurements*

Channel power

Occupied bandwidth

Spectrum emission mask

Adjacent channel power

Spurious emissions

Field strength

AM/FM audio demodulation

Route map

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

Cable and Antenna Analyzer (Standard)

Frequency

Range	5 MHz to 6 GHz
Resolution	10 kHz
Accuracy	±1 ppm

Data Points

	126, 251, 501, 1001, 2001

Measurement Speed

Reflection/DTF	1.0 ms/point (typical)

Measurement Accuracy

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

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Output Power

High	5 MHz to 5.5 GHz, 0 dBm (typical)
	5.5 GHz to 6 GHz, –5 dBm (typical)
Low	5 MHz to 6 GHz, –30 dBm (typical)

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	$(1.5 \times 10^8) \times (V_P)/$delta
	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

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.

RF Power Meter (Standard)

General Parameters

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

Internal RF Power Sensor

Frequency range	10 MHz to 6 GHz
Span	1 kHz to 100 MHz
Dynamic range	–120 to +25 dBm
Maximum power	+25 dBm
Accuracy	Same as spectrum analyzer

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 6 GHz
Frequency resolution	10 kHz

Output Power

High	5 MHz to 5.5 GHz, 0 dBm (typical)
	5.5 GHz to 6 GHz, −5 dBm (typical)
Low	5 MHz to 6 GHz, −30 dBm (typical)

Measurement Speed

Vector	1.6 ms/point (typical)
Scalar	3.4 ms/point (typical)

Dynamic Range

Vector	5 MHz to 3 GHz, 80 dB	@average 5
	>3 GHz to 6 GHz, 75 dB	@average 5
Scalar	5 MHz to 4.5 GHz, >110 dB	
	4.5 GHz to 6 GHz, >105 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 6 GHz
Frequency reference	<±1 ppm maximum
Frequency resolution	10 kHz

Output Power

Range	5 MHz to 5.5 GHz, −60 to 0 dBm
	>5.5 to 6 GHz, −60 to −5 dBm
Step	1 dB
Accuracy	±1.5 dB (20 to 30 °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	

Interference Analyzer (Option 011)

Measurements

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

Channel Scanner (Option 012)

Frequency Range

1 MHz to 8 GHz

Measurement Range

−110 to +25 dBm

Measurements

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

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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 +25 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 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 95th*	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 +25 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 Code channel power >−25 dB ±1.5 dB absolute power Code channel power >−25 dB
CPICH power accuracy	±0.8 dB (typical)

Measurements

Option 023			Option 043
Channel power	**Constellation**	**CDP table**	**Channel scanner (up to 6)**
Channel power	CPICH power	Reference power	Frequencies or channels
Spectral density	Rho, EVM	Code utilization	Channel power, scramble
Peak to average power	Peak CDE	Code, spreading factor	code, CPICH power, Ec/Io
Occupied bandwidth	Frequency error	Allocation (channel type)	**Scramble scanner (up to 6)**
Occupied bandwidth	Time offset	EVM, modulation type	Channel power
Integrated power	Carrier feed-through	Relative, absolute power	CPICH dominance
Occupied power	Scramble code	**Auto measure**	Scramble code
Spectrum emission mask	**Code domain power**	Channel power	Ec/Io, CPICH power, delay
Reference power	Abs/Rel code power	Occupied bandwidth	**Multipath profile**
Peak level at defined range	Individual code EVM	Spectrum emission mask	Channel, multipath power
ACLR	and its constellation	ACLR	Ec/Io, delay
Reference power	Channel power	Multi-ACLR	**Code domain power**
Abs power at defined range	Power bar graph	Spurious emission mask	Abs/Rel code power
Rel power at defined range	(Abs/Rel/Delta power)	Frequency error	Individual code EVM
Multi-ACLR	CPICH, P-CCPCH, S-CCPCH	EVM	Channel power
Lowest reference power	PICH, P-SCH, S-SCH	Peak CDE	Scramble code
Highest reference power	Max, avg active power	Carrier feed-through	CPICH, P-CCPCH, S-CCPCH,
Abs power at defined range	Max, avg inactive power	CPICH absolute power	PICH, P-SCH, S-SCH
Rel power at defined range	Scramble code	CPICH relative power	Max, avg active power
Spurious emissions	**Codogram**	Max inactive power	Max, avg inactive power
Peak frequency at defined range	Code utilization	Scramble code	Frequency error
Peak level at defined range	**RCSI**	**Power statistics CCDF**	Time offset, Rho
	CPICH, P-CCPCH, S-CCPCH,		Carrier feed-through
	PICH, P-SCH, S-SCH		(Composite) EVM
			CPICH EVM, P-CCPCH EVM
			Amplifier capacity
			Peak amplifier capacity
			Average amplifier capacity
			Code, peak utilization
			Average utilization
			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 +25 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	Code channel power >−25 dB
	±1.5 dB absolute power	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 +25 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	Code channel power >−25 dB
	±1.5 dB absolute power	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 scanner (up to 6)**
Channel power	**(Composite 64/128)**	Code utilization	Frequencies or channels
Spectral density	Channel power	**RCSI**	PN offset
Peak to average power	Rho, EVM, Peak CDE	Slot, pilot, MAC, data	Pilot, MAC, data power
Occupied bandwidth	Frequency error	**MAC CDP table**	**PN scanner (up to 6)**
Occupied bandwidth	Time offset	Reference power	Channel power
Integrated power	Carrier feed-through	Code utilization	Pilot dominance
Occupied power	PN offset	Code, spreading factor	PN offset
Spectrum emission mask	Pilot, MAC, data power	Allocation (channel type)	Ec/Io, pilot power, delay
Reference power	Pilot, MAC, data EVM	Relative, absolute power	**Multipath profile**
Peak level at defined range	**Constellation**	**Auto measure**	Channel power
ACPR	**(Pilot, MAC 64/128, and data)**	Channel power	Multipath power
Reference power	Channel power	Occupied bandwidth	Ec/Io, delay
Abs power at defined range	Rho, EVM, peak CDE	Spectrum emission mask	**Code domain power**
Rel power at defined range	Frequency error	ACPR	Slot average power
Multi-ACPR	Time offset	Multi-ACPR	PN offset
Lowest reference power	Carrier feed-through	Pilot, MAC, data power	Pilot, MAC, data power
Highest reference power	PN offset	On/off ratio	Pilot, MAC, data Rho
Abs power at defined range	Modulation type*	PvsT mask (idle slot) or	(Composite) EVM
Rel power at defined range	**Code Domain Power**	PvsT mask (active slot)	Frequency error
Spurious emissions	**(Pilot and MAC 64/128)**	Frequency error	Time offset
Peak frequency at defined range	Pilot/MAC channel power	Time offset	Carrier feed-through
Peak level at defined range	Slot average power	Carrier feed-through	Max active I/Q power
Power vs. Time	Max active I/Q power	Pilot, MAC, data Rho	Avg active I/Q power
(Idle and Active Slot)	Avg active I/Q power	Max inactive I/Q power	Code utilization
Slot average power	Max inactive I/Q power	PN offset	Peak utilization
On/off ratio	Avg inactive I/Q power	**Power statistics CCDF**	Average utilization
Idle activity	PN offset		**Route Map**
Pilot, MAC, data power	**Code Domain Power (Data)**		Pilot power
	Data channel power		Ec/Io
	Slot average power		
	Max, avg active power		
	Max, avg inactive power		
	PN offset		

Longitude, latitude, and satellite in all screens

*Measurement is performed in Data Constellation only.

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TD-SCDMA Signal Analyzer (Option 025)

General Parameters

Frequency range	1.785 GHz to 2.22 GHz	
Input signal level	–40 to +25 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

Channel power
Spectral density
Peak to average power

Occupied bandwidth

Occupied bandwidth
Integrated power
Occupied power

Spectrum emission mask

Reference power
Peak level at defined range

ACLR

Reference power
Abs power at defined range
Rel power at defined range

Multi-ACLR

Lowest reference power
Highest reference power
Abs power at defined range
Rel power at defined range

Spurious emissions

Peak frequency at defined range
Peak level at defined range

Power vs. time (slot)

Slot power
DwPTS power
UpPTS power
On/off slot ratio
Slot PAR
DwPTS code

Power vs. time (frame)

Slot power
(TS [0 to 6], DwPTS, UpPTS)
Data power left
(TS [0 to 6], DwPTS, UpPTS)

Midamble power
(TS [0 to 6], DwPTS, UpPTS)
Data power right
(TS [0 to 6], DwPTS, UpPTS)
Time offset
(TS [0 to 6], DwPTS, UpPTS)

Power vs. time (mask)

Slot power
On/off slot ratio
Off power

Timogram

Constellation

Rho
EVM RMS, EVM peak
Peak CDE
Frequency error
I/Q origin offset
Time offset

Midamble power

Slot power
DwPTS power
Midamble power (1 to 16)

Code power

Abs/Rel code power
Individual code EVM
   and its 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

Code error

Code power and error
Individual code EVM
   and its constellation
Data format
Slot, DwPTS power
No. of active code
Scramble code
Max active code power
Avg active code power
Max inactive code power
Avg inactive code power
Peak CDE and peak active CDE

Auto measure

Channel power
Occupied bandwidth
Spectrum emission mask
ACLR
Multi-ACLR
Slot power
DwPTS power
UpPTS power
On/off slot ratio
Frequency error
EVM RMS
Peak CDE
Max inactive power
Scramble code

Sync-DL ID scanner (32)

Scramble code group
Ec/Io, Tau
DwPTS power
Pilot dominance

Sync-DL ID vs. Tau (up to 6)

ID, power, Ec/Io, Tau
DwPTS power
Pilot dominance

Sync-DL ID multipath

Ec/Io, Tau
DwPTS power
Pilot dominance

Sync-DL ID analyzer

DwPTS power, Ec/Io trend
DwPTS power
Pilot dominance
EVM, frequency error
Ec/Io, CINR

Route Map

DwPTS Power

Longitude, latitude, and satellite in all screens

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 +25 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		Auto measure	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 power 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 +25 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			Option 048
Channel power	***Data channel***	I/Q origin offset	***ID scanner (up to 6)***
Channel power	Resource block power	EVM RMS, peak	RSRP/RSRQ dominance
Spectral density	I/Q diagram	Data EVM RMS, peak	S-SS RSSI dominance
Peak to average power	RB power	Cell, group, sector ID	S-SS Ec/Io dominance
Occupied bandwidth	Modulation format	***Time alignment error***	Cell, group, sector ID
Occupied bandwidth	I/Q origin offset	Time alignment error trend	RSRP/RSRQ
Integrated power	EVM RMS, EVM peak	Time alignment error	RS-SINR/S-SS RSSI
Occupied power	***Control channel***	RS power difference	P-SS/S-SS Power
Spectrum emission mask	Control channel summary	Antenna 0 RS power	S-SS Ec/Io
Reference power	(P-SS, S-SS, PBCH, PCFICH, PHICH,	Antenna 0 RS EVM	***Multipath profile***
Peak level at defined range	PDCCH, RS)	Antenna 1 RS power	Cell, group, sector ID
ACLR	EVM, relative or absolute	Antenna 1 RS EVM	Ant 0 RS Ec/Io, delay
Reference power	power, modulation type	Cell, group, sector ID	Ant 1 RS Ec/Io, delay
Abs power at defined range	Each control channels'	***Data allocation map***	Ant 0 Sync Ec/Io, delay
Rel power at defined range	I/Q diagram	Data allocation vs frame	Ant 1 Sync Ec/Io, Delay
Multi-ACLR	Modulation format	Resource block power	***Control channel***
Lowest reference power	Frequency error	OFDM symbol power	RS power trend
Highest reference power	I/Q origin offset	Data utilization	Cell, group, sector ID
Abs power at defined range	EVM RMS, EVM peak	Data allocation vs subframe	Control channel table
Rel power at defined range	***Subframe***	Resource block power	(P-SS, S-SS, PBCH, PCFICH, RS 0, RS 1)
Spurious emissions	Subframe summary table	Data utilization	Absolute power
Peak frequency at defined range	(P-SS, S-SS, PBCH, PCFICH, PHICH,	***Auto measure***	Relative power
Peak level at defined range	PDCCH, RS, PDSCH QPSK,	Channel power	EVM RSM, phase
Power vs. time (frame)	PDSCH 16 QAM, PDSCH 64 QAM)	Occupied bandwidth	Frequency error
Frame average power	EVM, relative or absolute power,	Spectrum emission mask	Time alignment error
Subframe power	modulation type	ACLR	Time offset
First slot power	Subframe power	Multi-ACLR	***Datagram***
Second slot power	OFDM symbol power	Spurious emission mask	Datagram
Cell ID, I/Q origin offset	Frequency, time error	Frame average power	Resource block power
Time offset	Data EVM RMS, peak	Time alignment error	Data utilization
Constellation	RS EVM RMS, peak	Frequency error	***Route Map***
RS TX power	Cell, group, sector ID	PDSCH QPSK EVM	RSRP
PDSCH QPSK EVM	***Frame***	PDSCH 16 QAM EVM	RSRQ
PDSCH 16 QAM EVM	Frame summary table	PDSCH 64 QAM EVM	RS-SINR
PDSCH 64 QAM EVM	(P-SS, S-SS, PBCH, PCFICH, PHICH,	Data EVM RMS, peak	S-SS RSSI
Data EVM RMS	PDCCH, RS, PDSCH QPSK,	RS, P-SS, S-SS EVM	P-SS, S-SS power
Data EVM peak	PDSCH 16 QAM, PDSCH 64 QAM)	RS, P-SS, S-SS power	S-SS Ec/Io
Frequency error	EVM, relative or absolute power,	PBCH power	
Time error	modulation type	Subframe power	
	Frame average power	OFDM power	
	OFDM symbol power	Time error	
	Frequency error	I/Q origin offset	
		Power statistics CCDF	

Longitude, latitude, and satellite in all screens

LTE-TDD Signal Analyzer (Option 029)

General Parameters

Frequency range	Band 33 to 43	
Input signal level	–40 to +25 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	***Time alignment error***	***ID scanner (up to 6)***
Channel power	Data EVM peak	Time alignment error trend	RSRP/RSRQ dominance
Spectral density	Frequency error	Time alignment error	S-SS RSSI dominance
Peak to average power	Time error	RS power difference	S-SS Ec/Io dominance
Occupied bandwidth	***Data channel***	Antenna 0 RS power	Cell, group, sector ID
Occupied bandwidth	Resource block power	Antenna 0 RS EVM	RSRP/RSRQ
Integrated power	I/Q diagram	Antenna 1 RS power	RS-SINR/S-SS RSSI
Occupied power	RB power	Antenna 1 RS EVM	P-SS/S-SS power
Spectrum emission mask	Modulation format	Cell, group, sector ID	S-SS Ec/Io
Reference power	I/Q origin offset	***Data allocation map***	***Multipath profile***
Peak level at defined range	EVM RMS, EVM peak	Data allocation vs frame	Cell, group, sector ID
ACLR	***Control channel***	Resource block power	Ant 0 RS Ec/Io, delay
Reference power	Control channel summary	OFDM symbol power	Ant 1 RS Ec/Io, delay
Abs power at defined range	(P-SS, S-SS, PBCH, PCFICH, PHICH,	Data utilization	Ant 0 Sync Ec/Io, Delay
Rel power at defined range	PDCCH, RS)	Data allocation vs subframe	Ant 1 Sync Ec/Io, Delay
Multi-ACLR	EVM, relative or absolute power,	Resource block power	***Control channel***
Lowest reference power	modulation type	Data utilization	RS power trend
Highest reference power	Each control channels'	***Auto measure***	Cell, group, sector ID
Abs power at defined range	I/Q diagram	Channel power	Control channel table
Rel power at defined range	Modulation format	Occupied bandwidth	(P-SS, S-SS, PBCH,
Spurious emissions	Frequency error	Spectrum emission mask	PCFICH, RS 0, RS 1)
Peak frequency at defined range	I/Q origin offset	ACLR	Absolute power
Peak level at defined range	EVM RMS, EVM peak	Mult-ACLR	Relative power
Power vs. time (frame)	***Subframe***	Spurious emission mask	EVM RSM, phase
Frame average power	Subframe summary table	Slot average power	Frequency error
Subframe power	(P-SS, S-SS, PBCH, PCFICH, PHICH,	Off power	Time alignment error
First slot power	PDCCH, RS, PDSCH QPSK,	Transition period	Time offset
Second slot power	PDSCH 16 QAM, PDSCH 64 QAM)	Time alignment error	***Datagram***
Cell ID, I/Q origin offset	EVM, relative or absolute power,	PDSCH QPSK EVM	Datagram
Time offset	modulation type	PDSCH 16 QAM EVM	Resource block power
Power vs. time (slot)	Subframe power	PDSCH 64 QAM EVM	Data utilization
Slot average power	OFDM symbol power	Data EVM RMS, peak	***Route Map***
Transient period length	Frequency, time error	RS, P-SS, S-SS EVM	RSRP
Off power	Data EVM RMS, peak	RS, P-SS, S-SS power	RSRQ
Constellation	RS EVM RMS, peak	PBCH power	RS-SINR
RS TX power	Cell, group, sector ID	Subframe power	S-SS RSSI
PDSCH QPSK EVM		OFDM power	P-SS, S-SS power
PDSCH 16 QAM EVM		Time error	S-SS Ec/Io
PDSCH 64 QAM EVM		I/Q origin offset	
		Power statistics CCDF	

Longitude, latitude, and satellite in all screens

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

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	BERT
Indicators	Indicators
E1 signal	E1 signal
Frame sync	Frame sync
Pattern sync	Pattern sync
Code sync	Code sync
FAS RAI	FAS RAI
AIS	AIS
HDB3	HDB3
Bit error[2]	Bit error[2]
Error count/rate	**Error count/rate**
Frame error	CRC error[1]
Code error	Frame error
Bit error[2]	Code error
	Bit error[2]
Alarm count	**Alarm count**
FAS	FAS
AIS	AIS
Loss count	**Loss count**
Frame sync	Frame sync
Pattern 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

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	RX signal level
Indicators	Indicators
T1 signal	T1 signal
Frame sync	Frame sync
Pattern sync	Pattern sync
B8ZS	B8ZS
Red alarm	Red alarm
RAI (yellow alarm)	RAI (yellow alarm)
AIS (blue alarm)	AIS (blue alarm)
BPV indicator	BPV indicator
Loss count	Vp-p
Signal loss	Vp-p Max
Frame sync loss	Vp-p Min
Patten sync loss	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	>+33 dBm, ±50 VDC (nominal), 3 min
Reflection/RF out	Cable and antenna analyzer
Connector	Type-N, female
Impedance	50 Ω (nominal)
Damage level	>+40 dBm, ±50 VDC (nominal), 3 min
RF in	Cable and antenna analyzer
Connector	Type-N, female
Impedance	50 Ω (nominal)
Maximum level	>+25 dBm, ±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
E1/T1	RJ45
Audio jack	3.5 mm headphone jack
External power	5.5 mm barrel connector
Speaker	Built-in speaker

Display

Type	Resistive touch screen
Size	8 inch, LED backlight, transflective LCD with anti-glare coating
Resolution	800 x 600

Power

External DC input	12 to 19 VDC	
Power consumption	37 W	49 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%), 5 hours (100%)
Charging temperature	0° to 45°C (32° to 104°F) ≤85% RH
Discharging temperature	−20° to 55°C (4° to 131°F) ≤85% RH
Storage temperature[3]	0° to 25°C (32° to 77°F) ≤85% RH (non-condensing)

Data Storage

Internal[4]	Maximum 100 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	85% RH (non-condensing)
Shock and vibration	MIL-PRF-28800F Class 2
Storage temperature[6]	−55° to 71°C (−67° to 160°F)

EMC

IEC/EN 61326-1:2006 (complies with European EMC)
CISPR11:2009 +A1:2010

ESD

IEC/EN 61000-4-2

Size and Weight (standard configuration)

Weight (with battery)	<4.3 kg (9.5 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 3800 traces.
5. Supports USB 2.0 compatible memory devices.
6. With the battery pack removed.

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Ordering Information

Standard

JD785A	9 kHz to 8 GHz spectrum analyzer
	5 MHz to 6 GHz cable and antenna analyzer[1]
	10 MHz to 8 GHz RF power meter (internal mode)

Options

NOTE: Upgrade options for the JD785A use the designation JD785AU before the respective last three-digit option number.

JD785A001	2-Port Transmission Measurement[2]	
JD785A002	Bias-Tee	(requires option 01)
JD785A003	CW Signal Generator	
JD785A004	E1 Analyzer[3]	
JD785A005	T1 Analyzer[3]	
JD785A010	GPS Receiver and Antenna	
JD785A011	Interference Analyzer [4,5]	
JD785A012	Channel Scanner	
JD785A013	Optical Power Meter[6]	
JD785A020	cdmaOne/cdma2000 Signal Analyzer	
JD785A021	EV-DO Signal Analyzer	(requires option 20)
JD785A022	GSM/GPRS/EDGE Signal Analyzer	
JD785A023	WCDMA/HSPA+ Signal Analyzer	
JD785A025	TD-SCDMA Signal Analyzer	
JD785A026	Mobile WiMAX Signal Analyzer	
JD785A028	LTE-FDD Signal Analyzer	
JD785A029	LTE-TDD Signal Analyzer	
JD785A040	cdmaOne/cdma2000 OTA Analyzer[5]	(requires option 10)
JD785A041	EV-DO OTA Analyzer[5]	(requires option 10)
JD785A042	GSM/GPRS/EDGE OTA Analyzer[5]	(requires option 10)
JD785A043	WCDMA/HSPA+ OTA Analyzer[5]	(requires option 10)
JD785A045	TD-SCDMA OTA Analyzer[5]	(requires option 10)
JD785A046	Mobile WiMAX OTA Analyzer[5]	(requires option 10)
JD785A048	LTE-FDD OTA Analyzer[5]	(requires option 10)
JD785A049	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 GB USB memory[7]
G710550325	Rechargeable lithium ion battery[7]
G710550323	Automotive cigarette lighter 12 VDC adapter[7]
G710550316	Stylus pen[7]
JD780A361	JD780A 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 JD785A010.
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

JD78050509	Y-Calibration Kit, Type-N(m), DC to 6 GHz, 50 Ω
JD78050507	Dual-port Type-N calibration kit, 50 Ω
	• Y-calibration kit, Type-N(m), DC to 6 GHz, 50 Ω
	• Two adapters Type-N(f) to Type-N(f), DC to 6 GHz, 50 Ω
	• Two 1 m RF test cables, Type-N(m) to Type-N(m), DC to 18 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 Type-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

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 Ω
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
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]
G710550324	External battery charger
JD780A362	JD780A series user's manual – printed version

8. Highly recommended for LTE testing.

Test & Measurement Regional Sales