



# CellAdvisor™

## JD785B Base Station Analyzer

### Spectrum Analyzer (Standard)

Frequency		
Frequency range	9 kHz to 8 GHz	
Frequency accuracy	± (Readout frequency x Internal 10MHz Frequency reference accuracy + RBW centering + 2 Hz + 0.5 x Horizontal resolution)	
Internal 10 MHz Frequency Reference		
Accuracy	±0.05 ppm + aging (0 to 50°C) ±0.01 ppm, after 15 minutes of GPS Lock (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		
<b>Carrier Offset</b>		
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 V DC	

**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

JD785B 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 at 20 to 30°C after being at this temperature for 15 minutes
  - Nominal: a general, descriptive term or parameter

Displayed Average Noise Level (DANL)	
1 Hz RBW, 1 Hz VBW, 50 $\Omega$ termination, 0 dB attenuation, RMS detector	
<b>Preamplifier Off</b> 10 MHz to 2.4 GHz >2.4 GHz to 6 GHz >6 GHz to 7 GHz >7 GHz to 8 GHz	-140 dBm (-145 dBm, typical) -136 dBm (-140 dBm, typical) -134 dBm (-138 dBm, typical) -128 dBm (-134 dBm, typical)
<b>Preamplifier On</b> 10 MHz to 3 GHz >3 GHz to 5 GHz >5 GHz to 7 GHz >7 GHz to 8 GHz	-160 dBm (-165 dBm, typical) -158 dBm (-162 dBm, typical) -155 dBm (-158 dBm, typical) -150 dBm (-155 dBm, typical)
Display Range	
Log scale and units (10 divisions displayed)	1 to 20 dB/division in 1 dB steps dBm, dBV, dBmV, dB $\mu$ 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	
1 MHz to 8 GHz	$\pm 1.3$ dB ( $\pm 0.5$ dB typical)  Add $\pm 1.0$ dB
	20 to 30°C after 60-minute warm up  -10 to 55°C after 60-minute warm up
Reference Level	
Setting range	-120 to +100 dBm
<b>Setting Resolution</b> Log scale Linear scale	0.1 dB 1% of reference level
Markers	
Marker types	Normal, delta, delta pair, noise, frequen- cy 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, Sweep mode	-90 dBm (nominal)	
Exceptions	-85 dBm at 164.1 MHz, 2.57264, 3.2, and 4.5 GHz -80 dBm at 4.8/7.8 GHz -75 dBm at 85.6 MHz and 428 MHz -70 dBm at 256.8 MHz and 770.4 MHz	
Input-related spurious	< -70 dBc (nominal)	
Dynamic Range		
2/3 (TOI-DANL) in 1 Hz RBW	>104 dB	at 2 GHz
Sweep Time		
Range	0.4 ms to 1000 s 24 $\mu$ s to 200 s	Span = 0 Hz (zero span)
Accuracy	$\pm 2\%$	Span = 0 Hz (zero span)
Mode	Continuous, single	
Gated Sweep		
Trigger source	External, video, and GPS	
Gate length	1 $\mu$ s to 100 ms	
Gate delay	0 to 100 ms	
Trigger		
Trigger source	Free run, video, external	
<b>Trigger Delay</b> Range Resolution	0 to 200 s 6 $\mu$ s	
Measurements*		
Channel power		
Occupied bandwidth		
Spectrum emission mask		
Adjacent channel power		
Spurious emissions		
Field strength		
AM/FM audio demodulation		
Route map		
PIM detection		
Dual spectrum		

\* High-power 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	±(0.3 +  20log(1+10-EP/20) ) (typical) EP = directivity – measured return loss
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 V DC
Interference Immunity	
On channel	+17 dBm at >14 MHz from carrier frequency (nominal)
On frequency	0 dBm within ±10 kHz from carrier frequency (nominal)
Measurements	
<b>Reflection (VSWR)</b>	
VSWR range	1 to 65
Return loss range	0 to 60 dB
Resolution	0.01
<b>Distance to Fault (DTF)</b>	
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 x 10 <sup>8</sup> ) x (V <sub>p</sub> )/delta V <sub>p</sub> = propagation velocity Delta = stop freq – start freq (Hz)
<b>Cable Loss (1-port)</b>	
Range	0 to 30 dB
Resolution	0.01 dB
<b>1-Port Phase</b>	
Range	–180 to +180°
Resolution	0.01°
<b>Smith Chart</b>	
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 0.1 x W (x = m, u, p)		
Internal RF Power Sensor			
Frequency range	10 MHz to 8 GHz		
Span	1 kHz to 100 MHz		
Dynamic range	–120 to +25 dBm		
Maximum power	+25 dBm		
Accuracy	Same as spectrum analyzer		
External RF Power Sensors			
<b>Directional</b>	<b>JD731B</b>	<b>JD733A</b>	
Frequency range	300 MHz to 3.8 GHz	150 MHz to 3.5 GHz	
Dynamic range	0.15 to 150 W (average) 4 to 400 W (peak)	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) <sup>1,2</sup>		
<b>Terminating</b>	<b>JD732B</b>	<b>JD734B</b>	<b>JD736B</b>
Frequency range	20 MHz to 3.8 GHz		
Dynamic range	–30 to +20 dBm		
Connector type	Type-N male		
Measurement type	Average	Peak	Average and peak
Accuracy	±7% <sup>1</sup>		

## Optical Power Meter (Standard)

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		
	<b>MP-60A</b>	<b>MP-80A</b>
Wavelength range	780 to 1650 nm	
Max permitted input level	+10 dBm	+23 dBm
Connector type	Type-N female on both ends	
Connector input	Universal 2.5 and 1.25 mm	
Accuracy	±5%	

1. CW condition at 25°C ±10°C

2. Forward power

## 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 >3 GHz to 6 GHz, 75 dB	at average 5 at average 5
Scalar	5 MHz to 4.5 GHz, >110 dB 4.5 GHz to 6 GHz, >105 dB	
Measurements		
<b>Insertion Loss/Gain</b>		
Range	-120 to 100 dB	
Resolution	0.01 dB	
<b>2-Port Phase</b>		
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	

## High Power CW Signal Generator (Option 003)

Frequency	
Frequency range	10 MHz to 5500 MHz
Frequency reference	< ±1 ppm maximum
Frequency resolution	10 kHz
Output Power	
Range	10 MHz to 3.5 GHz, -60 to +10 dBm 3.5 GHz to 5.5 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	±10 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	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	
	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

## Bluetooth® Connectivity (Option 013)

Personal area network (PAN)
File transfer profile (FTP)

## Wi-Fi Connectivity (Option 016)

Interface type	USB LAN Card
Interface standard	IEEE 802.11 b/g/n
Chipset	RealTek, Ralink
USB wireless mode	Infrastructure mode
Web-based remote control	Internet Explorer, Chrome, Safari
Internet protocol version	IPv4, IPv6

## GSM/GPRS/EDGE Signal Analyzer (Options 022 and 042)

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					
<b>Phase RMS Accuracy</b>					
Residual error	±1.0 degrees	(0 < Phase RMS < 8)			
Phase peak accuracy	0.7 degrees (typical)				
8 PSK modulation quality	±2.0 degrees	(0 < Phase peak < 30)			
<b>EVM Accuracy</b>					
Residual error	±1.5%	(2% < EVM < 8%)			
RF power vs. time	2.5% ±0.25 symbol				
Measurements					
Option 022					
<b>Channel Power</b>	<b>Spectrum Emission Mask</b>	<b>Power vs. Time (slot)</b>	Frequency error	<b>Auto Measure</b>	Phase error RMS
Channel power	Reference power	Burst power	Phase error RMS	Channel power	Phase error peak
Spectral density	Peak level at defined range	Max/min point	Phase error peak	Occupied bandwidth	EVM RMS*
Peak to average power		<b>Power vs. Time (frame)</b>	I/Q origin offset*	Spectrum emission mask	EVM Peak*
<b>Occupied Bandwidth</b>	<b>Spurious Emissions</b>	Frame average power	TSC	Spurious emission mask	I/Q origin offset
Occupied bandwidth	Peak frequency at defined range	Burst power (Slot 0 to 7)	BSIC	Burst power	C/I*
Integrated power		TSC (Slot 0 to 7)	C/I*	PvsT – mask	
Occupied power	Peak level at defined range	<b>Constellation</b>	EVM RMS*	Frame average power	
		Burst power	EVM Peak*	Frequency error	
		Modulation type	EVM 95th*		
Option 042					
<b>Channel/Frequency Scanner</b>	Group (traffic, control)	<b>Multipath Profile</b>	<b>Modulation Analyzer</b>	Frame average power	Burst power
	BSIC (NCC, BCC)	(10 strongest)	Frame avg power trend	BSIC, frame no. and time	Modulation type
Channels or frequencies		Frame average power	C/I trend	C/I, frequency error	
Absolute power		SNR, delay			

Longitude, latitude, and satellite in all screens

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

## WCDMA/HSPA+ Signal Analyzer (Options 023 and 043)

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 ±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

Channel Power	ACLR	Constellation	Max, avg active power	Codogram	Auto Measure
Channel power	Reference power	CPICH power	Max, avg inactive power	Code utilization	Channel power
Spectral density	Abs power at defined range	Rho, EVM	Scramble code	<b>RCSI</b>	Occupied bandwidth
Peak to average power		Peak CDE	<b>Relative Code Domain Error</b>		
<b>Occupied Bandwidth</b>	Rel power at defined range	Frequency error	Abs/Rel code power	<b>CDP Table</b>	Multi-ACLR
Occupied bandwidth		Time offset			
Integrated power	<b>Multi-ACLR</b>	Carrier feed-through	Code error	Reference power	Spurious emission mask
Occupied power	Lowest reference power	Scramble code			
<b>Spectrum Emission Mask</b>	Highest reference power	<b>Code Domain Power</b>	Channel power	Code, spreading factor	EVM
Reference power	Abs power at defined range	Abs/Rel code power		Allocation (channel type)	Peak CDE
Peak level at defined range	Rel power at defined range	Individual code EVM and its constellation	Channel power	EVM, modulation type	Carrier feed-through
		Channel power	Power bar graph (Abs/Rel/Delta power)	Relative, absolute power	CPICH absolute power
		Channel power	CPICH, P-CCPCH, S-CCPCH, PICH, P-SCH, S-SCH		CPICH relative power
					<b>Spurious Emissions</b>
	Peak frequency at defined range	CPICH, P-CCPCH, S-CCPCH	Avg RCDE QPSK, 16 QAM, 64 QAM		Scramble code
	Peak level at defined range	PICH, P-SCH, S-SCH			<b>Power Statistics CCDF</b>

#### Option 043

Channel Scanner (up to 6)	Scramble Scanner (up to 6)	Multipath Profile	Code Domain Power	Max, avg active power	Amplifier capacity
		Channel, multipath power	Abs/Rel code power	Max, avg inactive power	Peak amplifier capacity
Frequencies or channels	Channel power	Ec/Io, delay	Individual code EVM	Frequency error	Average amplifier capacity
Channel power, scramble code, CPICH power, Ec/Io	CPICH dominance		Channel power	Time offset, Rho	Code, peak utilization
	Scramble code		Scramble code	Carrier feed-through	
	Ec/Io, CPICH power, delay		CPICH, P-CCPCH, S-CCPCH, PICH, P-SCH, S-SCH	(Composite) EVM	Average utilization
				CPICH EVM, P-CCPCH EVM	<b>Route Map</b>
					CPICH power, Ec/Io

Longitude, latitude, and satellite in all screens

## cdmaOne/cdma2000® Signal Analyzer (Options 020 and 040)

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 ±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					
<i>Channel Power</i>	<i>ACPR</i>	<i>Spurious Emissions</i>	<i>Code Domain Power</i>	<i>RCSI</i>	<i>Auto Measure</i>
Channel power	Reference power	Peak freq at defined range	Abs/Rel code power	Pilot, Paging, Sync, Q-Paging	Channel power
Spectral density	Abs power at defined range	Peak level at defined range	Channel power		Occupied bandwidth
Peak to average power		Rel power at defined range	<b>Constellation</b>	Power bar graph (Abs/Rel)	<b>CDP Table</b>
<b>Occupied Bandwidth</b>	Occupied bandwidth		Pilot power	Pilot, Paging, Sync, Q-Paging	Reference power
Occupied bandwidth		Rho	Code utilization		Multi-ACPR
Integrated power	<b>Multi-ACPR</b>	EVM	Max, avg active power	Code, spreading factor	Rho
Occupied power	Lowest reference power	Frequency error	Max, avg inactive power	Allocation (channel type)	Frequency error
<b>Spectrum Emission Mask</b>	Highest reference power	Time offset	PN offset	Relative, absolute power	Time offset
Reference power	Abs power at defined range	Carrier feed-through	<b>Codogram</b>		Carrier feed-through
Peak level at defined range		PN offset	Code utilization		Pilot power
	Rel power at defined range				Max inactive power
					<b>Power Statistics CCDF</b>
Option 040					
<i>Channel Scanner (up to 6)</i>	<i>PN Scanner (up to 6)</i>	<i>Multipath Profile</i>	<i>Code Domain Power</i>	Frequency error	Code utilization
	Channel power	Channel power	Abs/Rel code power	Time offset, Rho, EVM	Peak utilization
Frequencies or channels	Pilot dominance	Multipath power	Channel power	Carrier feed-through	Average utilization
Channel power, PN offset	PN offset	Ec/lo, delay	PN offset	Amplifier capacity	<b>Route Map</b>
Pilot power, Ec/lo	Ec/lo, pilot power, delay		Pilot, Paging, Sync, Q-Paging power	Peak amplifier capacity	Pilot power
				Average amplifier capacity	Ec/lo
			Max, avg active power		
			Max, avg inactive power		

Longitude, latitude, and satellite in all screens

## EV-DO Signal Analyzer (Options 021 and 041)

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 ±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					
<b>Channel Power</b>	<b>ACPR</b>	<b>Power vs. Time (idle and active slot)</b>	<b>Constellation (pilot, MAC 64/128, and data)</b>	<b>Code Domain Power (data)</b>	<b>Auto Measure</b>
Channel power	Reference power				Channel power
Spectral density	Abs power at defined range	Slot average power	Channel power	Data channel power	Occupied bandwidth
Peak to average power		On/off ratio	Rho, EVM, peak CDE	Slot average power	Spectrum emission mask
<b>Occupied Bandwidth</b>	Rel power at defined range	Idle activity	Frequency error	Max, avg active power	ACPR
Occupied bandwidth		Pilot, MAC, data power	Time offset	Max, avg inactive power	Multi-ACPR
Integrated power	<b>Multi-ACPR</b>	<b>Constellation (composite 64/128)</b>	Carrier feed-through	PN offset	Pilot, MAC, data power
Occupied power	Lowest reference power		PN offset	<b>MAC Codogram</b>	On/off ratio
<b>Spectrum Emission Mask</b>	Highest reference power	Channel power	Modulation type*	Code utilization	PvsT mask (idle slot) or PvsT mask (active slot)
	Abs power at defined range	Rho, EVM, Peak CDE	<b>Code Domain Power (pilot and MAC 64/128)</b>	<b>RCSI</b>	
Reference power	Abs power at defined range	Frequency error			Slot, pilot, MAC, data
Peak level at defined range	Rel power at defined range	Time offset	Pilot/MAC channel power	<b>MAC CDP Table</b>	Time offset
		Carrier feed-through	Slot average power		Reference power
	<b>Spurious Emissions</b>	PN offset	Max active I/Q power	Code utilization	Pilot, MAC, data Rho
	Peak frequency at defined range	Pilot, MAC, data power	Avg active I/Q power	Code, spreading factor	Max inactive I/Q power
		Pilot, MAC, data EVM	Max inactive I/Q power	Allocation (channel type)	PN offset
	Peak level at defined range		Avg inactive I/Q power	Relative, absolute power	<b>Power Statistics CCDF</b>
			PN offset		

Option 041					
<b>Channel Scanner (up to 6)</b>	<b>PN Scanner (up to 6)</b>	<b>Multipath Profile</b>	<b>Code Domain Power</b>		
	Channel power	Channel power	Slot average power	Frequency error	Peak utilization
Frequencies or channels	Pilot dominance	Multipath power	PN offset	Time offset	Average utilization
PN offset	PN offset	Ec/Io, delay	Pilot, MAC, data power	Carrier feed-through	<b>Route Map</b>
Pilot, MAC, data power	Ec/Io, pilot power, delay		Pilot, MAC, data Rho	Max active I/Q power	Pilot power
			(Composite) EVM	Avg active I/Q power	Ec/Io
				Code utilization	

Longitude, latitude, and satellite in all screens

\*Measurement is performed in Data Constellation only.



## TD-SCDMA Signal Analyzer (Options 025 and 045)

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			
Code domain power	±0.5 dB relative power ±1.5 dB absolute power	Code channel power > -25 dB Code channel power > -25 dB			
Time error (Tau)	±0.2 μs (typical)	External trigger			
Spreading factor	Auto (DL, UL), 1, 2, 4, 8, 16				
Measurements					
Option 025					
Channel Power	Multi-ACLR	Power vs. Time (frame)	Midamble Power	Code Error	Auto Measure
Channel power	Lowest reference power	Slot power	Slot power	Code power and error	Channel power
Spectral density	Highest reference power	(TS [0 to 6], DwPTS, UpPTS)	DwPTS power	Individual code EVM and its constellation	Occupied bandwidth
Peak to average power	Abs power at defined range	Data power left	Midamble power (1 to 16)		Spectrum emission mask
Occupied Bandwidth			(TS [0 to 6], DwPTS, UpPTS)	Code Power	Data format
Occupied bandwidth	Rel power at defined range	Midamble Power	Abs/Rel code power	Slot, DwPTS power	Multi-ACLR
Integrated power		(TS [0 to 6], DwPTS, UpPTS)	Individual code EVM and its constellation	No. of active code	Slot power
Occupied power	Spurious Emissions	Data power right		Scramble code	DwPTS power
Spectrum Emission Mask	Peak frequency at defined range	(TS [0 to 6], DwPTS, UpPTS)	Data format	Max active code power	UpPTS power
Reference power		Time offset	Slot power, DwPTS power	Avg active code power	On/off slot ratio
Peak level at defined range	Peak level at defined range	(TS [0 to 6], DwPTS, UpPTS)	No. of active code	Max inactive code power	Frequency error
ACLR		Power vs. Time (mask)	Scramble code	Avg inactive code power	EVM RMS
Reference power	Power vs. Time (slot)	Slot power	Max active code power	Peak CDE and peak active CDE	Peak CDE
Abs power at defined range	Slot power	On/off slot ratio	Avg active code power		Max inactive power
	DwPTS power	Off power	Max inactive code power	Scramble code	
Rel power at defined range	UpPTS power	Timogram	Avg inactive code power		
	On/off slot ratio	Constellation			
	Slot PAR	Rho			
	DwPTS code	EVM RMS, EVM peak			
		Peak CDE			
		Frequency error			
		I/Q origin offset			
		Time offset			
Option 045					
Sync-DL ID Scanner (32)	Sync-DL ID vs. Tau (up to 6)	Sync-DL ID Multipath	Sync-DL ID Analyzer	Pilot dominance	Route Map
Scramble code group		Ec/Io, Tau	DwPTS power, Ec/Io trend	EVM, frequency error	DwPTS Power
Ec/Io, Tau	ID, power, Ec/Io, Tau	DwPTS power	DwPTS power	Ec/Io, CINR	
DwPTS power	DwPTS power	Pilot dominance			
Pilot dominance	Pilot dominance				

Longitude, latitude, and satellite in all screensTD-SCDMA Signal Analyzer (Option 025)

## Mobile WiMAX Signal Analyzer (Options 026 and 046)

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

<b>Channel Power</b>	<b>Spurious Emissions</b>	<b>Constellation</b>	<b>EVM vs. Subcarrier</b>	<b>Auto Measure</b>	Time offset
Channel power	Peak frequency at defined range	Channel power	RCE RMS, RCE peak	Channel power	I/Q origin offset
Spectral density		RCE RMS, RCE peak	EVM RMS, EVM peak	Occupied bandwidth	Spectral flatness
Peak to average power	Peak level at defined range	EVM RMS, EVM peak	Segment ID, cell ID	Spectrum emission mask	Frequency error
<b>Occupied Bandwidth</b>	<b>Power vs. Time (frame)</b>	Frequency error	Preamble index	Spurious emission mask	RCE RMS
Occupied bandwidth	Channel power	Time offset	<b>EVM vs. Symbol</b>	Preamble power	RCE peak
Integrated power	Frame average power	Segment ID, cell ID	RCE RMS, RCE peak	DL burst power	EVM RMS
Occupied power	Preamble power	Preamble index	EVM RMS, EVM peak	UL burst power	EVM peak
<b>Spectrum Emission Mask</b>	DL burst power	<b>Spectral Flatness</b>	Segment ID, cell ID	Frame average power	<b>Power Statistics CCDF</b>
Reference power	UL burst power	Average subcarrier power	Preamble index		
Peak level at defined range	I/Q origin offset	Subcarrier power variation			
	Time offset				
		Max, min, avg power			

#### Option 046

<b>Preamble Scanner</b>	<b>Multipath Profile</b>	<b>Preamble Power Trend</b>		<b>Route Map</b>
Total preamble power	Total preamble power	Preamble power trend	C/I	Preamble power
Preamble, relative power	Multipath power	Relative power trend	Preamble	
Cell ID, sector ID	Relative power, delay	Preamble power	Cell ID, sector ID	
Time offset		Frame avg power	Time offset	
		Relative power		

Longitude, latitude, and satellite in all screens

## LTE/LTE-Advanced—FDD Signal Analyzer (Options 028/030/032 and 048)

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 028/030/032					
<b>Channel Power</b>	<b>Power vs. Time (frame)</b>	<b>Control Channel</b>	Data EVM RMS, peak	Antenna 1 RS power and EVM	PDSCH/Data* 64 QAM EVM
Channel power	Frame average power	Control channel summary (P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS, MBSFN*)	RS EVM RMS, peak	Antenna 2 RS power and EVM**	PDSCH 256QAM EVM
Spectral density	Subframe power		Cell, group, sector ID		
Peak to average power	First slot power		<b>Frame</b>	Antenna 3 RS power and EVM**	RS, P-SS, S-SS EVM
<b>Occupied Bandwidth</b>	Second slot power		MBSFN*		
Occupied bandwidth	Cell ID, I/Q origin offset	EVM, relative or absolute power, modulation type	Frame summary table	<b>Data Allocation Map</b>	Subframe power
Integrated power	Time offset		(P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS, MBSFN*, PDSCH/		
Occupied power	<b>Constellation</b>	Each control channels'	Data* QPSK, PDSCDH/	Data allocation vs frame	OFDM power
<b>Spectrum Emission mask</b>	MBSFN*	I/Q diagram	Data* 16 QAM, PDSCH/	Resource block power	Time error
Reference power	RS TX power	Modulation format	Data* 64 QAM, PDSCH	OFDM symbol power	I/Q origin offset
Peak level at defined range	PDSCH/Data* QPSK EVM	Frequency error	256QAM)	Data utilization	<b>Carrier Aggregation**</b>
<b>ACLR</b>	PDSCH/Data* 16 QAM EVM	I/Q origin offset	EVM, relative or absolute power, modulation type	Data allocation vs sub-frame	
Reference power	PDSCH/Data* 64 QAM EVM	EVM RMS, EVM peak	Frame average power	Resource block power	Component carriers: up to 5
Abs power at defined range	PDSCH 256QAM EVM	Subframe	OFDM symbol power	Data utilization	Subframe power
Rel power at defined range	Data EVM RMS		MBSFN*	Frequency error	<b>Auto Measure</b>
<b>Multi-ACLR</b>	Data EVM peak	Subframe summary table (P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS, MBSFN*, PDSCH/	I/Q origin offset	Channel power	PDSCH/Data* QPSK power and EVM
Lowest reference power	Frequency error		Data* QPSK, PDSCH/	EVM RMS, peak	
Highest reference power	Time error	Data* 16 QAM, PDSCH/	Data EVM RMS, peak	Spectrum emission mask	PDSCH/Data* 16 QAM power and EVM
Abs power at defined range	<b>Data Channel</b>	Data* 64 QAM, PDSCH	Cell, group, sector ID	ACL	PDSCH/Data* 64 QAM power and EVM
Rel power at defined range	Resource block power	256QAM)	<b>Time Alignment Error</b>	Spurious emission mask	
<b>Spurious Emissions</b>	I/Q diagram	EVM, relative or absolute power, modulation type	Time alignment error trend	Frame average power	PDSCH 256QAM EVM
Peak frequency at defined range	RB power	Subframe power	Time alignment error	Time alignment error	Cell ID
Peak level at defined range	Modulation format	OFDM symbol power	RS power difference	Frequency error	Frequency error
	I/Q origin offset	Frequency, time error	Antenna 0 RS power and EVM		
	EVM RMS, EVM peak			MBSFN*	Time alignment error
				PDSCH/Data*QPSK EVM	Antenna port
				PDSCH/Data*16 QAM EVM	<b>Power Statistics CCDF</b>
Option 048					
<b>Channel Scanner (up to 6)</b>	<b>ID Scanner (up to 6)</b>	<b>Multipath Profile</b>	Control channel table	PMCH subframe power*	<b>Route Map</b>
Frequency or channels	RSRP/RSRQ dominance	Cell, group, sector ID	(P-SS, S-SS, PBCH, PCFICH, RS 0, RS 1, RS 2**, RS 3**, MBSFN RS*)	Time alignment error	RSRP
Cell, group, sector ID	S-SS RSSI dominance	Ant 0 RS Ec/Io, delay	Absolute power	Time offset	RSRQ
Channel power	S-SS Ec/Io dominance	Ant 1 RS Ec/Io, delay		Relative power	<b>Datagram</b>
RSRP/RSRQ	Cell, group, sector ID	Ant 2 RS Ec/Io**, delay**	EVM RMS, phase	Datagram	S-SS RSSI
RS-SINR	RSRP/RSRQ	Ant 3 RS Ec/Io**, delay**	Frequency error	Resource block power	P-SS/S-SS Power
Antenna port	RS-SINR/S-SS RSSI	<b>Control Channel</b>		Data utilization	S-SS Ec/Io
	P-SS/S-SS Power	RS power trend			
	S-SS Ec/Io	Cell, group, sector ID			

Longitude, latitude, and satellite in all screens

\*Measurement is performed when MBMS is enabled.

\*\*Measurement is performed when option 030 is enabled.

## LTE/LTE-Advanced— TDD Signal Analyzer (Options 029/031/033 and 049)

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 029/031/033

Channel Power	Spurious Emissions	Data EVM peak	Subframe	Antenna 3 RS power and EVM**	PDSCH/Data* 64 QAM EVM PDSCH 256QAM EVM
Channel power	Peak frequency at defined range	Frequency error	MBSFN*		
Spectral density		Time error	Subframe	Cell, group, sector ID	Data EVM RMS, peak
Peak to average power	Peak level at defined range	<b>Data Channel</b>	summary table (P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS, MBSFN*, PDSCH/Data*)	<b>Data Allocation Map</b>	RS, P-SS, S-SS EVM
<b>Occupied Bandwidth</b>		MBSFN*		Data allocation vs frame	RS, P-SS, S-SS power
Occupied bandwidth	<b>Power vs. Time (frame)</b>	Resource block power		Resource block power	PBCH power
Integrated power	Frame average power	I/Q diagram		OFDM symbol power	Subframe power
Occupied power	Subframe power	RB power		Data utilization	OFDM power
<b>Spectrum Emission Mask</b>	First slot power	Modulation format	EVM, relative or absolute power, modulation type	Data allocation vs subframe	Time error
Reference power	Second slot power	I/Q origin offset			I/Q origin offset
Peak level at defined range	Cell ID, I/Q origin offset	EVM RMS, EVM peak	Subframe power	Resource block power	<b>Carrier Aggregation**</b>
	Time offset	<b>Control Channel</b>	OFDM symbol power	Data utilization	Component carriers: up to 5
<b>ACLR</b>	<b>Power vs. Time (slot)</b>	Control channel summary (P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS, MBSFN*)	Frequency, time error	<b>Auto Measure</b>	
Reference power	Slot average power		Data EVM RMS, peak	Channel power	Subframe power
Abs power at defined range	Transient period length		RS EVM RMS, peak	Occupied bandwidth	P-SS, S-SS, PBCH, RS power and EVM
	Off power		Cell, group, sector ID	Spectrum emission mask	
Rel power at defined range	<b>Constellation</b>	EVM, relative or absolute power, modulation type	<b>Time Alignment Error</b>	ACLR	PDSCH/Data* QPSK power and EVM
	MBSFN*		Time alignment error trend	Multi-ACLR	
<b>Multi-ACLR</b>	RS TX power	Each control channels'	Time alignment error	Spurious emission mask	PDSCH/Data* 16 QAM power and EVM
Lowest reference power	PDSCH/Data* QPSK EVM	I/Q diagram	RS power difference	Slot average power	
Highest reference power	PDSCH/Data* 16 QAM EVM	Modulation format	Antenna 0 RS power and EVM	Off power	PDSCH/Data* 64 QAM power and EVM
Abs power at defined range		Frequency error		Transition period	PDSCH 256QAM EVM
	PDSCH/Data*	I/Q origin offset	Antenna 1 RS power and EVM	Time alignment error	Cell ID
Rel power at defined range	64 QAM EVM	EVM RMS, EVM peak	Antenna 2 RS power and EVM**	MBSFN*	Frequency error
	PDSCH 256QAM EVM			PDSCH/Data* QPSK EVM	Time alignment error
					Antenna port
	Data EVM RMS				<b>Power Statistics CCDF</b>

#### Option 049

Channel Scanner (up to 6)	ID Scanner (up to 6)	Multipath Profile	Control Channel	EVM RMS, phase	Route Map
	RSRP/RSRQ dominance	Cell, group, sector ID	RS power trend	Frequency error	RSRP
Frequency or channels	S-SS RSSI dominance	Ant 0 RS Ec/Io, delay	Cell, group, sector ID	PMCH subframe power*	RSRQ
Cell, group, sector ID	S-SS Ec/Io dominance	Ant 1 RS Ec/Io, delay	Control channel table (P-SS, S-SS, PBCH, PCFICH, RS 0, RS 1, RS 2**, RS 3**, MBSFN RS*)	Time alignment error	RS-SINR
Channel power	Cell, group, sector ID	Ant 2 RS Ec/Io**, delay**		Time offset	S-SS RSSI
RSRP/RSRQ	RSRP/RSRQ	Ant 3 RS Ec/Io**, delay**		<b>Datagram</b>	P-SS, S-SS power
RS-SINR	RS-SINR/S-SS RSSI			Datagram	S-SS Ec/Io
Antenna port	P-SS/S-SS power		Absolute power	Resource block power	
	S-SS Ec/Io		Relative power	Data utilization	

Longitude, latitude, and satellite in all screens

\*Measurement is performed when MBMS is enabled.

\*\*Measurement is performed when option 031 is enabled.

## NB-IoT Signal Analyzer (Option 034)

General Parameters		
Operation Mode	In-Band	
Input signal level	-40 to +25 dBm	
Channel power accuracy	±1.0 dB (typical)	
Supported bandwidths	180 kHz	
Anchore Carrier	PRBS Index	
Measurement Type	Frame, Subframe	
Frequency error	±10 Hz + ref freq accuracy	99% confidence level
Residual EVM (RMS)	2.0% (typical)	Data EVM
Measurement		
Option 034		
Channel Summary		IQ Diagram
EVM, Power (dBm), and Modulation type		Constellation diagram and Modulation quality indices
Frame / Subframe Power	Physical Cell ID	Modulation Format
NPSS	NPDSCH	IQ Origin Offset
NSSS	NRS0	EVM RMS (Current/ Accumulated)
NPBCH	NRS1	
		Frequency Error (Hz / PPM)
		EVM Peak (Current/ Accumulated)

## EMF Analyzer (Option 050)

General Parameters		
Supported Antenna	Isotropic Antenna G700050380 26 MHz to 3 GHz	
Mode	Sweep / FFT	
Trace	X-Axis, Y-Axis, Z-Axis, Current, Isotropic, Isotropic Accumulated	
Limit lines	MSL, ICNIRP	
Dwell Time	1 to 60s	
Measurement Time	1 to 30 min (# of measurement= Measurement Time / (Dwell Time x 3)	
Units	dBµV/m, dBmV/m, dBV/m, V/m, W/m², dBm/m², dBW/m², A/m, dBA/m, and Watt/cm².	
Miscellaneous	Spectrum logging and Replay Export to CSV PDF Report Generation	
Measurement		
<b>Option 050 and G700050380</b>		
Trace: X-Axis, Y-Axis, Z-Axis, Current, Isotropic, Isotropic Accumulated	Isotropic EMF Power: AVG, Max, Min	Accumulated Isotropic EMF Power: AVG, Max, Min

## RFoCPRI™ Interference Analyzer (Option 008, 060, 061, 062, 063, 064, and 065)

General Parameters					
Optical interface		Dual SFP/SFP+ (supports all MSA compliant SFP modules)			
Line rates		614.4 Mbps (1x) , 1228.8 Mbps (2x)		Option 008 and 060	
		2457.6 Mbps (4x)		Option 008 and 061	
		3072.0 Mbps (5x)		Option 008 and 062	
		4915.2 Mbps (8x)		Option 008 and 063	
		6144.0 Mbps (10x)		Option 008 and 064	
		9830.4 Mbps (16x)		Option 008 and 065	
Resolution Bandwidth (RBW)					
-3 dB bandwidth		1 kHz to 10 kHz (span ≤ 3.84 MHz) 1 KHz to 100 kHz (3.84 MHz < span < 30.86 MHz)		1-3-10 sequence	
Accuracy		±10% (nominal)			
VBW					
-3 dB bandwidth		1 Hz to 100 KHz		1-3-10 sequence	
Accuracy		±10% (nominal)			
CPRI Parameter					
IQ Sample width		4 – 20 (step 1)			
Mapping method		1 and 3			
TX clock		Internal/external/recovered			
Port type		Master/slave			
Map position		AxC#0 – AxC#7			
Bandwidth		1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz			
Measurements					
Layer-2 Monitoring		Layer-2 Term		Interference analyzer	
Port 1	Port 2	Port 1 or 2 (exclusive)		Spectrum	Sound indicator, AM/FM audio demodulation, interference ID, spectrum recorder
LOS	LOS	LOS SDI			
LOF	LOF	LOF RAI			
SDI	SDI	Optic RX level	dBm		
RAI	RAI	Optic TX level	dBm	Spectrogram	Collect up to 72 hr of data
Optic RX level	Optic RX level	Protocol version	1 to 10		
SFP Information	SFP Information	C and M HDLC rate (kbps)	No HDLC, 240, 480, 960, 1920, 2400	RSSI	Collect up to 72 hr of data
Wavelength	Wavelength				
Vendor	Vendor	C and M Ethernet subchannel number	20 to 63	Spectrum replay	X1, x2, x4, x8
Vendor PN	Vendor PN			PIM Detection	
Vendor rev	Vendor rev	Alarm Injection		Single carrier	
Power level type	Power level type	R-LOS	Single	Multi carrier	
Diagnostic byte	Diagnostic byte	R-LOF	Single	PIM calculator	
Nominal rate	Nominal rate	Error Injection			
Min rate	Min rate	Code	Single/rate		
Max RX level	Max RX level	K30.7	Single/rate		
Max TX level	Max TX level	Error rate	1E-3 to 1E-9		

## RFoCPRI™ GSM Interference Analyzer (Option 068)

General Parameters		
Optical interface	Dual SFP/SFP+ (supports all MSA compliant SFP modules)	
Line rates	614.4 Mbps (1x), 1228.8 Mbps (2x), 2457.6 Mbps (4x), 3072.0 Mbps (5x), 4915.2 Mbps (8x), 6144.0 Mbps (10x), 9830.4 Mbps (16x)	
Resolution Bandwidth (RBW)	1 KHz to 30 kHz (Span ≤ 960 kHz)	
	Accuracy	±10% (nominal)
Video Bandwidth (RBW)	1 Hz to 30 KHz	
	Accuracy	±10% (nominal)

CPRI Parameter	
IQ Sample Width	4 – 20 (step 1)
Sample Rate	960 KHz
Mapping	NA=1, S=1, K=4, NC=1
TX clock	Internal/external/recovered
Port type	Master/slave

General Parameters					
Layer-2 Monitoring		Layer-2 Term		Layer-2 Term (cont.)	
Port 1	Port 2	Port 1 or 2 (exclusive)		Error	
LOS	LOS	LOS	Error rate	Code	Single/rate
LOF	LOF	LOF	K30.7	Error rate	Single/rate
RAI	RAI	Optic RX level	dBm	K30.7	
SDI	SDI	Optic TX level	dBm	<b>Interference analyzer</b>	
Optic RX level	Optic RX level	Port Type	Master	Spectrum	
<b>SFP Information</b>	<b>SFP Information</b>	Protocol Version	1 to 10	Sound indicator	
Wavelength	Wavelength	C&M HDLC rate (kbps)	No HDLC, 240, 480, 960, 1920, 2400	AM/FM audio demodulation	
Vendor	Vendor	C&M Ethernet Sub-channel number	20 to 63	Interference ID	
Vendor PN	Vendor PN			Spectrum recorder	
Vendor rev	Vendor rev	Word Sync Loss Event		Spectrogram	
Power level type	Power level type	Code Violation		RSSI	
Diagnostic byte	Diagnostic byte	K30.7 words		Spectrum replay	
Nominal rate	Nominal rate	Frame Sync Loss Events		PIM Detection	
Min rate	Min rate	<b>Alarm Injection</b>		Single Carrier	
Max RX level	Max RX level	R-LOS	SDI	Multi Carrier	
Max TX level	Max TX level	R-LOF	RAI	PIM Calculator	

## RFoBSAI™ Interference Analyzer (Option 070, 071, 072, 073)

General Parameters					
Optical interface	Dual SFP/SFP+ (supports all MSA compliant SFP modules)				
Line rates	768 Mbps (1x)	Option 008 and 070			
	1536 Mbps (2x)	Option 008 and 071			
	3072 Mbps (4x)	Option 008 and 072			
	6144 Mbps (8x)	Option 008 and 073			
Resolution bandwidth (RBW)	1 kHz to 10 kHz (span ≤ 3.84 MHz)				
	1 KHz to 100 kHz (3.84 MHz < span ≤ 30.86 MHz)				
	Accuracy	±10% (nominal)			
Video bandwidth (RBW)	1 Hz to 100 kHz				
	Accuracy	±10% (nominal)			
RP3 type	LTE (FDD/TDD), UMTS (FDD)				
RP3 address	Hexadecimal				
TX clock	Internal/external/recovered				
Port type	Master/slave				
Bandwidth	LTE-FDD/TDD: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz UMTS: 3 MHz for downlink, 5 MHz for uplink				
RP3 address list	RP3 address, Technology, Scrambler seed*, Message Count*				
Scrambler seed	Nx7 Index: 0 – 17, step 1				
Measurements					
Layer-2 Monitoring		Layer-2 Term		Interference analyzer	
Port 1	Port 2	Port 1 or 2		Spectrum	Sound indicator
LOS	LOS	LOS			AM/FM audio demodulation
LOF	LOF	LOF			Interference ID
Code violation	Code violation	Optic RX level	dBm	Spectrogram	Spectrum recorder
K30.7 words	K30.7 words	Optic TX level	dBm		Collect up to 72 hr of data
Optic RX level	Optic RX level	Port type	Master	RSSI	Collect up to 72 hr of data
Optic TX level	Optic TX level	TX state	State machine	Spectrum replay	x1, x2, x4, x8
Messages address	Message address	RX state	State machine		PIM detection
Message counter	Message counter	TX address	RP3 address (hexadecimal)	Multicarrier	
<b>SFP Information</b>	<b>SFP Information</b>	RX address	RP3 address (hexadecimal)	PIM calculator	
Wavelength	Wavelength	Word sync loss event			
Vendor	Vendor	Code violation			
Vendor PN	Vendor PN	K30.7 words			
Vendor rev	Vendor rev	Frame sync loss events			
Power level type	Power level type	<b>Alarm Injection</b>			
Diagnostic byte	Diagnostic byte	K30.7	Single		
Nominal rate	Nominal rate	<b>Error Injection</b>			
Min rate	Min rate	Code	Single/rate		
Max RX level	Max RX level	Error rate	1E-3 to 1E-9		
Max TX level	Max TX level				

\*Available only when the link rate is 6.1 Gbps



## RFoCPRI LTE-FDD Signal Generator (Option 081)

General Parameters		
Optical interface	Dual SFP/SFP+ (supports all MSA compliant SFP modules)	
Line rates	614.4 Mbps (1x), 1228.8 Mbps (2x), 2457.6 Mbps (4x), 3072.0 Mbps (5x), 4915.2 Mbps (8x), 6144.0 Mbps (10x), 9830.4 Mbps (16x)	
IQ Sample width	8 – 20 bits	
Mapping method	Packed and Flexible	
Waveform	CW: Single Tone, Two tones LTE-FDD waveform: E-TM1.1, E-TM1.2, E-TM2, E-TM3.1, E-TM3.2, E-TM3.3	
Bandwidth	5 MHz, 10 MHz, 15 MHz, 20 MHz	
Sampling Frequency	N x 3.84 MHz (N=2, 4, 6, 8)	
Gain dynamic range	0 to –50 dB	
Frequency error	±10 Hz + ref freq accuracy	99% confidence level
Residual EVM (RMS)	0.2% (typical)	Data EVM

## RFoCPRI™ LTE-TDD Signal Generator (Option 082)

General Parameters		
<b>Optical Hardware (Option 008)</b>		
Interface	Two SFP/SFP+ ports (supports all MSA compliant SFP modules), one Ethernet port	
<b>CPRI Parameter</b>		
Line coding	8B/10B	
Line rates	614.4 Mbps, 1228.8 Mbps (Option 060)	
	2457.6 Mbps (Option 061)	
	3072.0 Mbps (Option 062)	
	4915.2 Mbps (Option 063)	
	6144.0 Mbps (Option 064)	
	9830.4 Mbps (Option 065)	
<b>CPRI Parameter</b>		
IQ Sample width	8 – 20 (step 1)	
Mapping method	1 and 3	
Waveform	CW: Single Tone, Two Tones LTE-TDD waveform: E-TM1.1, E-TM1.2, E-TM2, E-TM3.1, E-TM3.2, E-TM3.3	
Bandwidth	5 MHz, 10 MHz, 15 MHz, 20 MHz	
Sampling Frequency	N x 3.84 MHz (N=2, 4, 6, 8)	
Gain dynamic range	0 to –50 dB	
Frequency error	±10 Hz + ref freq accuracy, 99% confidence level	
Residual EVM (RMS)	0.02% (typical), data EVM	

## RFoCPRI LTE-FDD Multi Carrier Signal Generator (Option 083)

General Parameters	
<b>Optical Hardware (Option 008)</b>	
Interface	Two SFP/SFP+ ports (supports all MSA compliant SFP modules)
Max TX	4 carriers / SFP port, Dual port operation is available
<b>CPRI Parameter</b>	
Line coding	8B/10B
Line rates	614.4 Mbps, 1228.8 Mbps, 2457.6 Mbps, 3072.0 Mbps, 4915.2 Mbps , 6144.0 Mbps , 9830.4 Mbps
<b>CPRI Parameter</b>	
IQ Sample width	8 – 20 (step 1)
Waveform mapping	Carrier / TX Container Map Position
Waveform	CW, CW (two tone), LTE-FDD E-TM1.1, E-TM1.2, E-TM2, E-TM3.1, E-TM3.2, E-TM3.3
Bandwidth	5 MHz, 10 MHz, 15 MHz, 20 MHz
Sampling Frequency	N x 3.84 MHz (N=2, 4, 6, 8)
Gain dynamic range	0 to –50 dB
Frequency error	±10 Hz + ref freq accuracy, 99% confidence level
Residual EVM (RMS)	0.02% (typical), Data EVM

## RFoCPRI LTE-TDD Multi Carrier Signal Generator (Option 084)

General Parameters	
<b>Optical Hardware (Option 008)</b>	
Interface	Two SFP/SFP+ ports (supports all MSA compliant SFP modules)
Max TX	4 carriers / SFP port, Dual port operation is available
<b>CPRI Parameter</b>	
Line coding	8B/10B
Line rates	614.4 Mbps, 1228.8 Mbps, 2457.6 Mbps, 3072.0 Mbps, 4915.2 Mbps , 6144.0 Mbps , 9830.4 Mbps
<b>CPRI Parameter</b>	
IQ Sample width	8 – 20 (step 1)
Waveform mapping	Carrier / TX Container Map Position
Waveform	CW, CW (two tone), LTE-TDD E-TM1.1, E-TM1.2, E-TM2, E-TM3.1, E-TM3.2, E-TM3.3
Bandwidth	5 MHz, 10 MHz, 15 MHz, 20 MHz
Sampling Frequency	N x 3.84 MHz (N=2, 4, 6, 8)
Gain dynamic range	0 to –50 dB
Frequency error	±10 Hz + ref freq accuracy, 99% confidence level
Residual EVM (RMS)	0.02% (typical), Data EVM

## RFoOBSAI™ LTE-FDD Signal Generator (Option 086)

<b>General Parameters</b>	
<b>Optical Hardware (Option 008)</b>	
Interface	Two SFP/SFP+ ports (supports all MSA compliant SFP modules), one Ethernet port
<b>OBSAI Parameter</b>	
Line coding	8B/10B
Line rates	768 Mbps (Option 070)
	1536 Mbps (Option 071)
	3072 Mbps (Option 072)
	6144 Mbps (Option 073)
<b>CPRI Parameter</b>	
RP3 type	LTE
RP3 address	Hexadecimal
Waveform	CW, LTE-FDD E-TM1.1, E-TM1.2, E-TM2, E-TM3.1, E-TM3.2, E-TM3.3
Bandwidth	5 MHz, 10 MHz, 15 MHz, 20 MHz
Sampling frequency	N x 3.84 MHz (N=2, 4, 6, 8)
Gain dynamic range	0 to -50 dB
Frequency error	±10 Hz + ref freq accuracy, 99% confidence level
Residual EVM (RMS)	0.02% (typical), data EVM

## RFoCPRI LTE-FDD Signal Analyzer (Option 091)

General Parameters		
Optical interface	Dual SFP/SFP+ (supports all MSA compliant SFP modules)	
Line rates	614.4 Mbps (1x), 1228.8 Mbps (2x), 2457.6 Mbps (4x), 3072.0 Mbps (5x), 4915.2 Mbps (8x), 6144.0 Mbps (10x), 9830.4 Mbps (16x)	
RBW	100 kHz	
IQ Sample width	Uplink: 4 – 20 bits, Downlink: 8 – 20 bits	
Mapping method	Packed and Flexible	
AxC Container/Carrier	Up to 8 AxC container per carrier	
LTE Signal Bandwidth	5 MHz, 10MHz, 15MHz, 20MHz	
Span	Fixed and equal to sampling frequency of LTE signal.	
Frequency error	±10 Hz + ref freq accuracy	99% confidence level
Residual EVM (RMS)	0.02% (typical)	Data EVM

### Measurements

Option 091				
Channel Power	Power vs. Time (frame)	Control Channel	Data EVM RMS, peak	Antenna 1 RS power and EVM
Channel power	Frame average power	Control channel summary (P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS, MBSFN*)	RS EVM RMS, peak	Antenna 2 RS power and EVM
Spectral density	Subframe power		Cell, group, sector ID	
Peak to average power	First slot power		<b>Frame</b>	MBSFN*
<b>Occupied Bandwidth</b>	Second slot power	EVM, relative or absolute power, modulation type	Frame summary table (P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS, MBSFN*, PDSCH/Data* QPSK, PDSCH/Data* 16 QAM, PDSCH/Data* 64 QAM)	<b>Data Allocation Map</b>
Occupied bandwidth	Cell ID, I/Q origin offset			Each control channels'
Integrated power	<b>Constellation</b>	I/Q diagram	EVM, relative or absolute power, modulation type	Data allocation vs subframe
Occupied power	MBSFN*			Modulation format
	RS TX power	Frequency error	EVM RMS, EVM peak	Data utilization
	PDSCH/Data* QPSK EVM			I/Q origin offset
	PDSCH/Data* 16 QAM EVM	<b>Subframe</b>	Frame average power	Resource block power
	PDSCH/Data* 64 QAM EVM			MBSFN*
	Data EVM RMS	Error rate	OFDM symbol power	<b>Power Statistics CCDF</b>
	Data EVM peak			Frame summary table (P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS, MBSFN*, PDSCH/Data* QPSK, PDSCH/Data* 16 QAM, PDSCH/Data* 64 QAM)
	Frequency error	Subframe power	I/Q origin offset	
	Time error			EVM RMS, peak
	<b>Data Channel</b>	EVM, relative or absolute power, modulation type	Data EVM RMS, peak	
	MBSFN*			Cell, group, sector ID
	Resource block power	I/Q diagram	<b>Time Alignment Error</b>	
	I/Q diagram			Time alignment error trend
	RB power modulation format	Subframe power	Time alignment error	
	I/Q origin offset			RS power difference
	EVM RMS, EVM peak	OFDM symbol power	Antenna 0 RS power and EVM	
		Frequency, time error		

\*Measurement is performed when MBMS is enabled.

## RFoCPRI™ LTE-TDD Analyzer (Option 092)

General Parameters				
<b>Optical Hardware (Option 008)</b>				
Interface	Two SFP/SFP+ ports (supports all MSA compliant SFP modules), one Ethernet port			
<b>CPRI Parameter</b>				
Line coding	8B/10B			
Line rates	614.4 Mbps, 1228.8 Mbps (Option 060)			
	2457.6 Mbps (Option 061)			
	3072.0 Mbps (Option 062)			
	4915.2 Mbps (Option 063)			
	6144.0 Mbps (Option 064)			
9830.4 Mbps (Option 065)				
<b>Resolution Bandwidth (RBW)</b>				
-3 dB bandwidth	100 kHz			
Accuracy	±10% (nominal)			
<b>CPRI Parameter</b>				
IQ Sample width	4 – 20 (step 1)			
Mapping method	1 and 3			
TX clock	Internal/external/recovered			
Port type	Master/slave			
Map position	AxC#0 – AxC#7			
Bandwidth	5 MHz, 10 MHz, 15 MHz, 20 MHz			
Span	Fixed and equal to sampling frequency of LTE signal			
Frequency error	±10 Hz + ref freq accuracy, 99% confidence level			
Residual EVM (RMS)	0.02% (typical), data EVM			
Measurements				
Option 008, 060, 061, 062, 063, 064, and 065				
Channel Power	Constellation	Data Channel	Time Alignment Error	Data Allocation Map
Channel power	MBSFN*	MBSFN*	Time alignment error trend	Data allocation vs. frame
Spectral density	RS TX power	Resource block power	Time alignment error	Resource block power
Peak to average power	PDSCH/Data* QPSK EVM	I/Q diagram	RS power difference	OFDM symbol power
<b>Occupied Bandwidth</b>	PDSCH/Data* 16QAM EVM	RB power	Antenna 0 RS power, EVM	Data utilization
Occupied bandwidth	PDSCH/Data* 64QAM EVM	Modulation format	Antenna 1 RS power, EVM	Data allocation vs.subframe
Integrated power	Data EVM RMS, peak	I/Q origin offset	Cell, group, sector ID	Resource block power
Occupied power	Frequency error	EVM RMS, peak		Data utilization
<b>Power vs. Time (Frame)</b>	Time error	<b>Subframe</b>		<b>Power Statistics CCDF</b>
Frame average power	<b>Control Channel</b>	MBSFN*		Average power
Subframe power	Control Channel summary EVM, rel., or abs. power of each control channel	Subframe summary		Peak power crest factor
First Slot power		EVM, abs. and rel. power		
Second Slot power		Subframe power		
Cell ID, I/Q origin offset	IQ diagram	OFDM symbol power		
Time offset	Modulation format	Frequency error		
<b>Power vs. Time (Slot)</b>	Frequency error	Time error		
Slot average power	I/Q origin offset	Data EVM RMS, peak		
Transient period length	Control EVM RMS, peak	RS EVM RMS, peak		
Off power		Cell, group, sector ID		

Longitude, latitude, and satellite in all screens

\*Measurement is performed when MBMS is enabled.

## RFoOBSAI™ LTE-FDD Analyzer (Option 096)

General Parameters				
<b>Optical Hardware (Option 008)</b>				
Interface	Two SFP/SFP+ ports (supports all MSA compliant SFP modules), one Ethernet port			
<b>OBSAI Parameter</b>				
Line coding	8B/10B			
Line rates	768 Mbps (Option 070)			
	1536 Mbps (Option 071)			
	3072 Mbps (Option 072)			
	6144 Mbps (Option 073)			
<b>Resolution Bandwidth (RBW)</b>				
-3 dB bandwidth	100 kHz			
Accuracy	±10% (nominal)			
<b>OBSAI Parameter</b>				
RP3 type	LTE (FDD/TDD), UMTS (FDD)			
RP3 address	Hexadecimal			
TX clock	Internal/external/recovered			
Port type	Master/slave			
Bandwidth	LTE-FDD/TDD: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz UMTS: 3 MHz for downlink, 5 MHz for uplink			
RP3 address list	RP3 address, technology, scrambler seed*, message count			
Scrambler seed	Nx7 Index: 0 – 17, step 1			
<b>Measurements</b>				
<b>Channel Power</b>	<b>Constellation</b>	<b>Data Channel</b>	<b>Time Alignment Error</b>	<b>Data Allocation Map</b>
Channel power	MBSFN**	MBSFN**	Time alignment error trend	Data allocation vs. frame
Spectral density	RS TX power	Resource block power	Time alignment error	Resource block power
Peak to average power	PDSCH/data** QPSK EVM	I/Q diagram	RS power difference	OFDM symbol power
<b>Occupied Bandwidth</b>	PDSCH/data** 16QAM EVM	RB power	Antenna 0 RS power, EVM	Data utilization
Occupied bandwidth	PDSCH/data** 64QAM EVM	Modulation format	Antenna 1 RS power, EVM	Data allocation vs. subframe
Integrated power	Data EVM RMS, peak	I/Q origin offset	Cell, group, sector ID	Resource block power
Occupied power	Frequency error	EVM RMS, peak	<b>Frame</b>	Data utilization
<b>Power vs. Time (frame)</b>	Time error	<b>Subframe</b>	MBSFN**	
Frame average power	<b>Control Channel</b>	MBSFN**	Frame summary	
Subframe power	Control channel summary EVM, rel., or abs power of each control channel	Subframe summary	EVM, abs. and rel. power	
First slot power		EVM, abs. and rel. power	Frame average power	
Second slot power		Subframe power	OFDM symbol power	
Cell ID, I/Q origin offset	IQ Diagram	OFDM symbol power	Frequency error	
Time offset	Modulation format	Frequency error	IQ origin offset	
<b>Power Statistics CCDF</b>	Frequency error	Time error	Data EVM RMS, peak	
Average power	I/Q origin offset	Data EVM RMS, peak	Control EVM RMS, peak	
Peak power Crest Factor	Control EVM RMS, peak	RS EVM RMS, peak	Cell, group, sector ID	
		Cell, group, sector ID		

Longitude, latitude, and satellite in all screens

\*OBSAI 6144 Mbps only.

\*\*Measurement is performed when MBMS is enabled.

## RFoCPRI BBU Emulation for Alcatel-Lucent (Option 101)

General Parameters			
<b>Optical Hardware</b> (Option 008)			
Interface	Dual SFP/SFP+ (supports all MSA-compliant SFP modules)		
Max TX	4 Carrier/SFP port (Option 083 or 084), Dual port operation		
<b>CPRI Parameter</b>			
Line coding	8B/10B		
Line rates	614.4 Mbps, 1228.8 Mbps (Option 060) 2457.6 Mbps (Option 061) 3072.0 Mbps (Option 062) 4915.2 Mbps (Option 063) 6144.0 Mbps (Option 064) 9830.4 Mbps (Option 065)		
<b>Resolution Bandwidth (RBW)</b>			
-3 dB bandwidth	1 kHz to 10 kHz (span $\leq$ 3.84 MHz) 1 KHz to 100 kHz (3.84 MHz < span $\leq$ 30.86 MHz)		
Accuracy	$\pm$ 10% (nominal)		
<b>CPRI parameter</b>			
IQ Sample width	4 – 20 (step 1)		
Mapping method	1 and 3		
TX clock	Internal/external		
Port type	Master		
Bandwidth	5/10/15/20 MHz		
Span	Adjustable (max span= sampling frequency)		
Measurements			
Option 101			
<i>Carrier Configuration</i>	<i>SFP Information</i>	<i>Spectrum Clearance</i>	<i>Coverage Range</i>
RRH description	RRH description	Spectrum	Spectrum
Carrier information	SFP information	Spectrogram	Carrier information
<i>CPRI and Active SW</i>	<i>RTD Information</i>	RSSI	VSWR
RRH description	Round Trip Delay	Dual spectrum	Tilt
CPRI state	Round Trip Delay (avg/min/max)	Dual active trace	<i>PIM Analysis</i>
Active SW		Dual spectrogram	Single radio Spectrum flatness
Option 101/083/084			
PIM Analysis with two sweep tones from a single SFP port.		PIM Detection with up to 4 LTE carriers	
PIM Analysis with two sweep tones from each SFP port under dual BBU emulation mode		PIM Detection with up to 8 LTE carriers (2 SFP ports x 4 carriers) under dual BBU emulation mode	

## Layer-2 BERT (Option 110)

General Parameters			
Optical interface	Dual SFP/SFP+ (supports all MSA compliant SFP modules)		
Line rates	614.4 Mbps (1x), 1228.8 Mbps (2x), 2457.6 Mbps (4x), 3072.0 Mbps (5x), 4915.2 Mbps (8x), 6144.0 Mbps (10x), 9830.4 Mbps (16x)		
TX clock	Internal/external/recovered		
Port	SFP Port 1 and Port 2 (Dual independent operation)		
Port type	Master/Slave		
Alarm / Error Injection	Alarm	R-LOS/R-LOF/RAI/SDI	
	Error	Code/ K30.7/ Bit	
	Insert Type	Single/ Rate	
Bit Pattern	Live, Digital Word, ANSI 2 <sup>23</sup> -1, ANSI 2 <sup>23</sup> -1 Inv, ANSI 2 <sup>31</sup> -1, ANSI 2 <sup>31</sup> -1 Inv, ANSI 2 <sup>20</sup> -1, ANSI 2 <sup>20</sup> -1 Inv, ANSI 2 <sup>15</sup> -1, ANSI 2 <sup>15</sup> -1 Inv, ANSI 2 <sup>11</sup> -1, ANSI 2 <sup>11</sup> -1 Inv, ITU 2 <sup>23</sup> -1, ITU 2 <sup>23</sup> -1 Inv, ITU 2 <sup>31</sup> -1, ITU 2 <sup>31</sup> -1 Inv, ITU 2 <sup>15</sup> -1, ITU 2 <sup>15</sup> -1 Inv, ITU 2 <sup>11</sup> -1, ITU 2 <sup>11</sup> -1 Inv		
Bit Pattern Mapping mode	Bulk mode for whole payload		
	Channelized mode for AxC Group	Bandwidth: 5MHz, 10MHz, 15MHz, 20MHz Map Position: AxC 0 - 7	
Round Trip Delay	Resolution: ns (min step: 1ns)		
Measurements			
Common			
LOS	RAI	Pattern Sync	Optic Rx level
LOF	SDI		Optic Tx level
BERT	Count	L1 Inband	
Code Violation	Rx Code Words	RX Protocol Version	
Code Violation Rate	Tx Code Words	Rx C&M HDLC Rate (kbps)	
RX K30.7 Words	Rx Frame	Rx C&M Eth Subchannel Number	
Word Sync Loss Events	Tx Frame	TX Protocol Version	
Frame Sync Loss Events	Round Trip Delay	TX C&M HDLC Rate (kbps)	
Bit Errors	Round Trip Delay (Offset)	TX C&M Eth Subchannel Number	
Bit Error Rate	Round Trip Delay (avg)	Port Type	
Svc Disruption (ms)	Round Trip Delay (min)	Start-up State	
	Round Trip Delay (max)		



## General Information

Inputs and Outputs		
<b>RF in</b>	Spectrum analyzer	
Connector	Type-N, female	
Impedance	50 Ω (nominal)	
Damage level	>+33 dBm, ±50 V DC (nominal), 3 min	
<b>Reflection/RF out</b>	Cable and antenna analyzer	
Connector	Type-N, female	
Impedance	50 Ω (nominal)	
Damage level	>+40 dBm, ±50 V DC (nominal), 3 min	
<b>RF in</b>	Cable and antenna analyzer	
Connector	Type-N, female	
Impedance	50 Ω (nominal)	
Damage level	>+25 dBm, ±50 V DC (nominal)	
<b>External trigger, GPS</b>		
Connector	SMA, female	
Impedance	50 Ω (nominal)	
<b>External ref</b>		
Connector	SMA, female	
Impedance	50 Ω (nominal)	
Input frequency	10 MHz, 13 MHz, 15 MHz	
Input range	-5 to +5 dBm	
<b>USB</b>		
USB host <sup>1</sup>	Type A, 1 port	
USB client <sup>2</sup>	Type B, 1 port	
<b>SFP Cage</b>		
Port 1	RFoFiber (with option 008) SFP/SFP+ compatible	
Port 2	SFP/SFP+ compatible	
LAN <sup>3</sup>	RJ45, 10/100Base-T	
Audio jack	3.5 mm headphone jack	
External power	5.5 mm barrel connector	
Speaker	Built-in speaker	
<b>Display</b>		
Type	Resistive touch screen	
Size	8 inch, LED backlight, transreflective LCD with anti-glare coating (Resolution: 800x600)	
<b>Power</b>		
External DC input	18 to 19 V DC	
Power consumption	42 W	54 W maximum (when charging battery)

Battery	
Type	10.8 V, 7800 mA/hr (Lithium ion)
Operating time	>3 hr (typical)
Charge time	3 hr (while not operating) 9 hr (while operating)
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 <sup>3</sup>	0 to 25°C (32 to 77°F)
<b>Data Storage</b>	
Internal <sup>4</sup>	Maximum 512 MB
External <sup>5</sup>	Limited by size of USB flash drive
<b>Environmental</b>	
<b>Operating temperature</b>	
AC power	0 to 40°C (32 to 104°F) with no derating
Battery	0 to 40°C (32 to 104°F) at charging -10 to 55°C (14 to 131°F) at discharging -10 to 50°C (14 to 122°F) at discharging with Option 008
Maximum humidity	95% RH (noncondensing)
Shock and vibration	MIL-PRF-28800F class 2
Storage temperature <sup>6</sup>	-30 to 71°C (-22 to 160°F)
<b>EMC</b>	
IEC/EN 61326-1:2006 (complies with European EMC)	
CISPR11:2009 +A1:2010	
<b>ESD</b>	
IEC/EN 61000-4-2	
<b>Size and Weight (standard configuration)</b>	
Weight (with battery)	4.4 kg (9.7 lb)
Size (W x H x D)	295 x 195 x 82 mm
<b>Warranty</b>	
3 years	
<b>Calibration Cycle</b>	
1 year	

1. Connects flash drive, power sensor, EZ-Cal kit, and fiber microscope.
2. Data transfer and PC Application based remote control.
3. Data transfer or PC Application/Web-based remote control.
4. 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.
5. Supports USB 2.0 compatible memory devices.
6. With the battery pack removed.

## Ordering Information

Description	Part Number
<b>Standard CellAdvisor Base Station Analyzer</b>	
Base station analyzer includes: <ul style="list-style-type: none"> <li>· Spectrum analyzer 9 kHz to 8 GHz</li> <li>· RF power meter 10 MHz to 8 GHz</li> <li>· Cable and antenna 5 MHz to 6 GHz</li> </ul>	JD785B <sup>1,2</sup>
<b>Options</b>	
Note: Upgrade options for the JD785B use the designation JD785BU before the respective last three-digit option number	
2 Port transmission measurements for JD785B <sup>3</sup>	JD785B001
Bias Tee for JD785B <sup>4</sup>	JD785B002
CW signal generator for JD785B	JD785B003
Optical hardware for JD785B <sup>5</sup>	JD785B008
GPS receiver and antenna for JD785B	JD785B010
Interference analyzer for JD785B <sup>6,7</sup>	JD785B011
Channel scanner for JD785B	JD785B012
Bluetooth connectivity for JD785B <sup>8</sup>	JD785B013
LTE-FDD RAN performance indicator for JD785B <sup>9</sup>	JD785B014
LTE-TDD RAN performance indicator for JD785B <sup>10</sup>	JD785B015
Wi-Fi connectivity for JD785B <sup>11</sup>	JD785B016
cdmaOne/cdma2000 analyzer for JD785B	JD785B020
EV-DO analyzer for JD785B <sup>12</sup>	JD785B021
GSM/GPRS/EDGE analyzer for JD785B	JD785B022
WCDMA/HSPA+ analyzer for JD785B	JD785B023
TD-SCDMA analyzer for JD785B	JD785B025
Mobile WiMAX analyzer for JD785B	JD785B026
LTE - FDD analyzer for JD785B <sup>13</sup>	JD785B028
LTE - TDD analyzer for JD785B <sup>13</sup>	JD785B029
LTE Advanced - FDD analyzer for JD785B <sup>14,15</sup>	JD785B030
LTE Advanced - TDD analyzer for JD785B <sup>15,16</sup>	JD785B031
LTE-FDD 256 QAM Demodulator for JD785B <sup>17</sup>	JD785B032
LTE-TDD 256 QAM Demodulator for JD785B <sup>18</sup>	JD785B033
NB-IoT Analyzer for JD785B <sup>14</sup>	JD785B034
cdmaOne/cdma2000 OTA analyzer for JD785B <sup>19</sup>	JD785B040
EV-DO OTA analyzer for JD785B <sup>19</sup>	JD785B041
GSM/GPRS/EDGE OTA analyzer for JD785B <sup>19</sup>	JD785B042
WCDMA/HSPA+ OTA analyzer for JD785B <sup>19</sup>	JD785B043
TD-SCDMA OTA analyzer for JD785B <sup>19</sup>	JD785B045
Mobile WiMAX OTA analyzer for JD785B <sup>19</sup>	JD785B046
LTE - FDD OTA analyzer for JD785B <sup>19</sup>	JD785B048
LTE - TDD OTA analyzer for JD785B <sup>19</sup>	JD785B049
EMF analyzer for JD785B <sup>20</sup>	JD785B050
RFoCPRI 614M & 1.2G interference analyzer for JD785B <sup>21,22</sup>	JD785B060
RFoCPRI 2.4G interference analyzer for JD785B <sup>21,22</sup>	JD785B061
RFoCPRI 3.1G interference analyzer for JD785B <sup>21,22</sup>	JD785B062
RFoCPRI 4.9G interference analyzer for JD785B <sup>21,22</sup>	JD785B063
RFoCPRI 6.1G interference analyzer for JD785B <sup>21,22</sup>	JD785B064
RFoCPRI 9.8G interference analyzer for JD785B <sup>21,22</sup>	JD785B065
RFoCPRI GSM interference analyzer for JD785B <sup>21,22,23</sup>	JD785B068

Description	Part Number
RFoBSAI 768M Interference analyzer for JD785B <sup>21,22</sup>	JD785B070
RFoBSAI 1.5G interference analyzer for JD785B <sup>21,22</sup>	JD785B071
RFoBSAI 3.1G interference analyzer for JD785B <sup>21,22</sup>	JD785B072
RFoBSAI 6.1G interference analyzer for JD785B <sup>21,22</sup>	JD785B073
RFoCPRI LTE-FDD signal generator for JD785B <sup>21,22,23</sup>	JD785B081
RFoCPRI LTE-TDD signal generator for JD785B <sup>21,22,23</sup>	JD785B082
RFoCPRI LTE-FDD multi carrier signal generator for JD785B <sup>21,22,24</sup>	JD785B083
RFoCPRI LTE-TDD multi carrier signal generator for JD785B <sup>21, 22, 25</sup>	JD785B084
RFoBSAI LTE-FDD signal generator for JD785B <sup>21,22,26</sup>	JD785B086
RFoCPRI LTE-FDD signal analyzer for JD785B <sup>21,22,23</sup>	JD785B091
RFoCPRI LTE-TDD signal analyzer for JD785B <sup>21,22,23</sup>	JD785B092
RFoBSAI LTE-FDD signal analyzer for JD785B <sup>21,22,26</sup>	JD785B096
BBU Emulation for AT&T for JD785B <sup>21,22</sup>	JD785B100
ALU BBU emulation for JD785B <sup>21,22</sup>	JD785B101
CPRI Layer-2 BERT for JD785B <sup>21,22</sup>	JD785B110
2 port transmission measurements floating license for JD740B/JD780B	JD780B001-FL
GPS receiver and antenna floating license for JD740B/JD780B	JD780B010-FL
Interference analyzer floating license for JD740B/JD780B	JD780B011-FL
Channel scanner floating license for JD740B/JD780B	JD780B012-FL
Bluetooth connectivity floating license for JD740B/JD780B	JD780B013-FL
LTE-FDD RAN performance indicator floating license for JD740B/JD780B	JD780B014-FL
LTE-TDD RAN performance indicator floating license for JD740B/JD780B	JD780B015-FL
Wi-Fi connectivity floating license for JD740B/JD780B	JD780B016-FL
cdmaOne/cdma2000 analyzer floating license for JD740B/JD780B	JD780B020-FL
EV-DO analyzer floating license for JD740B/JD780B	JD780B021-FL
GSM/GPRS/EDGE analyzer floating license for JD740B/JD780B	JD780B022-FL
WCDMA/HSPA+ analyzer floating license for JD740B/JD780B	JD780B023-FL
TD-SCDMA analyzer floating license for JD740B/JD780B	JD780B025-FL
Mobile WiMAX analyzer floating license for JD740B/JD780B	JD780B026-FL
LTE - FDD analyzer floating license for JD740B/JD780B	JD780B028-FL
LTE - TDD analyzer floating license for JD740B/JD780B	JD780B029-FL
LTE Advanced - FDD analyzer floating license for JD740B/JD780B	JD780B030-FL

## Ordering Information (Continued)

Description	Part Number
LTE Advanced - TDD analyzer floating license for JD740B/JD780B	JD780B031-FL
LTE-FDD 256 QAM Demodulator floating license for JD740B/JD780B	JD780B032-FL
LTE-TDD 256 QAM Demodulator floating license for JD740B/JD780B	JD780B033-FL
cdmaOne/cdma2000 OTA analyzer floating license for JD740B/JD780B	JD780B040-FL
EV-DO OTA analyzer floating license for JD740B/JD780B	JD780B041-FL
GSM/GPRS/EDGE OTA analyzer floating license for JD740B/JD780B	JD780B042-FL
WCDMA/HSPA+ OTA analyzer floating license for JD740B/JD780B	JD780B043-FL
TD-SCDMA OTA analyzer floating license for JD740B/JD780B	JD780B045-FL
Mobile WiMAX OTA analyzer floating license for JD740B/JD780B	JD780B046-FL
LTE - FDD OTA analyzer floating license for JD740B/JD780B	JD780B048-FL
LTE - TDD OTA analyzer floating license for JD740B/JD780B	JD780B049-FL
EMF analyzer floating license for JD740B/JD780B	JD780B050-FL
RFoCPRI 614M & 1.2G interference analyzer floating license for JD740B/JD780B	JD780B060-FL
RFoCPRI 2.4G interference analyzer floating license for JD740B/JD780B	JD780B061-FL
RFoCPRI 3.1G interference analyzer floating license for JD740B/JD780B	JD780B062-FL
RFoCPRI 4.9G interference analyzer floating license for JD740B/JD780B	JD780B063-FL
RFoCPRI 6.1G interference analyzer floating license for JD740B/JD780B	JD780B064-FL
RFoCPRI 9.8G interference analyzer floating license for JD740B/JD780B	JD780B065-FL
RFoBSAI 768M interference analyzer floating license for JD740B/JD780B	JD780B070-FL
RFoBSAI 1.5G interference analyzer floating license for JD740B/JD780B	JD780B071-FL
RFoBSAI 3.1G interference analyzer floating license for JD740B/JD780B	JD780B072-FL
RFoBSAI 6.1G interference analyzer floating license for JD740B/JD780B	JD780B073-FL
RFoCPRI LTE-FDD signal generator floating license for JD740B/JD780B	JD780B081-FL
RFoCPRI LTE-TDD signal generator floating license for JD740B/JD780B	JD780B082-FL
RFoBSAI LTE-FDD signal generator floating license for JD740B/JD780B	JD780B086-FL
RFoCPRI LTE-FDD signal analyzer floating license for JD740B/JD780B	JD780B091-FL
RFoCPRI LTE-TDD signal analyzer floating license for JD740B/JD780B	JD780B092-FL

Description	Part Number
RFoBSAI LTE-FDD signal analyzer floating license for JD740B/JD780B	JD780B096-FL
BBU Emulation for AT&T floating license for JD740B/JD780B	JD780B100-FL
ALU BBU emulation floating license for JD740B/JD780B	JD780B101-FL

### Optional Accessories

#### Accessory - RF Calibrators (General)

Y- calibration kit Type-N(m), DC to 4 GHz, 50 ohm	JD72450509
Y- calibration kit DIN(m), DC to 4 GHz, 50 ohm	JD72450510
Y- calibration kit Type-N(m), DC to 6 GHz, 50 ohm	JD78050509
Y- calibration kit DIN(m), DC to 6 GHz, 50 ohm	JD78050510
EZ-Cal kit Type-N(m), DC to 6 GHz, 50 ohm	JD70050509
Dual port Type-N 4 GHz calibration kit	JD71050507
Dual port DIN 4 GHz calibration kit	JD71050508
Dual port Type-N 6 GHz calibration kit	JD78050507
Dual port DIN 6 GHz calibration kit	JD78050508
50 ohm Load, DC to 4 GHz, 1 W	GC72550511

#### Accessory - RF Cables (Cables)

RF cable DC to 8 GHz Type-N(m) to Type-N(m), 1.0 m	G700050530
RF cable DC to 8 GHz Type-N(m) to Type-N(f), 1.5 m	G700050531
RF cable DC to 8 GHz Type-N(m) to Type-N(f), 3.0 m	G700050532
RF cable DC to 18 GHz Type-N(m) to SMA(m), 1.5 m	G710050533
RF cable DC to 18 GHz Type-N(m) to QMA(m), 1.5 m	G710050534
RF cable DC to 18 GHz Type-N(m) to SMB(m), 1.5 m	G710050535
RF cable DC to 6 GHz Type-N(m) to DIN(f), 1.5 m	G710050536
RF cable DC to 4 GHz Type-N(m) to 1.0/2.3 (m), 1.5 m	G710050537
Phase-stable RF cable w grip DC to 6 GHz Type-N(m) to Type-N(f), 1.5 m	G700050540
Phase-stable RF cable w grip DC to 6 GHz Type-N(m) to DIN(f), 1.5 m	G700050541
RF cable DC to 18 GHz Type-N(m) to Type-N(f), 1.5 m	G710050531

#### Accessory - Optic Cables (Cables)

SM/LC T-Jumper and 1.5 m fiber cable	G700050401
MM/LC T-Jumper and 1.5 m fiber cable	G700050402

## Ordering Information (Continued)

Description	Part Number
<b>Accessory - RF Antennas (General)</b>	
RF omni antenna Type-N(m), 806 to 896 MHz	G700050353
RF omni antenna Type-N(m), 870 to 960 MHz	G700050354
RF omni antenna Type-N(m), 1710 to 2170 MHz	G700050355
RF omni antenna Type-N(m), 720 to 800 MHz	G700050356
RF omni antenna Type-N(m), 2300 to 2700 MHz	G700050357
Mag mount RF omni antenna Type-N(m), 689 to 1200 MHz, 1700 to 2700 MHz, 3000 to 6000 MHz	G700050358
RF yagi antenna Type-N(f), 1750 to 2390 MHz, 10.2 dBd	G700050363
RF yagi antenna Type-N(f), 806 to 896 MHz, 10.2 dBd	G700050364
RF yagi antenna Type-N(f), 866 to 960 MHz, 9.8 dBd	G700050365
RF yagi antenna SMA(f), 700 to 4000 MHz, 1.85 dBd	G700050366
RF yagi antenna SMA(f), 700 to 6000 MHz, 2.85 dBd	G700050367
Isotropic Antenna Type-N(m), 26 MHz to 3 GHz	G700050380
<b>Accessory - RF Power Sensor (General)</b>	
Directional power sensor (peak and average power) 300 to 3800 MHz	JD731B
Terminating power sensor (Average Power) 20 to 3800 MHz	JD732B
Directional power sensor (peak and average power) 150 to 3500 MHz	JD733A
Terminating power sensor (peak power) 20 to 3800 MHz	JD734B
Terminating power sensor (average/peak power) 20 to 3800 MHz	JD736B
<b>Accessory - RF Adapters (Connector &amp; Adapters)</b>	
Adapter Type-N(m) to DIN(f), DC to 7.5 GHz, 50 ohm	G700050571
Adapter DIN(m) to DIN(m), DC to 7.5 GHz, 50 ohm	G700050572
Adapter Type-N(m) to SMA(f) DC to 18 GHz, 50 ohm	G700050573
Adapter Type-N(m) to BNC(f), DC to 4 GHz, 50 ohm	G700050574
Adapter Type-N(f) to Type-N(f), DC to 18 GHz 50 ohm	G700050575
Adapter Type-N(m) to DIN(m), DC to 7.5 GHz, 50 ohm	G700050576
Adapter Type-N(f) to DIN(f), DC to 7.5 GHz, 50 ohm	G700050577
Adapter Type-N(f) to DIN(m), DC to 7.5 GHz, 50 ohm	G700050578
Adapter DIN(f) to DIN(f), DC to 7.5 GHz, 50 ohm	G700050579
Adapter Type-N(m) to Type-N(m), DC to 11 GHz 50 ohm	G700050580
Adapter N(m) to QMA(f), DC to 6.0 GHz, 50 ohm	G700050581
Adapter N(m) to QMA(m), DC to 6.0 GHz, 50 ohm	G700050582
Adapter N(m) to 4.1/9.5 MINI DIN (f), DC to 6.0 GHz, 50 ohm	G700050583
Adapter N(m) to 4.1/9.5 MINI DIN (m), DC to 6.0 GHz, 50 ohm	G700050584
Adapter N(m) to 4.3-10 (f), DC to 6.0 GHz, 50 ohm	G700050585
Adapter N(m) to 4.3-10 (m), DC to 6.0 GHz, 50 ohm	G700050586
Adapter Type-N(m) to DIN(f), DC to 4 GHz, 50 ohm	G710050571
Adapter N(f) to N(f), DC to 4 GHz, 50 ohm	G710050575
Adapter Type-N(f) to DIN(f), DC to 4 GHz, 50 ohm	G710050577
Adapter Type-N(f) to DIN(m), DC to 7 GHz, 50 ohm	G710050578

Description	Part Number
<b>Accessory - RF Miscellaneous (General)</b>	
Attenuator 40 dB, 100 W, DC to 4 GHz (unidirectional)	G710050581
RF directional coupler, 700 to 4000 MHz, 30 dB, 50 W Input/output; Type-N(m) to Type-N(f), tap off; Type-N(f)	G710050585
RF combiner, 700 to 4000 MHz, Type-N(f) to Type-N(m)	G710050586
4x1 RF combiner, 700 to 4000 MHz, Type-N(f) to Type-N(m)	G710050587
Bandpass filter 696 MHz to 716 MHz, N(m) to N(f), 50 ohm	G700050601
Bandpass filter 776 MHz to 788 MHz, N(m) to N(f), 50 ohm	G700050602
Bandpass filter 806 MHz to 849 MHz, N(m) to N(f), 50 ohm	G700050603
Bandpass filter 1710 MHz to 1755 MHz, N(m) to N(f), 50 ohm	G700050604
Bandpass filter 1850 MHz to 1910 MHz, N(m) to N(f), 50 ohm	G700050605
<b>Accessory - General</b>	
USB Bluetooth dongle and dipole antenna 5 dBi	JD70050006
GPS antenna for JD740 and JD780 series	JD71050351
AntennaAdvisor handle	JD70050007
Cross LAN cable (6ft)	G700550335
USB A to B cable (1.8m)	GC73050515
> 1GB USB memory	GC72450518
Stylus pen	G710550316
<b>Accessory - Battery &amp; Chargers</b>	
Rechargeable lithium ion battery	G710550325
JD700B series AC/DC power adapter_90 W_15 V	JD70050326
Automotive cigarette lighter/12V DC adapter	G710550323
External battery charger	G710550324
<b>Accessory - Manual &amp; Documentation</b>	
JD700B series user's guide - printed version	JD700B362
<b>Accessory - Carrying Case</b>	
Soft carrying case	JD74050341
Hard carrying Case	JD71050342
Hard carrying case with wheels	JD70050342
CellAdvisor backpack carrying case	JD70050343
<b>Optional TAP</b>	
Optical nTAP, three-channel, 50 µm, MM, LC, 50/50 split ratio	TO3-M5-LC-55-K
Optical nTAP, three-channel, 9 µm, SM, LC, 50/50 split ratio	TO3-SM-LC-55-K

## Ordering Information (Continued)

Description	Part Number
<b>Optional SFP Transceiver</b>	
SFP 4G/2G/1G Fibre Channel & 1G Ethernet, 850nm, 150-500m, SX	CSFP-4G-8-1
SFP 4G/ 2G/ 1G Fibre Channel & 1G Ethernet, 1310nm, 5km, LX	CSFP-4G-3-1
SFP 4G/2G/1G Fibre Channel & 1G Ethernet, 1310nm, 20km, LX	CSFP-4G-3-2
SFP+ 8G/4G/2G Fibre Channel, 6G/4.9G CPRI 850 nm MM Multirate	CSFP-PLUS-8G-8-1
SFP+ 8G/4G/2G Fibre Channel, 6G/4.9G CPRI 1310nm SM, 10km	CSFP-PLUS-8G-3-1
SFP+ 1G/10G Ethernet, 1G/10G Fiber Channel & 9.8G CPRI, 850nm, MM, 300m	SFPPLUS-1GE-10GE-8-1
SFP+ 1G/10G Ethernet, 1G/10G Fiber Channel & 9.8G CPRI, 1310nm, SM, 10km	SFPPLUS-1GE-10GE-3-1
<b>Optical Power Meters and Fiber Microscope Kits</b>	
USB optical power meter with software, 2.5 and 1.25 mm interfaces, 30-inch USB extender, and carry- ing pouch	MP-60A
USB optical power meter — high power, with software, 2.5 and 1.25 mm interfaces, 30-inch USB extender, and carrying pouch	MP-80A
KIT: FBP-P5000i digital probe, FiberChekPRO software, case, and four tips	FBP-SD101
KIT: FBP-P5000i digital probe, FiberChekPRO software, case, and seven tips	FBP-MTS-101
KIT: FBP-P5000i digital probe, MP-60A USB power meter, FiberChekPRO software, case, tips, and adapters	FIT-SD103
KIT: FBP-P5000i digital probe, MP-60A USB power meter, FiberChekPRO software, case, tips, adapters, and cleaning materials	FIT-SD103-C
KIT: FBP-P5000i digital probe, MP-80A USB power meter, FiberChekPRO software, case, tips, and adapters	FIT-SD113

- Supplied accessories: User's Guide, USB Memory (1GB), Cross LAN Cable, USB Cable, DC car adapter, Li-Ion Battery, AC/DC adapter, Stylus Pen
- Highly recommended using the Calibration Kit (JD78050509, JD78050510, JD70050509)
- Highly recommended using the Calibration Kit (JD78050507, JD78050508) and Bias Tee (option 002)
- Requires option 001
- Needs for RFoFIBER options 060,061,062,063,064,065,068,070,071,072,073,081,082,083,084,086,091,092,096,101
- Needs Omni or Yagi antenna
- Highly recommended adding option 010
- Includes a Bluetooth USB dongles with 5 dBi dipole antennas (JD70050006)
- Requires option 013 and option 028 and Needs TrueSite(FTA)
- Requires option 013 and option 029 and Needs TrueSite(FTA)
- Includes a Wi-Fi USB dongle (JD70050008)
- Requires option 020
- Highly recommended using the RF Directional Coupler (G710050585) or RF combiner (G710050586)
- Requires option 028
- Highly recommended using the 4x1 RF combiner (G710050587)
- Requires option 029
- Requires option 030
- Requires option 031
- Requires option 010
- Requires G700050380
- Requires option 008
- Needs proper SFP/SFP+ Transceiver and Optical Tap or Thur mode fiber cable (G700050401 or G700050402)
- Requires at least one of RFoCPRI Interference Analyzer options (option 060 to 065), needs each of the respective/corresponding Interference Analyzer line rate
- Requires option 081
- Requires option 082
- Requires at least one of RFoOBSAI Interference Analyzer options (option 070 to 073), needs each of the respective/corresponding Interference Analyzer line rate



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