

# VIAVI

## CellAdvisor™

### JD748B Signal Analyzer Specifications

#### Spectrum Analyzer (Standard)

Frequency		
Frequency range	100 kHz to 4 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 4 GHz	
Resolution	1 Hz	
Resolution Bandwidth (RBW)		
-3 dB bandwidth	1 Hz to 3 MHz	1-3-10 sequence
Accuracy	±10% (nominal)	
Video Bandwidth (VBW)		
-3 dB bandwidth	1 Hz to 3 MHz	1-3-10 sequence
Accuracy	±10% (nominal)	
Single Sideband (SSB) Phase Noise		
Fc 1 GHz, RBW 10 kHz, VBW 1 kHz, RMS detector		
Carrier Offset		
30 kHz	< -90 dBc/Hz (typical)	
100 kHz	< -95 dBc/Hz (typical)	
1 MHz	< -102 dBc/Hz (typical)	
Measurement Range		
DANL to +20 dBm		
Input attenuator range	0 to 50 dB, 5 dB steps	
Maximum Input Level		
Average continuous power	+20 dBm	
DC voltage	±50 V DC	



#### Spectrum Analyzer: 100 kHz to 4 GHz Power Meter: 10 MHz to 4 GHz Specification\* Conditions

JD748B 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

<b>Displayed Average Noise Level (DANL)</b>	
1 Hz RBW, 1 Hz VBW, 50 $\Omega$ termination, 0 dB attenuation, RMS detector	
<b>Preamplifier Off</b>	
10 MHz to 2.3 GHz	-140 dBm (-146 dBm, typical)
>2.3 GHz to 3 GHz	-138 dBm (-144 dBm, typical)
>3 GHz to 4 GHz	-135 dBm (-140 dBm, typical)
<b>Preamplifier On</b>	
10 MHz to 2.3 GHz	-155 dBm (-160 dBm, typical)
>2.3 GHz to 3 GHz	-153 dBm (-158 dBm, typical)
>3 GHz to 4 GHz	-150 dBm (-156 dBm, typical)
<b>Display Range</b>	
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, trace math
<b>Total Absolute Amplitude Accuracy</b>	
Preamplifier off, power level >-50 dBm, auto-coupled (20 to 30°C)	
5 MHz to 4 GHz	$\pm 1.25$ dB, $\pm 0.5$ dB (typical)      Attenuation <40 dB
	$\pm 1.55$ dB, $\pm 1.0$ dB (typical)      Attenuation $\geq 40$ dB
<b>Reference Level</b>	
Setting range	-120 to +100 dBm
<b>Setting Resolution</b>	
Log scale	0.1 dB
Linear scale	1% of reference level
<b>Markers</b>	
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, always peak on/off
<b>RF Input VSWR</b>	
20 MHz to 4 GHz	1.5:1 (typical)
<b>Second Harmonic Distortion</b>	
Mixer level	-25 dBm
10 MHz to 1.3 GHz	<-65 dBc (typical)
>1.3 GHz to 4 GHz	<-70 dBc (typical)
<b>Third-Order Inter-Modulation (third-order intercept: TOI)</b>	
200 MHz to 2 GHz	+10 dBm (typical)
>2 GHz to 4 GHz	+12 dBm (typical)

<b>Spurious</b>	
Inherent residual response Input terminated, 0 dB attenuation, preamplifier off, RBW at 10 kHz, Sweep mode	
20 MHz to 3 GHz	-90 dBm (nominal)
>3 GHz to 4 GHz	-85 dBm (nominal)
Exceptions	< -70 dBm at 85.6MHz/ 227.88/ 770.4/ 1791.8/ 2647.8/ 2927.3/ 3195.2/ 3915.1/ 3640 MHz
Input-related spurious	<-67 dBc (nominal)
<b>Dynamic Range</b>	
2/3 (TOI-DANL) in 1 Hz RBW	>95 dB
<b>Sweep Time</b>	
Range	80 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
<b>Gated Sweep</b>	
Trigger source	External, video, and GPS
Gate length	1 $\mu$ s to 100 ms
Gate delay	0 to 100 ms
<b>Trigger</b>	
Trigger source	Free run, video, external
<b>Trigger Delay</b>	
Range	0 to 200 s
Resolution	6 $\mu$ s
<b>Measurements*</b>	
Channel power	
Occupied bandwidth	
Spectrum emission mask	
Adjacent channel power	
Spurious emissions	
Field strength	
AM/FM audio demodulation	
Route map	
PIM detection	
Dual spectrum	

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

## 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 4 GHz		
Span	1 kHz to 100 MHz		
Dynamic range	-120 to +20 dBm		
Maximum power	+20 dBm		
Accuracy	Same as spectrum analyzer		
External RF Power Sensors			
Directional	JD731B	JD733A	
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	$\pm(4\% \text{ of reading} + 0.05 \text{ W})^{1,2}$		
Terminating	JD732B	JD734B	JD736B
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	$\pm 7\%^1$		

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

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

2. Forward power

## 2-Port Transmission Measurements (Option 001)

Frequency	
Frequency range	5 MHz to 4 GHz
Frequency resolution	10 kHz
Transmission uncertainty	
Output Power	
High	0 dBm (typical)
Low	-30 dBm (typical)
Dynamic Range	
Scalar	5 MHz to 4 GHz, >100 dB
Measurements	
Insertion Loss/Gain	
Range	-120 to 100 dB
Resolution	0.01 dB

## CW Signal Generator (003 and 007)

Frequency	
Frequency range	25 MHz to 4 GHz
Frequency reference	±25 ppm Maximum
Frequency resolution	10 kHz
Output Power	
Range	0 dBm, -30 to -80 dBm
Step	1 dB
Accuracy	±1.5 dB, (0 dBm, -30 to -70 dBm) ± 2.5 dB (-70 to -80 dBm) (15 to 35°C)

## GPS Receiver and Antenna (Option 010)

GPS Indicator	
Latitude, longitude, altitude	
High-Frequency Accuracy	
Spectrum, interference, and signal analyzer	
GPS lock	±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	
10 MHz to 4 GHz	
Measurement Range	
-110 to +20 dBm	
Measurements	
Channel scanner	1 to 20 channels
Frequency scanner	1 to 20 frequencies
Custom scanner	1 to 20 channels or frequencies

## 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 +20 dBm				
Burst power	±1.0 dB				
Frequency error	±10 Hz + reference-frequency 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>	Reference power	Frame average power	I/Q origin offset*	Occupied bandwidth	EVM RMS*
Channel power	Peak level at defined range	Burst power (Slot 0 to 7)	TSC	Spectrum emission mask	EVM Peak*
Spectral density	<b>Spurious Emissions</b>	TSC (Slot 0 to 7)	BSIC	Spurious emission mask	I/Q origin offset
Peak to average power	Peak frequency at defined range	<b>Constellation</b>	C/I*	Burst power	C/I*
<b>Occupied Bandwidth</b>	Peak level at defined range	Burst power	EVM RMS*	PvsT – Mask	
Occupied bandwidth	<b>Power vs. Time (slot)</b>	Modulation type	EVM Peak*	Frame average power	
Integrated power	Burst power	Frequency error	EVM 95th*	Frequency error	
Occupied power	Max/min point	Phase error RMS	<b>Auto Measure</b>	Phase error RMS	
<b>Spectrum Emission mask</b>	<b>Power vs. Time (frame)</b>	Phase error peak	Channel power	Phase error peak	
Option 042					
<b>Channel/Frequency Scanner</b>	Group (traffic, control)	(10 strongest)	<b>Modulation Analyzer</b>	Frame average power	Burst power
Channels or frequencies	BSIC (NCC, BCC)	Frame average power	Frame avg power trend	BSIC, frame no. and time	Modulation type
Absolute power	<b>Multipath Profile</b>	SNR, delay	C/I trend	C/I, frequency error	

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 +20 dBm	
RF channel power accuracy	±1.0 dB, ±0.7 dB (typical)	
Occupied bandwidth accuracy	±100 kHz	
Adjacent channel leakage ratio (ACLR)	< -56 dB, ±0.7 dB at 5 MHz offset, < -58 dB, ±0.8 dB at 10 MHz offset	
WCDMA modulation	QPSK	
HSPA+ modulations	QPSK, 16 QAM, 64 QAM	
Frequency error	±10 Hz + reference-frequency 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

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

Measurements					
Option 043					
<b>Channel Scanner (up to 6)</b>	Scramble code	Abs/Rel code power	Max, avg inactive power	Amplifier capacity	CPICH power, Ec/Io
Frequencies or channels	Ec/Io, CPICH power, delay	Individual code EVM	Frequency error	Peak amplifier capacity	
Channel power, scramble code, CPICH power, Ec/Io	<b>Multipath Profile</b>	Channel power	Time offset, Rho	Average amplifier capacity	
<b>Scramble Scanner (up to 6)</b>	Channel, multipath power	Scramble code	Carrier feed-through	Code, peak utilization	
Channel power	Ec/Io, delay	CPICH, P-CCPCH, S-CCPCH, PICH, P-SCH, S-SCH	(Composite) EVM	Average utilization	
CPICH dominance	<b>Code Domain Power</b>	Max, avg active power	CPICH EVM, P-CCPCH EVM	<b>Route Map</b>	

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 +20 dBm				
RF channel power accuracy	±1.0 dB (typical)				
CDMA compatibility	cdmaOne and cdma2000				
Frequency error	±10 Hz + ref freq accuracy	99% confidence level			
Rho accuracy	±0.005	0.9 < Rho < 1.0			
Residual Rho	>0.995 (typical)				
PN offset	1 x 64 chips				
Code domain power	±0.5 dB relative power ±1.5 dB absolute power	Code channel power > -25 dB Code channel power > -25 dB			
Pilot power accuracy	±1.0 dB (typical)				
Time offset	±1.0 μs, ±0.5 μs (typical)	External trigger			
Measurements					
Option 020					
<b>Channel Power</b>	<b>ACPR</b>	Peak level at defined range	Channel power	Reference power	Rho
Channel power	Reference power	<b>Constellation</b>	Power bar graph (Abs/Rel)	Code utilization	Frequency error
Spectral density	Abs power at defined range	Pilot power	Pilot, Paging, Sync, Q-Paging	Code, spreading factor	Time offset
Peak to average power	Rel power at defined range	Rho	Max, avg active power	Allocation (channel type)	Carrier feed-through
<b>Occupied Bandwidth</b>	<b>Multi-ACPR</b>	EVM	Max, avg inactive power	Relative, absolute power	Pilot power
Occupied bandwidth	Lowest reference power	Frequency error	PN offset	<b>Auto Measure</b>	Max inactive power
Integrated power	Highest reference power	Time offset	<b>Codogram</b>	Channel power	PN offset
Occupied power	Abs power at defined range	Carrier feed-through	Code utilization	Occupied bandwidth	<b>Power Statistics CCDF</b>
<b>Spectrum Emission Mask</b>	Rel power at defined range	PN offset	<b>RCSI</b>	Spectrum emission mask	
Reference power	<b>Spurious Emissions</b>	<b>Code Domain Power</b>	Pilot, Paging, Sync, Q-Paging	ACPR	
Peak level at defined range	Peak freq at defined range	Abs/Rel code power	<b>CDP Table</b>	Multi-ACPR	
Option 040					
<b>Channel Scanner (up to 6)</b>	Pilot dominance	Ec/Io, delay	Max, avg active power	Peak amplifier capacity	Ec/Io
Frequencies or channels	PN offset	<b>Code Domain Power</b>	Max, avg inactive power	Average amplifier capacity	
Channel power, PN offset	Ec/Io, pilot power, delay	Abs/Rel code power	Frequency error	Code utilization	
Pilot power, Ec/Io	<b>Multipath Profile</b>	Channel power	Time offset, Rho, EVM	Average utilization	
<b>PN Scanner (up to 6)</b>	Channel power	PN offset	Carrier feed-through	<b>Route Map</b>	
Channel power	Multipath power	Pilot, Paging, Sync, Q-Paging power	Amplifier capacity	Pilot 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 +20 dBm				
RF channel power accuracy	±1.0 dB (typical)				
EV-DO compatibility	Rev 0, Rev A and Rev B				
Frequency error	±10 Hz + ref freq accuracy	99% confidence level			
Rho accuracy	±0.005	0.9 < Rho < 1.0			
Residual Rho	>0.995 (typical)				
PN offset	1 x 64 chips				
Code domain power	±0.5 dB relative power ±1.5 dB absolute power	Code channel power >-25 dB Code channel power >-25 dB			
Pilot power accuracy	±1.0 dB (typical)				
Time offset	±1.0 µs, ±0.5 µs (typical)	External trigger			
Measurements					
Option 021					
<b>Channel Power</b>	<b>Multi-ACPR</b>	Rho, EVM, Peak CDE	<b>Code Domain Power (pilot and MAC 64/128)</b>	<b>MAC Codogram</b>	ACPR
Channel power	Lowest reference power	Frequency error	Pilot/MAC channel power	Code utilization	Pilot, MAC, data power
Spectral density	Highest reference power	Time offset	Slot average power	<b>RCSI</b>	On/off ratio
Peak to average power	Abs power at defined range	Carrier feed-through	Max active I/Q power	Slot, pilot, MAC, data	PvsT mask (idle slot) or PvsT mask (active slot)
<b>Occupied Bandwidth</b>	Rel power at defined range	PN offset	Avg active I/Q power	<b>MAC CDP table</b>	Frequency error
Occupied bandwidth	<b>Spurious Emissions</b>	Pilot, MAC, data power	Max inactive I/Q power	Reference power	Time offset
Integrated power	Peak frequency at defined range	Pilot, MAC, data EVM	Avg inactive I/Q power	Code utilization	Carrier feed-through
Occupied power	Peak level at defined range	<b>Constellation (pilot, MAC 64/128, and data)</b>	PN offset	Code, spreading factor	Pilot, MAC, data Rho
<b>Spectrum Emission Mask</b>	<b>Power vs. Time (idle and active slot)</b>	Channel power	<b>Code Domain Power (data)</b>	Allocation (channel type)	Max inactive I/Q power
Reference power	Slot average power	Rho, EVM, peak CDE	Data channel power	Relative, absolute power	PN offset
Peak level at defined range	On/off ratio	Frequency error	Slot average power	<b>Auto Measure</b>	<b>Power Statistics CCDF</b>
<b>ACPR</b>	Idle activity	Time offset	Max, avg active power	Channel power	
Reference power	Pilot, MAC, data power	Carrier feed-through	Max, avg inactive power	Occupied bandwidth	
Abs power at defined range	<b>Constellation (composite 64/128)</b>	PN offset	PN offset	Spectrum emission mask	
Option 041					
<b>Channel scanner (up to 6)</b>	Channel power	Channel power	PN offset	Time offset	Peak utilization
Frequencies or channels	Pilot dominance	Multipath power	Pilot, MAC, data power	Carrier feed-through	Average utilization
PN offset	PN offset	Ec/Io, delay	Pilot, MAC, data Rho	Max active I/Q power	<b>Route Map</b>
Pilot, MAC, data power	Ec/Io, pilot power, delay	<b>Code Domain Power</b>	(Composite) EVM	Avg active I/Q power	Pilot power
<b>PN Scanner (up to 6)</b>	<b>Multipath Profile</b>	Slot average power	Frequency error	Code utilization	Ec/Io

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			
Time error (Tau)	±1.0 μs (typical)	External trigger			
Spreading factor	Auto (DL, UL), 1, 2, 4, 8, 16				
Measurements					
Option 025					
<b>Channel Power</b>	<b>Multi-ACLR</b>	UpPTS power	Frequency error	Avg Active Code Power	Spectrum emission mask
Channel power	Lowest reference power	On/off slot ratio	I/Q origin offset	Ave Inactive Code Power	ACLR
Spectral density	Highest reference power	Slot PAR	Time offset	<b>Code Error</b>	Multi-ACLR
Peak to average power	Abs power at defined range	DwPTS code	<b>Midamble Power</b>	Abs/Rel code power (Bar Chart)	Slot power
<b>Occupied Bandwidth</b>	Rel power at defined range	<b>Power vs. Time (frame)</b>	Slot power	Constellation diagram for Individual code	DWPTS power
Occupied bandwidth	<b>Code Error</b>	Slot Power, Data Power (L), Midamble Power, Data Power (R), Time offset of all TS (from TS0 to TS7) and DwPTS, UpPTS	DwPTS power	Slot Power, DWPTS Power	UpPTS power
Integrated power	Code power and error	<b>Power vs. Time (mask)</b>	Midamble power (1 to 16)	No. of Active Code	On/Off Ratio
Occupied power	Individual code EVM and its constellation	Slot power	<b>Code Power</b>	Scramble Code	Frequency Error
<b>Spectrum Emission Mask</b>	Data format	On/off slot ratio	Abs/Rel code power (Bar Chart)	Max Active Code Power	EVM RMS
Reference power	<b>Spurious Emissions</b>	Off power	Constellation diagram for Individual code	Max Inactive Code Power	Peak CDE
Peak level at defined range	Peak frequency at defined range	<b>Timogram</b>	Slot Power, DWPTS Power	Avg Active Code Power	Max Inactive
<b>ACLR</b>	Peak level at defined range	<b>Constellation</b>	No. of Active Code	Ave Inactive Code Power	Spurious Emission
Reference power	<b>Power vs. Time (slot)</b>	Rho	Scramble Code	<b>Auto Measure</b>	
Abs power at defined range	Slot power	EVM RMS, EVM peak	Max Active Code Power	Channel Power	
Rel power at defined range	DwPTS power	Peak CDE	Max Inactive Code Power	Occupied bandwidth	
Option 045					
<b>Sync-DL ID Scanner (32)</b>	Pilot dominance	Pilot dominance	Pilot dominance	Pilot dominance	DwPTS Power
Scramble code group	<b>Sync-DL ID vs. Tau (up to 6)</b>	<b>Sync-DL ID Multipath</b>	<b>Sync-DL ID Analyzer</b>	EVM, frequency error	
Ec/Io, Tau	ID, power, Ec/Io, Tau	Ec/Io, Tau	DwPTS power, Ec/Io trend	Ec/Io, CINR	
DwPTS power	DwPTS power	DwPTS power	DwPTS power	<b>Route Map</b>	

Longitude, latitude, and satellite in all screens

## 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 +20 dBm				
Channel power accuracy	±1.0 dB (typical)				
Supported bandwidth	7 MHz, 8.75 MHz, and 10 MHz				
Frequency error	±10 Hz + reference-frequency accuracy	99% confidence level			
Residual EVM (RMS)	1.5% (typical)				
Measurements					
Option 026					
<b>Channel Power</b>	<b>Spurious Emissions</b>	<b>Constellation</b>	Max, min, avg power	<b>Auto Measure</b>	Spectral flatness
Channel power	Peak frequency at defined range	Channel power	<b>EVM vs. Subcarrier</b>	Channel power	Frequency error
Spectral density	Peak level at defined range	RCE RMS, RCE peak	RCE RMS, RCE peak	Occupied bandwidth	RCE RMS
Peak to average power	<b>Power vs. Time (frame)</b>	EVM RMS, EVM peak	EVM RMS, EVM peak	Spectrum emission mask	RCE peak
<b>Occupied Bandwidth</b>	Channel power	Frequency error	Segment ID, cell ID	Spurious emission mask	EVM RMS
Occupied bandwidth	Frame average power	Time offset	Preamble index	Preamble power	EVM peak
Integrated power	Preamble power	Segment ID, cell ID	<b>EVM vs. Symbol</b>	DL burst power	<b>Power Statistics CCDF</b>
Occupied power	DL burst power	Preamble index	RCE RMS, RCE peak	UL burst power	
<b>Spectrum Emission Mask</b>	UL burst power	<b>Spectral Flatness</b>	EVM RMS, EVM peak	Frame average power	
Reference power	I/Q origin offset	Average subcarrier power	Segment ID, cell ID	Time offset	
Peak level at defined range	Time offset	Subcarrier power variation	Preamble index	I/Q origin offset	
Option 046					
<b>Preamble Scanner (up to 6)</b>	Time offset	Relative power, delay	Preamble power	Preamble	Preamble power
Total preamble power	<b>Multipath Profile</b>	Preamble power trend	Frame avg power	Cell ID, sector ID	
Preamble, relative power	Total preamble power	<b>Preamble Power Trend</b>	Relative power	Time offset	
Cell ID, sector ID	Multipath power	Relative power trend	C/I	<b>Route Map</b>	

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 +20 dBm	
Channel power accuracy	±1.0 dB (typical)	
Supported bandwidths	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, and 20 MHz	
Frequency error	±10 Hz + reference-frequency accuracy	99% confidence level
Residual EVM (RMS)	2.0% (typical)	Data EVM

### Measurements

#### Option 028/030/032

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

#### Option 048

Channel Scanner (up to 6)	ID Scanner (up to 6)	Multipath Profile	Control channel table	PMCH subframe power*	Route Map
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		Datagram	RS-SINR
RSRP/RSRQ	Cell, group, sector ID	Ant 2 RS Ec/Io**, delay**	Relative power	Datagram	S-SS RSSI
RS-SINR	RSRP/RSRQ	Ant 3 RS Ec/Io**, delay**	EVM RSM, phase	Resource block power	P-SS/S-SS Power
Antenna port	RS-SINR/S-SS RSSI	<b>Control Channel</b>	Frequency error	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 +20 dBm				
Channel power accuracy	±1.0 dB (typical)				
Supported bandwidth	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, and 20 MHz				
Frequency error	±10 Hz + reference-frequency accuracy	99% confidence level			
Residual EVM (RMS)	2.0% (typical)	Data EVM			
Measurements					
Option 029/031/033					
<b>Channel Power</b>	<b>Spurious Emissions</b>	Data EVM peak	<b>Subframe</b>	Antenna 3 RS power and EVM**	PDSCH/Data* 64 QAM EVM
Channel power	Peak frequency at defined range	Frequency error	MBSFN*		PDSCH 256QAM EVM
Spectral density		Time error	Subframe summary table	Cell, group, sector ID	Data EVM RMS, peak
Peak to average power	Peak level at defined range	<b>Data Channel</b>	(P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS, MBSFN*, PDSCH/Data* QPSK, PDSCH/Data* 16 QAM, PDSCH/Data* 64 QAM, PDSCH 256QAM)	<b>Data Allocation Map</b>	RS, P-SS, S-SS EVM
<b>Occupied Bandwidth</b>	<b>Power vs. Time (frame)</b>	MBSFN*		Data allocation vs frame	RS, P-SS, S-SS power
Occupied bandwidth	Resource block power	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	Frequency, time error	<b>Auto Measure</b>	Subframe power
Reference power	Slot average power	(P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS, MBSFN*)	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* 64 QAM EVM	I/Q origin offset	Antenna 1 RS power and EVM	Time alignment error	Cell ID
Rel power at defined range	PDSCH 256QAM EVM	EVM RMS, EVM peak	Antenna 2 RS power and EVM**	MBSFN*	Frequency error
				PDSCH/Data* QPSK EVM	Time alignment error
	Data EVM RMS			PDSCH/Data* 16 QAM EVM	Antenna port
					<b>Power Statistics CCDF</b>
Option 049					
<b>Channel Scanner (up to 6)</b>	<b>ID Scanner (up to 6)</b>	<b>Multipath Profile</b>	<b>Control Channel</b>	EVM RSM, phase	<b>Route Map</b>
	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	Time alignment error	RS-SINR
Channel power	Cell, group, sector ID	Ant 2 RS Ec/Io**, delay**	(P-SS, S-SS, PBCH, PCFICH, RS 0, RS 1, RS 2**, RS 3**, MBSFN RS*)	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, Guard Band, and Standalone	
Input signal level	-40 to +25 dBm	
Channel power accuracy	±1.0 dB (typical)	
Supported bandwidths	180 kHz	
Anchor Carrier definition	PRBS Index or Frequency	
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		
RF Analysis		Modulation Analysis
<b>Channel Power</b>	<b>Spectrum Emission Mask</b>	<b>IQ Diagram</b>
Channel power	Reference Power	Constellation diagram, Modulation Format, Frequency error, IQ Origin offset, EVM RMS/Peak
Spectral density	Peak level at defined range	
Peak to average Power	<b>ACLR</b>	
<b>Occupied bandwidth</b>	Reference Power	<b>Channel Summary</b>
Occupied Bandwidth	Abs. power at defined range	EVM, Power (dBm), and Modulation type of: Frame (Subframe) Power, NPSS, NSSS, NPBCH, NPDSCH, NRS0 (NRS1), PCI
Integrated Power	Rel. power at defined range	
Occupied power	<b>Spurious Emission</b>	
	Peak frequency at defined range	
	Peak level at defined range	

## 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		
Option 050 and G700050380		
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, 065, and 066)

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
		10137.6 Mbps (20x)		Option 008 and 066
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 bits		
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
LOS	LOS	LOS	SDI	Interference ID
LOF	LOF	LOF	RAI	Sound Indicator
SDI	SDI	Optic RX level	dBm	Spectrogram
RAI	RAI	Protocol version	1 to 10	RSSI
Optic RX level	Optic RX level	C and M HDLC rate (kbps)	No HDLC, 240, 480, 960, 1920, 2400	Spectrum Replayer
<b>SFP Information</b>	<b>SFP Information</b>			Dual Spectrum
Wavelength	Wavelength	C and M Ethernet subchannel number	20 to 63	Dual Spectrogram
Vendor	Vendor			Quad Spectrum
Vendor PN	Vendor PN	Alarm Injection		PIM Detection
Vendor rev	Vendor rev	R-LOS	Single	Single carrier
Power level type	Power level type	R-LOF	Single	Multi carrier
Diagnostic byte	Diagnostic byte	Error Injection		PIM calculator
Nominal rate	Nominal rate	Code	Single/rate	
Min rate	Min rate	K30.7	Single/rate	
Max RX level	Max RX level	Error rate	1E-3 to 1E-9	
Max TX level	Max TX level			

## 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 bits			
Sample rate		960 KHz			
Mapping		$N_A=1, S=1, K=4, N_C=1$			
TX clock		Internal/External/Recovered			
Port type		Master/Slave			
Measurements					
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 RX level	dBm	<b>Interference analyzer</b>	
Optic RX level	Optic RX level	Port Type	Master	Spectrum	
SFP Information	SFP Information	Protocol Version	1 to 10	Sound indicator	
Wavelength	Wavelength	C&M HDLC rate (kbps)	No HDLC, 240, 480, 960, 1920, 2400	Interference ID	
Vendor	Vendor	C&M Ethernet Subchannel number	20 to 63	Spectrogram	
Vendor PN	Vendor PN	Word Sync Loss Event		RSSI	
Vendor rev	Vendor rev	Code Violation		Spectrum Replayer	
Power level type	Power level type	K30.7 words		Dual Spectrum	
Diagnostic byte	Diagnostic byte	Frame Sync Loss Events		Dual Spectrogram	
Nominal rate	Nominal rate	<b>Alarm Injection</b>		Quad Spectrum	
Min rate	Min rate	R-LOS	SDI	<b>PIM Detection</b>	
Max RX level	Max RX level	R-LOF	RAI	Single Carrier	
Max TX level	Max TX level			Multi Carrier	
				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 070	
		1536 Mbps (2x)	Option 071	
		3072 Mbps (4x)	Option 072	
		6144 Mbps (8x)	Option 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)		
Video Bandwidth (RBW)		Accuracy	±10% (nominal)	
		1 Hz to 100 KHz		
RP3 Type		Accuracy		
		±10% (nominal)		
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: 3MHz for downlink, 5MHz 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 (exclusive)		Spectrum
LOS	LOS	LOS		Interference ID
LOF	LOF	LOF		Sound Indicator
Code Violation	Code Violation	Optic RX level	dBm	Spectrogram
K30.7 words	K30.7 words	Optic TX level	dBm	RSSI
Optic RX level	Optic RX level	Port Type	Master	Spectrum Replayer
Optic TX level	Optic TX level	TX State	State machine	Dual Spectrum
Messages Address	Message Address	RX State	State machine	Dual Spectrogram
Message Counter	Message Counter	TX Address	RP3 Address (Hexadecimal)	Quad Spectrum
<b>SFP Information</b>	<b>SFP Information</b>	RX Address	RP3 Address (Hexadecimal)	<b>PIM Detection</b>
Wavelength	Wavelength	Word Sync Loss Event		Single Carrier
Vendor	Vendor	Code Violation		Multi Carrier
Vendor PN	Vendor PN	K30.7 words		PIM Calculator
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 61Gbps

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

General Parameters		
Optical interface	Dual SFP/SFP+ (supports all MSA compliant SFP modules)	
Link Rate	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	1 and 3	
Waveform	CW: Single Tone, Two Tones Waveform: E-TM1.1, E-TM1.2, E-TM2, E-TM3.1, E-TM3.2, E-TM3.3, Custom	
Bandwidth	5 MHz, 10MHz, 15MHz, 20MHz	
Sampling Frequency	N x 3.84MHz (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 (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)	
<b>CPRI Parameter</b>		
IQ Sample width	8 – 20 bits	
Mapping method	1 and 3	
Waveform	CW: Single Tone, Two Tones Waveform: E-TM1.1, E-TM1.2, E-TM2, E-TM3.1, E-TM3.2, E-TM3.3, Custom	
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>		
Line coding 8B/10B	Line coding 8B/10B	
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	
Waveform mapping	Carrier / TX Container /Map Position	
Mapping Method	1 and 3	
Waveform	CW, CW (two tone), LTE-FDD E-TM1.1, E-TM1.2, E-TM2, E-TM3.1, E-TM3.2, E-TM3.3, Custom	
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	
Measurement		
<b>PIM Analysis (Option 101)</b>		
Single Port Sweep mode	Multi Port Sweep Mode	Multi Port Wideband Mode
Possible PIM Order	Possible PIM Order	Flatness
Possible PIM Frequency	Possible PIM Frequency	Level Diff
PIM level	PIM level	Possible PIM
PIM Detection with Two CW Tones		PIM Detection with up to 8 LTE carriers (2 SFP ports x 4 carriers)

## 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	
CPRI Parameter		
Line coding 8B/10B	Line coding 8B/10B	
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	
Waveform mapping	Carrier / TX Container /Map Position	
Mapping Method	1 and 3	
Waveform	CW, CW (two tone), LTE-FDD E-TM1.1, E-TM1.2, E-TM2, E-TM3.1, E-TM3.2, E-TM3.3, Custom	
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	
Measurement		
<b>PIM Analysis (Option 101)</b>		
Single Port Sweep mode	Multi Port Sweep Mode	Multi Port Wideband Mode
Possible PIM Order	Possible PIM Order	Flatness
Possible PIM Frequency	Possible PIM Frequency	Level Diff
PIM level	PIM level	Possible PIM
PIM Detection with Two CW Tones		PIM Detection with up to 8 LTE carriers (2 SFP ports x 4 carriers)

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

### General Parameters

#### Optical Hardware (Option 008)

Interface	Two SFP/SFP+ ports (supports all MSA compliant SFP modules), One Ethernet port
-----------	--

#### OBSAI Parameter

Line coding	8B/10B
Line rates	768 Mbps (Option 070) 1536 Mbps (Option 071) 3072 Mbps (Option 072) 6144 Mbps (Option 073)

#### CPRI Parameter

RP3 Type	LTE
RP3 Address	Hexadecimal
Waveform	CW: Single Tone, Two Tones Waveform: E-TM1.1, E-TM1.2, E-TM2, E-TM3.1, E-TM3.2, E-TM3.3, Custom
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			
<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 (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)		
<b>Resolution Bandwidth (RBW)</b>			
-3 dB bandwidth	100kHz		
Accuracy	±10% (nominal)		
<b>CPRI Parameter</b>			
IQ Sample width	8 – 20bits		
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		
<b>Measurements: Option 008, 060, 061, 062, 063, 064, and 065</b>			
<b>Channel Power</b>	<b>Constellation</b>	<b>Subframe</b>	<b>Frame</b>
Channel power	MBSFN*	MBSFN*	MBSFN*
Spectral density	RS TX Power	Subframe Summary	Frame Summary
Peak to average power	PDSCH/Data* QPSK EVM	EVM, Abs. and Rel. Power	EVM, Abs. and Rel. Power
<b>Occupied bandwidth</b>	PDSCH/Data* 16QAM EVM	Subframe Power	Frame Average Power
Occupied Bandwidth	PDSCH/Data* 64QAM EVM	OFDM Symbol Power	OFDM Symbol Power
Integrated Power	Data EVM RMS, Peak	Frequency Error	Frequency Error
Occupied power	Frequency error	Time Error	IQ Origin Offset
<b>Power vs. Time (Frame)</b>	Time Error	Data EVM RMS, Peak	Data EVM RMS, Peak
Frame average power	<b>Control Channel</b>	RS EVM RMS, Peak	Control EVM RMS, Peak
Subframe power	Control Channel Summary	Cell, Group, Sector ID	Cell, Group, Sector ID
First Slot power	EVM, Rel or Abs power of each control channel	<b>Time Alignment Error</b>	<b>Data Allocation Map</b>
Second Slot power		Time alignment error trend	Data Allocation vs. Frame
Cell ID, I/Q origin offset	IQ Diagram	Time alignment error	Resource Block Power
Time offset	Modulation format	RS power difference	OFDM Symbol Power
<b>Power Statistics CCDF</b>	Frequency Error	Antenna 0 RS power, EVM	Data Utilization
Average Power	I/Q origin offset	Antenna 1 RS power, EVM	Data Allocation vs Subframe
Peak Power Crest Factor	Control EVM RMS, Peak	Cell, Group, Sector ID	Resource block power
	<b>Data Channel</b>		Data Utilization
	MBSFN*		
	Resource block power		
	I/Q diagram		
	RB power		
	Modulation format		
	I/Q origin offset		
	EVM RMS, Peak		

\* Longitude, latitude, and satellite in all screens

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

### General Parameters

#### Optical Hardware (Option 008)

Interface	Two SFP/SFP+ ports (supports all MSA compliant SFP modules), One Ethernet port
-----------	--

#### CPRI Parameter

Line coding	8B/10B
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)

-3 dB bandwidth	100kHz
Accuracy	±10% (nominal)

#### CPRI Parameter

IQ Sample width	8 – 20 bits
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	Subframe	Data Allocation Map
Channel power	MBSFN*	MBSFN*	Data Allocation vs. Frame
Spectral density	RS TX Power	Subframe Summary	Resource Block Power
Peak to average power	PDSCH/Data* QPSK EVM	EVM, Abs. and Rel. Power	OFDM Symbol Power
<b>Occupied bandwidth</b>	PDSCH/Data* 16QAM EVM	Subframe Power	Data Utilization
Occupied Bandwidth	PDSCH/Data* 64QAM EVM	OFDM Symbol Power	Data Allocation vs Subframe
Integrated Power	Data EVM RMS, Peak	Frequency Error	Resource block power
Occupied power	Frequency error	Time Error	Data Utilization
<b>Power vs. Time (Frame)</b>	Time Error	Data EVM RMS, Peak	<b>Power Statistics CCDF</b>
Frame average power	<b>Control Channel</b>	RS EVM RMS, Peak	Average Power
Subframe power	Control Channel Summary	Cell, Group, Sector ID	Peak Power Crest Factor
First Slot power	EVM, Rel or Abs power of each control channel	<b>Time Alignment Error</b>	
Second Slot power		Time alignment error trend	
Cell ID, I/Q origin offset	IQ Diagram	Time alignment error	
Time offset	Modulation format	RS power difference	
<b>Power vs. Time (Slot)</b>	Frequency Error	Antenna 0 RS power, EVM	
Slot average power	I/Q origin offset	Antenna 1 RS power, EVM	
Transient period length	Control EVM RMS, Peak	Cell, Group, Sector ID	
Off power	<b>Data Channel</b>		
	MBSFN*		
	Resource block power		
	I/Q diagram		
	RB power		
	Modulation format		
	I/Q origin offset		
	EVM RMS, Peak		

\* Longitude, latitude, and satellite in all screens

## RFoBSAI™ LTE-FDD Signal 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>CPRI 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	100kHz		
Accuracy	±10% (nominal)		
<b>OBSAI Parameter</b>			
RP3 type	LTE-FDD		
RP3 address	Hexadecimal		
TX clock	Internal/External/Recovered		
Port type	Master/Slave		
Bandwidth	5 MHz, 10 MHz, 15 MHz, 20 MHz		
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>Subframe</b>	<b>Frame</b>
Channel power	MBSFN*	MBSFN*	MBSFN*
Spectral density	RS TX Power	Subframe Summary	Frame Summary
Peak to average power	PDSCH/Data* QPSK EVM	EVM, Abs. and Rel. Power	EVM, Abs. and Rel. Power
<b>Occupied bandwidth</b>	PDSCH/Data* 16QAM EVM	Subframe Power	Frame Average Power
Occupied Bandwidth	PDSCH/Data* 64QAM EVM	OFDM Symbol Power	OFDM Symbol Power
Integrated Power	Data EVM RMS, Peak	Frequency Error	Frequency Error
Occupied power	Frequency error	Time Error	IQ Origin Offset
<b>Power vs. Time (Frame)</b>	Time Error	Data EVM RMS, Peak	Data EVM RMS, Peak
Frame average power	<b>Control Channel</b>	RS EVM RMS, Peak	Control EVM RMS, Peak
Subframe power	Control Channel Summary	Cell, Group, Sector ID	Cell, Group, Sector ID
First Slot power	EVM, Rel or Abs power of each control channel	<b>Time Alignment Error</b>	<b>Data Allocation Map</b>
Second Slot power		Time alignment error trend	Data Allocation vs. Frame
Cell ID, I/Q origin offset	IQ Diagram	Time alignment error	Resource Block Power
Time offset	Modulation format	RS power difference	OFDM Symbol Power
<b>Power Statistics CCDF</b>	Frequency Error	Antenna 0 RS power, EVM	Data Utilization
Average Power	I/Q origin offset	Antenna 1 RS power, EVM	Data Allocation vs Subframe
Peak Power Crest Factor	Control EVM RMS, Peak	Cell, Group, Sector ID	Resource block power
	<b>Data Channel</b>		Data Utilization
	MBSFN*		
	Resource block power		
	I/Q diagram		
	RB power		
	Modulation format		
	I/Q origin offset		
	EVM RMS, Peak		

\* Longitude, latitude, and satellite in all screens

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

General Parameters			
<b>Optical Hardware</b> (Option 008)			
Interface	Dual SFP/SFP+ (supports all MAS-compliant SFP modules)		
Max TX	4 Carriers/ SFP Port with Option 083 or 084, Dual port operation		
<b>CPRI parameter</b>			
Line Coding	8B/10B		
Line Rate	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)		
Sampling Rates (fs)	3.84 MHz, 7.68 MHz, 15.36 MHz, 23.04 MHz, 30.72MHz		
Channel Bandwidth	3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz,		
NV (NC*K-NA*s)	0		
IQ Sample width	4 – 20 bits		
Mapping Method	1 and 3		
TX Clock	Internal, External, Recovered		
Port Type	Master		
Measurements			
	Option 101	Option 101 and 081 (082)	Option 101 and 083 (084)
<b>Configuration Verification: Carrier Information</b>	<b>RET Information</b>	<b>Coverage Range</b>	<b>PIM Analysis-Single Port Sweep Mode</b>
RRH Description Carrier Information RRH Description	ALD Device Information Antenna Device Data Alarm Status	Spectrum, Downlink Power, Downlink VSWR, Uplink VSWR, Antenna Tilt	TX Power, Possible PIM Order, Possible PIM Frequency, PIM Level
<b>Configuration Verification: CPRI &amp; Active SW</b>	<b>Spectrum Clearance</b>		<b>PIM Analysis-Multi Port Sweep Mode</b>
CPRI State Active SW	Spectrum Spectrogram RSSI Dual Spectrum Dual Spectrogram		TX Power, Possible PIM Order, Possible PIM Frequency, PIM Level
<b>Configuration Verification: SFP Information</b>	<b>Link Status</b>		<b>PIM Analysis-Multi Port Wideband Mode</b>
RRH Description SFP Information	LOS, LOF, RAI, SDI, Optic RX Level, Optic TX Level Protocol Version, C&M HDLC Rate, C&M Eth Subchannel Number, Start-up Status, WSLE, CV, K30.7, FSLE		Spectrum, TX Power, Spectral Flatness
<b>Configuration Verification: RTD Information</b>			
RRH Description RTD Information			



## 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> Connector Impedance Damage level	Spectrum analyzer Type-N, female 50 $\Omega$ (nominal) >+40 dBm, $\pm$ 50 V DC (nominal)
<b>RF Out</b> Connector Impedance Damage level	Type-N, female 50 $\Omega$ (nominal) >+37 dBm, $\pm$ 50 V DC (nominal)
<b>External Trigger, GPS</b> Connector Impedance	SMA, female 50 $\Omega$ (nominal)
<b>External Ref</b> Connector Impedance Input frequency Input range	SMA, female 50 $\Omega$ (nominal) 10 MHz, 13 MHz, 15 MHz -5 to +5 dBm
<b>USB</b> USB host <sup>1</sup> USB client <sup>2</sup>	Type A, 1 port Type B, 1 port
<b>SFP Cage</b> Port 1 Port 2	RFoFiber (with option 008) 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
Display	
Type	Resistive touch screen
Size	8 inch, LED backlight, transfective LCD with anti-glare coating
Power	
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 at spectrum analyzer)
Charge time	3 hr (while not operating) 9 hr (while operating)
Charging temperature	0 to 45°C (32 to 104°F) $\leq$ 85% RH
Discharging temperature	-20 to 55°C (4 to 131°F) $\leq$ 85% RH
Storage temperature <sup>4</sup>	0 to 25°C (32 to 77°F)
Data Storage	
Internal	Maximum 512 MB
External <sup>5</sup>	Limited by size of USB flash drive

Environmental		
Operating Temperature		
AC power	0 to 40C (without derating on battery charging)	
	-10 to 55C (with derating on battery charging)	
Battery Operation	0 to 40C (without derating on battery operating time)	
	-10 to 55C (with derating on battery operating time)	
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)	
EMC		
IEC/EN 61326-1:2013 (complies with European EMC)		
CISPR11:2009 +A1:2010		
ESD		
IEC/EN 61000-4-2		
Size and Weight (standard configuration)		
Weight (with battery)	Standard	3.77 kg (8.31 lb)
	Full loaded	4.34 kg (9.57 lb)
Size (W x H x D)	295 x 195 x 82 mm	
Warranty		
3 years		
Calibration Cycle		
1 year		

1. Connects flash drive, power sensor, EZ-Cal kit, fiber microscope, EMF Antenna, and AntennaAdvisor Handle
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. Support USB 2.0 compatible memory devices. Support memory size up to 2GB (FAT formatted) and 32GB (FAT32 formatted). NTFS format is not supported.
6. With the battery pack removed

## Ordering Information

Description	Part Number
<b>Standard CellAdvisor RF Analyzer</b>	
RF analyzer includes: Spectrum analyzer 100 kHz to 4 GHz RF power meter 10 MHz to 4 GHz	JD748B <sup>1</sup>
<b>Options</b> NOTE: Upgrade options for the JD748B use the designation JD748BU before the respective last three-digit option number	
2 Port transmission measurements for JD748B <sup>2</sup>	JD748B001
CW signal generator for JD748B <sup>2</sup>	JD748B003
Signal Generator hardware for JD748B <sup>3</sup>	JD748B007
Optical hardware for JD748B <sup>4</sup>	JD748B008
20 MHz demodulation hardware for JD748B <sup>5</sup>	JD748B009
GPS receiver and antenna for JD748B	JD748B010
Interference analyzer for JD748B <sup>6,7</sup>	JD748B011
Channel scanner for JD748B	JD748B012
Bluetooth connectivity for JD748B <sup>8</sup>	JD748B013
LTE-FDD RAN performance indicator for JD748B <sup>9,10</sup>	JD748B014
LTE-TDD RAN performance indicator for JD748B <sup>10,11</sup>	JD748B015
Wi-Fi connectivity for JD748B <sup>12</sup>	JD748B016
cdmaOne/cdma2000 analyzer for JD748B <sup>10</sup>	JD748B020
EV-DO analyzer for JD748B <sup>10,13</sup>	JD748B021
GSM/GPRS/EDGE analyzer for JD748B <sup>10</sup>	JD748B022
WCDMA/HSPA+ analyzer for JD748B <sup>10</sup>	JD748B023
TD-SCDMA analyzer for JD748B <sup>10</sup>	JD748B025
Mobile WiMAX analyzer for JD748B <sup>10</sup>	JD748B026
LTE - FDD analyzer for JD748B <sup>10,14</sup>	JD748B028
LTE - TDD analyzer for JD748B <sup>10,14</sup>	JD748B029
LTE Advanced - FDD analyzer for JD748B <sup>10,15,16</sup>	JD748B030
LTE Advanced - TDD analyzer for JD748B <sup>10,16,17</sup>	JD748B031
LTE-FDD 256 QAM Demodulator for JD748B <sup>10,18</sup>	JD748B032
LTE-TDD 256 QAM Demodulator for JD748B <sup>10,19</sup>	JD748B033
NB-IoT Analyzer for JD748B <sup>15</sup>	JD748B034
cdmaOne/cdma2000 OTA analyzer for JD748B <sup>10,20</sup>	JD748B040
EV-DO OTA analyzer for JD748B <sup>10,20</sup>	JD748B041
GSM/GPRS/EDGE OTA analyzer for JD748B <sup>10,20</sup>	JD748B042
WCDMA/HSPA+ OTA analyzer for JD748B <sup>10,20</sup>	JD748B043
TD-SCDMA OTA analyzer for JD748B <sup>10,20</sup>	JD748B045
Mobile WiMAX OTA analyzer for JD748B <sup>10,20</sup>	JD748B046
LTE - FDD OTA analyzer for JD748B <sup>10,20</sup>	JD748B048
LTE - TDD OTA analyzer for JD748B <sup>10,20</sup>	JD748B049
EMF analyzer for JD748B <sup>21</sup>	JD748B050
RFoCPRI 614M & 1.2G interference analyzer for JD748B <sup>22,23</sup>	JD748B060
RFoCPRI 2.4G interference analyzer for JD748B <sup>22,23</sup>	JD748B061
RFoCPRI 3.1G interference analyzer for JD748B <sup>22,23</sup>	JD748B062
RFoCPRI 4.9G interference analyzer for JD748B <sup>22,23</sup>	JD748B063
RFoCPRI 6.1G interference analyzer for JD748B <sup>22,23</sup>	JD748B064
RFoCPRI 9.8G interference analyzer for JD748B <sup>22,23</sup>	JD748B065
RFoCPRI 10.1G interference analyzer for JD748B <sup>22,23</sup>	JD748B066
RFoCPRI GSM interference analyzer for JD748B <sup>22,23,24</sup>	JD748B068

Description	Part Number
RFoBSAI 768M Interference analyzer for JD748B <sup>22,23</sup>	JD748B070
RFoBSAI 1.5G interference analyzer for JD748B <sup>22,23</sup>	JD748B071
RFoBSAI 3.1G interference analyzer for JD748B <sup>22,23</sup>	JD748B072
RFoBSAI 6.1G interference analyzer for JD748B <sup>22,23</sup>	JD748B073
RFoCPRI LTE-FDD signal generator for JD748B <sup>22,23,24</sup>	JD748B081
RFoCPRI LTE-TDD signal generator for JD748B <sup>22,23,24</sup>	JD748B082
RFoCPRI LTE-FDD multi carrier signal generator for JD748B <sup>22,23,25</sup>	JD748B083
RFoCPRI LTE-TDD multi carrier signal generator for JD748B <sup>22,23,26</sup>	JD748B084
RFoBSAI LTE-FDD signal generator for JD748B <sup>22,23,27</sup>	JD748B086
RFoCPRI LTE-FDD signal analyzer for JD748B <sup>22,23,24</sup>	JD748B091
RFoCPRI LTE-TDD signal analyzer for JD748B <sup>22,23,24</sup>	JD748B092
RFoBSAI LTE-FDD signal analyzer for JD748B <sup>22,23,27</sup>	JD748B096
ALU BBU emulation for JD748B <sup>22,23</sup>	JD748B101
Reserved for VZW <sup>21, 22</sup>	JD740B102
CPRI Layer-2 BERT for JD748B <sup>22,23,24</sup>	JD748B110
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
LTE Advanced - TDD analyzer floating license for JD740B/JD780B	JD780B031-FL

## Ordering Information (Continued)

Description	Part Number
LTE-FDD 256 QAM Demodulator floating license for JD740B/JD780B	JD780B032-FL
LTE-TDD 256 QAM Demodulator floating license for JD740B/JD780B	JD780B033-FL
NB-IoT Analyzer floating license for JD740B/JD780B	JD780B034-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
RFoCPRI 10.1G interference analyzer floating license for JD740B/JD780B	JD780B066-FL
RFoCPRI GSM interference analyzer floating license for JD740B/JD780B	JD780B068-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
RFoCPRI LTE-FDD multi carrier signal generator floating license for JD740B/JD780B	JD780B083-FL

Description	Part Number
RFoCPRI LTE-TDD multi carrier signal generator floating license for JD740B/JD780B	JD780B084-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
RFoBSAI LTE-FDD signal analyzer floating license for JD740B/JD780B	JD780B096-FL
ALU BBU emulation floating license for JD740B/JD780B	JD780B101-FL
Layer-2 BERT floating license for JD740B/JD780B	JD780B110-FL

### Optional Accessories

#### 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
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

#### Accessory - RF Antennas (General)

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 Omni Antenna N(m), 2.4 GHz to 2.5 GHz, 4.5 dBi, and 5.150 GHz to 5.850 GHz, 7 dBi	G700050359
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

#### Accessory - RF Power Sensor (General)

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

## Ordering Information (Continued)

Description	Part Number
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 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
<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, 650 to 4000 MHz, Type-N(f) to Type-N(m)	G710050586
4x1 RF combiner, 650 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
Bandpass filter 703 MHz to 748 MHz, N(m) to N(f), 50 ohm	G700050606
Bandpass filter 832 MHz to 862 MHz, N(m) to N(f), 50 ohm	G700050607

Description	Part Number
Bandpass filter 880 MHz to 915 MHz, N(m) to N(f), 50 ohm	G700050608
Bandpass filter 1710 MHz to 1785 MHz, N(m) to N(f), 50 ohm	G700050609
Bandpass filter 1920 MHz to 1980 MHz, N(m) to N(f), 50 ohm	G700050610
Bandpass filter 2500 MHz to 2570 MHz, N(m) to N(f), 50 ohm	G700050611
<b>Accessory - General</b>	
2 port USB hub	G700050200
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
<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	CSFPPLUS-8G-8-1
SFP+ 8G/4G/2G Fibre Channel, 6G/4.9G CPRI 1310nm SM, 10km	CSFPPLUS-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

Description	Part Number
<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 carrying 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

1. Supplied accessories: User's Guide (soft copy), USB Memory, Cross LAN Cable, USB Cable, DC car adapter, Li-Ion Battery, AC/DC adapter, Stylus Pen
2. Requires option 007
3. Requires option 003
4. Needs for RfOFIBER options 060,061,062,063,064,065,066,068,070,071,072,073,081,082,083, 084,091,092,096,101
5. Needs for options 020, 021, 022, 023, 025, 026, 028, 029, 030, 031, 032, 033, 040, 041, 042, 043, 045, 046, 048, 049
6. Needs Omni or Yagi antenna
7. Highly recommended adding option 010
8. Includes a Bluetooth USB dongles with 5 dBi dipole antennas (JD70050006)
9. Requires option 013 and option 028 and Needs TrueSite(FTA)
10. Requires option 009
11. Requires option 013 and option 029 and Needs TrueSite(FTA)
12. Includes a Wi-Fi USB dongle (JD70050008)
13. Requires option 020
14. Highly recommended using the RF Directional Coupler (G710050585) or RF combiner (G710050586)
15. Requires option 028
16. Highly recommended using the 4x1 RF combiner (G710050587)
17. Requires option 029
18. Requires option 030
19. Requires option 031
20. Requires option 010
21. Requires G700050380
22. Requires option 008
23. Needs proper SFP/SFP+ Transceiver and Optical Tap or thur mode fiber cable (G700050401 or G700050402)
24. Requires at least one of RfOCPRI Interference Analyzer options (option 060 to 065), needs each of the respective/corresponding Interference Analyzer line rate
25. Requires option 081
26. Requires option 082
27. Requires at least one of RfOBSAI Interference Analyzer options (option 070 to 073), needs each of the respective/corresponding Interference Analyzer line rate



Contact Us **+1 844 GO VIAVI**  
(+1 844 468 4284)

To reach the VIAVI office nearest you,  
visit [viavisolutions.com/contact](http://viavisolutions.com/contact).

© 2019 VIAVI Solutions Inc.  
Product specifications and descriptions in this document are subject to change without notice.  
jd748bsaspec-ds-nsd-nse-ae  
30176036 905 0919