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FREECALL 1800 680 680

Data Sheet

VI.AVI

CellAdvisor 5G

5G analyzer CA5000 Specifications

VI.AVI CellAdvisor™ 5G is the ideal field portable solution to validate 5G radio access.



**Portable Real-Time Spectrum Analyzer:
FR1 (up to 6 GHz) and
FR2 (24 GHz to 40 GHz)**

**Support for 5G TF and 5G NR
Demodulation and Beamforming Analysis**

**Signal Analysis Bandwidth up to
100 MHz**

**Cable and antenna analysis up to
6 GHz***

RF source*

**OTDR test for fronthaul, DAS and
C-RAN*****

Specification** Conditions

- CA5000 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
 - Typical and nominal values are defined as:
 - Typical: performance statistics represented by 80% of production units
 - Nominal: a general, descriptive term or parameter

* Requires a CAA module. Refer to CAA06M Data Sheet

**All specifications are subject to change without notice

*** Requires OTDR Module. Refer to 4100-Series OTDR Modules and DWDM OTDR Module datasheets

Spectrum Analyzer (Standard)

Frequency and time specifications

Option		Frequency range
Option F001		FR1 Band: 9 kHz to 6 GHz
Option F002		FR1 and FR2 Bands: – FR1 Band: 9 kHz to 6 GHz – FR2 Band: 24 GHz to 40 GHz
Frequency reference		
Accuracy		± 0.05 ppm (0 to 50 °C (32 to 122 °F)) + aging
Accuracy which GPS		± 25 ppb GPS lock
		± 50 ppb Hold over (72 hours)
Aging		± 0.5 ppm/year
Frequency readout accuracy (start, stop, center, marker)		
\pm (readout frequency x frequency reference accuracy + RBW centering + 0.5 x horizontal resolution + 2 Hz)		
horizontal resolution = frequency span/trace #, RBW centering = 15% x RBW		
Frequency span		
Range		0 Hz (zero span), 9 kHz to max frequency of each band
Resolution		1 Hz
Accuracy		$\pm(2 \times \text{RBW centering} + \text{horizontal resolution})$
Sweep time readout		The time required to complete a sweep from start to finish, including tuning, data acquisition and process
Trace update		Nominal
	15 trace/sec	Span= 260 MHz RBW 100 kHz
Sweep time		Nominal
Range	0.4 ms to 1000 s 24 μ s to 200 s	zero span
Accuracy	± 2 %	zero span
Type	Continuous, Single	
Mode	Gated sweep (requires option S015), Normal, Fast	
Trigger		
Trigger source		Free run, Video, External
Trigger delay		Range: 0 to 200 s
		Resolution: 6 μ s
Resolution bandwidth (RBW)		Nominal
Range	1 Hz to 3 MHz	- 3 dB bandwidth 1-3-10 sequence
Accuracy	$\pm 10\%$	
Video bandwidth (VBW)		Nominal
Range	1 Hz to 3 MHz	- 3 dB bandwidth 1-3-10 sequence
Accuracy	$\pm 10\%$	

Amplitude accuracy and range specifications

Amplitude range		
Measurement range	FR1 Band: DANL to +25 dBm	
	FR2 Band: DANL to +15 dBm	
Input attenuator range	FR1 Band: 0 to 55 dB in 5 dB steps	
	FR2 Band: 0 to 50 dB in 5 dB steps	
Preamplifier		
Frequency range	FR1 Band: 10 MHz to 6 GHz	
	FR2 Band: 24 GHz to 40 GHz	
Gain	FR1 Band: 20 dB	
	FR2 Band: 20 dB	
Max RF input operating level		
	FR1 Band: +25 dBm, ± 50 VDC	Average CW power
	FR2 Band: +15 dBm, ± 50 VDC	Average CW power
Display range		
Log/Linear scale	10 divisions	
	1 to 20 dB/Division in 1 dB	
Scale units	dBm, dBV, dBmV, dB μ V, V, mV, W, mW	
Reference level		
Range	-120 to +100 dBm	
Resolution	Log scale: 0.1 dB	
	Linear scale: 1 % of reference level	
Trace		
Detectors	Normal, Positive peak, Negative peak, Sample, Average (RMS)	
Number of traces	6	
States	Clear/write, Maximum hold, Minimum hold, Capture, Load, Blank, Trace math, Trace info	
Functions	Time expired maximum hold and minimum hold, Trace math, Trace info	
Marker		
Type	Normal, Delta, Delta pair, Marker table	
Number of markers	6	
Functions	Noise marker	
Marker to ->	Peak, Next peak, Next peak right, Next peak left, Min search, Always peak Center, Start, Stop	
Audio beep	Tone change with signal strength	
Marker table	Display 6 markers	
Absolute amplitude accuracy		
Preamplifier off: input signal \geq -50 dBm, auto-coupled, 15-minute warm-up		
Preamplifier on: -90 dBm < input signal < -50 dBm, auto-coupled, 15-minute warm-up		
	FR1 Band: 1 MHz to 6 GHz ± 1.0 dB, ± 0.5 dB typical ± 2.0 dB, ± 1.2 dB typical	20 to 30°C (68 to 86°F)
		-10 to 55°C (14 to 131°F)
	FR2 Band: 24 GHz to 40 GHz ± 1.5 dB, ± 0.8 dB typical ± 3.3 dB, ± 1.5 dB typical	20 to 30°C (68 to 86°F)
		-10 to 55°C (14 to 131°F)
Input VSWR Nominal		
	FR1 Band: 1.8:1 @ 10 dB Attenuation	
	FR2 Band: 2.5:1	

Dynamic range specifications

Displayed average noise level (DANL)

1 Hz RBW, 1 Hz VBW, 50 Ω termination, 0 dB attenuation, RMS detector

Preamplifier off	FR1 Band: 10 MHz to 3.0 GHz -143 dBm, -146 dBm typical > 3.0 GHz to 4.5 GHz -140 dBm, -143 dBm typical > 4.5 GHz to 6.0 GHz -135 dBm, -138 dBm typical
	FR2 Band: 24 GHz to 25 GHz -128 dBm, -132 dBm typical > 25 GHz to 30 GHz -130 dBm, -135 dBm typical > 30 GHz to 40 GHz -125 dBm, -130 dBm typical
Preamplifier on	FR1 Band: 10 MHz to 3.0 GHz -160 dBm, -165 dBm typical Preamp 1 > 3.0 GHz to 6.0 GHz -155 dBm, -160 dBm typical Preamp 1 10 MHz to 3.0 GHz -163 dBm, -168 dBm typical Preamp 1 and 2 > 3.0 GHz to 6.0 GHz -161 dBm, -165 dBm typical Preamp 1 and 2
	FR2 Band: 24 GHz to 40 GHz -148 dBm, -153 dBm typical

Second harmonic distortion

	50 MHz to 4.5 GHz < -65 dBc, typical
	> 4.5 GHz to 6.0 GHz < -75 dBc, typical

Third-order inter-modulation (third-order intercept: TOI)

	FR1 Band: 10 MHz to 3.0 GHz +9 dBm typical > 3.0 GHz to 6.0 GHz +11 dBm typical
	FR2 Band: +12 dBm typical

Spur free dynamic range

2/3 (TOI-DANL) in 1 Hz RBW	FR1 Band: > 104 dB @ 2 GHz
	FR2 Band: > 95 dB @ 28 GHz

Spurious

Inherent residual response	Input terminated, 0 dB attenuation, Preamp off
	Sweep Tuned: 10 kHz RBW, 1 kHz VBW, RMS detector
	Real time: RBW: 30 kHz, VBW: 30 kHz, Peak mode, Span= 100 MHz
	FR1 Band: Sweep tuned: -95 dBm typical Real time: -75 dBm typical Exceptions: -62 dBm @ 5420 MHz Notice spurs: -77 dBm @ 1520 MHz, 2925 MHz -80 dBm @ 5635 MHz -87 dBm @ 1845 MHz, 3141 MHz 3500 MHz, 4495 MHz -89 dBm @ 2280 MHz

Dynamic range specifications continued

Spurious continued	
	FR2 Band: Sweep tuned: -80 dBm typical Real time: -70 dBm typical Notice spurs: -72 dBm @ 26.21 GHz -75 dBm @ 31.83 GHz
Input-related spurious	0 dB attenuation, Input signal= -25 dBm, Preamp off
	Sweep tuned: 10 kHz RBW, 1 kHz VBW, Peak detector, Span < 1 GHz
	Real time: 30 kHz RBW, 30 kHz VBW, Peak detector, Span= 100 MHz
	FR1 Band: Carrier offset > 5 MHz Sweep tuned: -70 dBc typical Notice spurs: Span > 9 MHz Spur freq (MHz) = $7 \times CF - 6 \times Rin - 11$ $1.083 \leq CF - Rin \leq 2.583$ Spur freq (MHz) = $4 \times Rin - 3 \times CF + 41.4$ $9.225 \leq CF - Rin \leq 11.475$ Real time: -55 dBc typical CF: Center freq (MHz) Rin: RF input freq (MHz)
	FR2 Band: Carrier offset > 5 MHz Sweep tuned: -60 dBc typical Real time: -50 dBc typical
LO feedthrough to input	FR1 Band: < -85 dBm
	FR2 Band: < -47 dBm
Single sideband (SSB) phase noise	
	FR1 Band @ 1 GHz -98 dBc/Hz, -103 dBc/Hz typical @ 10 kHz offset -105 dBc/Hz, -110 dBc/Hz typical @ 100 kHz offset -120 dBc/Hz, -125 dBc/Hz typical @ 1 MHz offset
	FR2 Band @ 25 GHz -90 dBc/Hz, -95 dBc/Hz typical @ 10 kHz offset -90 dBc/Hz, -95 dBc/Hz typical @ 100 kHz offset -110 dBc/Hz, -115 dBc/Hz typical @ 1 MHz offset

Measurements

Channel power	Channel power
	Spectral density
	PAR (Peak to average ratio)
Occupied bandwidth	Occupied bandwidth
	Integrated power
	Occupied power
	x dB bandwidth
Spectrum emission mask	Reference power
	Peak level at defined range
	Reference power
	Peak level at defined range
Adjacent channel power (ACP)	Reference power
	Absolute power at defined frequency offset
	Relative power at defined frequency offset
Multi-ACP (Adjacent channel power)	Reference power at lowest defined frequency
	Reference power at highest defined frequency
	Absolute power at defined frequency offset
	Relative power at defined frequency offset
Spurious emissions	Peak power at defined range
	Frequency of peak power at defined range
Total harmonic distortion	Power level at each harmonic
	% of THD
Field strength	Field strength power at markers

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, μ, p)
Internal RF power sensor	
Frequency range	FR1 Band: 10 MHz to 6 GHz
	FR2 Band: 24 GHz to 40 GHz
Span	1 kHz to 100 MHz
Dynamic range	FR1 Band: -120 to +25 dBm
	FR2 Band: -120 to +15 dBm
Maximum power	FR1 Band: +25 dBm
	FR2 Band: +15 dBm
Accuracy	Same as spectrum analyzer

External RF Power Sensor (Standard, requires external RF power sensor)

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, μ, p)		
Directional power sensor			
Model	JD731B	JD733A	
Frequency range	300 MHz to 3.8 GHz	150 MHz to 3.5 GHz	
Dynamic range	Average: 0.15 to 150 W	Average: 0.1 to 50 W	
	Peak: 4 to 400 W	Peak: 0.1 to 50 W	
Measurement type	Forward/Reverse average power, Forward peak power, VSWR		
Accuracy	$\pm(4\% \text{ of reading} + 0.05 \text{ W})^{1,2}$		
Connector type	Type-N female on both ends		
Terminating power sensor			
Model	JD732B	JD734B	JD736B
Measurement type	Average	Peak	Average and Peak
Frequency range	20 MHz to 3.8 GHz		
Dynamic range	-30 to + 20 dBm		
Accuracy	$\pm 7\%$ ¹		
Connector type	Type-N female		

¹CW condition at 15 to 35 °C (59 to 95 °F)

²Forward power

GPS Connectivity with Antenna (Option S002)

GPS receiver type	
Built-in type	
GPS time and location	
GPS information	Latitude, Longitude, Satellite, Status, GPS Engine, Satellite view, ID, and C/N
GPS time and location	Time, Latitude, and Longitude on display Time, Latitude, and Longitude on trace
High-frequency accuracy	
GPS lock	±25 ppb
Hold over for 3 days	±50 ppb (0 to 50 °C (32 to 122 °F)) 15 minutes after satellite locked
Connector	SMA, female
Supplied antenna	SMA (m), 3.3 VDC or 5 VDC

Bluetooth Connectivity (Option S003)

Interface type	Build-in type
Mode	File transfer profile (FTP)

Wi-Fi Connectivity (Option S004)

Interface type	Build-in type
Interface standard	IEEE 802.11 b/g/n
Wireless mode	Infrastructure mode
Internet protocol version	IPv4, IPv6

Real Time Spectrum Analyzer (Option S010 and S011)

Frequency range	
Option F001	FR1 Band: 9 kHz to 6 GHz
Option F002	FR1 and FR2 Bands: –FR1 Band: 9 kHz to 6 GHz –FR2 Band: 24 GHz to 40 GHz
Frequency span	
Option S010	50 MHz real time
Option S011	100 MHz real time 100 MHz step sequence
Acquisition	
IF bandwidth	50 MHz or 100 MHz
Resolution bandwidth	30 kHz to 3 MHz 1-3-10 sequence
A/D converter	245.76 Msps, 16 bits
FFT lengths	8192
Maximum acquisition time	1000 ms
Minimum IQ resolution	8.138 ns
Probability of intercept (POI)	125 µs Span: 100 MHz

Real Time Spectrum Analyzer (Option S010 and S011) continued

Spectrum display	
Trace detectors	Normal, Positive peak, Negative peak, Sample, Average (RMS)
Number of traces	6
Trace states	Clear/write, Maximum hold, Minimum hold, Capture, Load, Blank
Marker type	Normal, Delta, Delta pair, Marker table
Number of markers	6
Marker to ->	Peak, Next peak, Next peak right, Next peak left, Min search, Always peak Center, Start, Stop
Audio beep	Tone change with signal strength
Marker table	Display 6 markers
Persistence spectrum display	
Spectrum processing rate	≤ Max 15,000/s
Bitmap resolution	201 x 801
Marker information	Frequency, Amplitude, Signal density
Dwell time per step	100 ms to 100 s
Trace processing	Color-graded bitmap, +Peak, -Peak, Average
Trace length	801
Marker type	Normal, Delta, Marker table
Number of markers	6
Marker to ->	Peak, Next peak, Next peak right, Next peak left, Min search, Always peak Center, Start, Stop
Audio beep	Tone change with signal strength
Marker table	Display 6 markers
Persistence spectrogram display	
Trace detection	+Peak, -Peak, Average (RMS)
Trace length, Memory depth	
Time resolution per line	100 ms to 1 s, user selectable

Interference Analyzer (S013)

Measurement	
Spectrum analyzer	Sound indicator, Interference ID, Spectrum recorder
Spectrogram	Collect up to 72 hours of data
RSSI	Collect up to 72 hours of data
Interference finder	
Radar chart	
Spectrum replayer	Playback recorded data using CA5000

Route Map (S014)

Mode	Spectrum analyzer	
Plot method	Time, Position, GPS	
Plot legend	Excellent, Very good, Good, Poor	User definable range
Map type	Outdoor (position information embedded)	Import maps using VIAVI Mapcreator
	Indoor (no position information embedded)	Import maps using VIAVI Mapcreator
Measurements	RSSI, ACP, Peak search	

Gated Sweep (S015)

Gated method	FFT
Gated delay range	0 to 100 ms
Gated length	1 us to 100 ms
Trigger source	External, Video and GPS

Channel Scanner (S016)

Frequency range	FR1 Band: 10 MHz to 6 GHz
	FR2 Band: 24 GHz to 40 GHz
Measurement range	FR1 Band: -110 to +25 dBm
	FR2 Band: -110 to +15 dBm
Measurements	Channel scanner: 1 to 20 channels
	Frequency scanner: 1 to 20 frequencies
	Customer scanner: 1 to 20 channels or frequencies

LTE/LTE-A FDD Signal Analyzer (S032)

General Parameters		
Frequency range	Band 1 to 14, 17 to 26	
Input signal level	10 MHz to 6 GHz: -75 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		
Channel Power	Constellation	
Channel power	MBSFN*	
Spectral density	RS power	
Peak to average ratio	PDSCH/Data* QPSK EVM	
Occupied Bandwidth	PDSCH/Data* 16 QAM EVM	
Occupied bandwidth	PDSCH/Data* 64 QAM EVM	
Integrated power	PDSCH/Data* 256 QAM EVM	
Occupied power	Data EVM RMS	
Spectrum Emission mask	Data EVM peak	
Reference power	Frequency error	
Peak level at defined range	Time Error	
ACLR	Data Channel	
Reference power	Physical Cell ID, Group ID, Sector ID	
Absolute power at defined range	MBSFN*	
Relative power at defined range	Resource block power	
Multi-ACLR	I-Q diagram	
Lowest reference power	Resource block power	
Highest reference power	Modulation power, IQ origin offset	
Absolute power at defined range	EVM RMS, EVM peak	
Relative power at defined range	Control Channel	
Spurious Emissions	Physical Cell ID, Group ID, Sector ID	
Peak frequency at defined range	MBSFN*	
Peak level at defined range	EVM, relative or absolute power, modulation type for P-SS, S-SS, PCFICH, PHICH, PDCCH, RS, MBSFN RS*	
Power vs. Time (frame)		
Frame average power	Each control channels'	
I-Q origin offset, Time Offset	IQ diagram, Modulation format, Frequency error, IQ origin offset, EVM RMS, EVM peak	
Subframe power		
First slot power	Subframe	
Second slot power	Physical Cell ID, Group ID, Sector ID	
Physical Cell ID, Group ID, Sector ID	MBSFN*	
	Subframe power	
	Channel summary table EVM, relative or absolute power, modulation type for P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS, MBSFN RS* Data QPSK, 16/64/256 QAM	
	Subframe summary OFDM symbol power, Frequency error, time error Data EVM RMS, data EVM peak, RS EVM RMS, RS EVM peak IQ Imbalance	

*Measurement is performed when MBMS is enabled

Measurements continued		
Frame	Carrier Aggregation	Control Channel
Physical Cell ID, Group ID, Sector ID	Component carriers: up to 5	Physical Cell ID, Group ID, Sector ID
MBSFN*	Subframe, P-SS, S-SS, PBCH, RS power	MBSFN*
Frame power	Data QPSK, 16/64/256 QAM power	RS/EVM power trend
Channel summary table EVM, relative or absolute power, modulation type for P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS, MBSFN RS* PBSCH/PMCH QPSK, 16/64/256 QAM	MBSFN RS power*	Control channel table Absolute power, EVM, phase for P-SS, S-SS, PBCH, PCFICH, RS0, RS1, RS2, RS3
Subframe summary OFDM symbol power, Frequency error, IQ-origin offset, Data EVM RMS, Data EVM peak EVM RMS, EVM peak	Subframe, P-SS, S-SS, PBCH, RS EVM	Frequency error
	Data QPSK, 16/64/256 QAM EVM	Time alignment error
	MBSFN RS EVM*	Time offset
	MBSFN*, Physical Cell ID	Datagram
	Frequency error, time alignment error	Datagram
	Antenna port	Resource block power
	Power Statistics CCDF	Data utilization
	Average power	Resource block allocation
	Max power	Route Map
	Crest factor	RSRP, RSRQ, RS-SINR, S-SS RSSI
	OTA Channel Scanner (up to 6)	P-SS,/S-SS power, S-SS Ec/Io
Time Alignment Error	Frequency or channels	
Time alignment error trend	Physical Cell ID, Group ID, Sector ID	
Time alignment error	Channel power, RSSI, RSRP, RSRQ	
RS power difference	RS-SINR, Antenna port	
Antenna 0 RS power, EVM, time difference	OTA ID Scanner (up to 6)	
Antenna 1 RS power, EVM, time difference	RSRP, RSRQ dominance	
Antenna 2 RS power, EVM, time difference	S-SS RSSI, S-SS Ec/Io dominance	
Antenna 3 RS power, EVM, time difference	Physical Cell ID, Group ID, Sector ID	
	RSRP, RSRQ, RS-SIN, S-SS RSSI, P-SS, S-SS, S-SS Ec/Io	
	Multipath Profile	
	Physical Cell ID, Group ID, Sector ID	
Data Allocation Map	Antenna 0 RS Ec/Io, delay	
Frame data utilization	Antenna 1 RS Ec/Io, delay	
OFDM symbol power	Antenna 2 RS Ec/Io, delay	
Data allocation vs frame	Antenna 3 RS Ec/Io, delay	
Subframe data utilization		
Resource block power		
Data allocation vs subframe		

LTE/LTE-A TDD Signal Analyzer (S033)

General Parameters		
Frequency range	Band 33 to 43	
Input signal level	10 MHz to 6 GHz: -75 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		
Channel Power	Constellation	
Channel power	MBSFN*	
Spectral density	RS power	
Peak to average ratio	PDSCH/Data* QPSK EVM	
Occupied Bandwidth	PDSCH/Data* 16 QAM EVM	
Occupied bandwidth	PDSCH/Data* 64 QAM EVM	
Integrated power	PDSCH/Data* 256 QAM EVM	
Occupied power	Data EVM RMS	
Spectrum Emission mask	Data EVM peak	
Reference power	Frequency error	
Peak level at defined range	Time error	
ACLR	Data Channel	
Reference power	Physical Cell ID, Group ID, Sector ID	
Absolute power at defined range	MBSFN*	
Relative power at defined range	Resource block power	
Multi-ACLR	I-Q diagram	
Lowest reference power	Resource block power	
Highest reference power	Modulation power, IQ origin offset	
Absolute power at defined range	EVM RMS, EVM peak	
Relative power at defined range	Control Channel	
Spurious Emissions	Physical Cell ID, Group ID, Sector ID	
Peak frequency at defined range	MBSFN*	
Peak level at defined range	EVM, relative or absolute power, modulation type for P-SS, S-SS, PCFICH, PHICH, PDCCH, RS, MBSFN RS*	
Power vs. Time (frame)	Each control channels'	
Frame average power	IQ diagram, Modulation format,	
I-Q origin offset, Time Offset	Frequency error, IQ origin offset,	
Subframe power	EVM RMS, EVM peak	
First slot power	Subframe	
Second slot power	Physical Cell ID, Group ID, Sector ID	
Physical Cell ID, Group ID, Sector ID	MBSFN*	
Power vs. Time (slot)	Subframe power	
Slot average power	Channel summary table	
Transition period length	EVM, relative or absolute power, modulation type for P-SS, S-SS,	
Off Power	PBCH, PCFICH, PHICH, PDCCH, RS, MBSFN RS*	
Physical Cell ID, Group ID, Sector ID	Data QPSK, 16/64/256 QAM	

*Measurement is performed when MBMS is enabled

Measurements continued	
Subframe summary OFDM symbol power, Frequency error, time error Data EVM RMS, data EVM peak, RS EVM RMS, RS EVM peak IQ Imbalance	Power Statistics CCDF Average power Max power Crest factor
Frame	OTA Channel Scanner (up to 6) Frequency or channels
Physical Cell ID, Group ID, Sector ID	Physical Cell ID, Group ID, Sector ID
MBSFN*	Channel power, RSSI, RSRP, RSRQ
Frame power	RS-SINR, Antenna port
Channel summary table EVM, relative or absolute power, modulation type for P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS, MBSFN RS* PBSCH/PMCH QPSK, 16/64/256 QAM	OTA ID Scanner (up to 6) RSRP, RSRQ dominance S-SS RSSI, S-SS Ec/Io dominance Physical Cell ID, Group ID, Sector ID RSRP, RSRQ, RS-SIN, S-SS RSSI, P-SS, S-SS, S-SS Ec/Io
Subframe summary OFDM symbol power, Frequency error, IQ-origin offset, Data EVM RMS, Data EVM peak EVM RMS, EVM peak	Multipath Profile Physical Cell ID, Group ID, Sector ID Antenna 0 RS Ec/Io, delay Antenna 1 RS Ec/Io, delay Antenna 2 RS Ec/Io, delay Antenna 3 RS Ec/Io, delay
Time Alignment Error	Control Channel
Time alignment error trend	Physical Cell ID, Group ID, Sector ID
Time alignment error	MBSFN*
RS power difference	RS/EVM power trend
Antenna 0 RS power, EVM, time difference	Control channel table Absolute power, EVM, phase for P-SS, S-SS, PBCH, PCFICH, RS0, RS1, RS2, RS3
Antenna 1 RS power, EVM, time difference	
Antenna 2 RS power, EVM, time difference	
Antenna 3 RS power, EVM, time difference	
Data Allocation Map	
Frame data utilization	Frequency error
OFDM symbol power	Time alignment error
Data allocation vs frame	Time offset
Subframe data utilization	Datagram
Resource block power	Datagram
Data allocation vs subframe	Resource block power
Carrier Aggregation	Data utilization
Component carriers: up to 5	Resource block allocation
Subframe, P-SS, S-SS, PBCH, RS power	Route Map
Data QPSK, 16/64/256 QAM power	RSRP, RSRQ, RS-SINR, S-SS RSSI
MBSFN RS power*	P-SS/S-SS power, S-SS Ec/Io
Subframe, P-SS, S-SS, PBCH, RS EVM	
Data QPSK, 16/64/256 QAM EVM	
MBSFN RS EVM*	
MBSFN*, Physical Cell ID	
Frequency error, time alignment error	
Antenna port	

*Measurement is performed when MBMS is enabled

5G TF Signal Analyzer (S040)

Frequency range	FR1 Band: 10 MHz to 6 GHz	
	FR2 Band: 24 GHz to 40 GHz	
Input signal level	FR1 Band: -75 to +25 dBm	
	FR2 Band: -75 to +15 dBm	
RX sensitivity	-110 dBm	PSS detection
Channel power accuracy	±1.0 dBm typical	
Supported bandwidth	100 MHz	
Frequency error	±100 Hz	99% confidence level
Residual EVM (RMS)	3.0% typical	
Carrier scanner	Carrier scanner bar up to 8 carriers	
	BRSRP	
	Channel power	
	Carrier scanner summary	
	Cell ID/Beam index	
	Carrier frequency	
	Channel power	
	Frequency error	
	xPBCH EVM	
Beam analyzer	Beam analyzer bar/summary up to 8 beams	
	Cell ID/Beam index	
	BRSRP	
	PSS-RSSI	
	BRS-SNR	
Route map	Cell ID/Beam index	
	BRSRP	
	PSS-RSSI	

5G NR Signal Analyzer (S041)

Frequency range	FR1 Band: 10 MHz to 6 GHz	
	FR2 Band: 24 GHz to 40 GHz	
Input signal level	FR1 Band: -75 to +25 dBm	
	FR2 Band: -75 to +15 dBm	
Rx sensitivity	-123 dBm	PSS (SCS 240 kHz)
	-118 dBm	PSS (SCS 120 kHz)
	-106 dBm	PSS (SCS 30 kHz)
	-100 dBm	PSS (SCS 15 kHz)
Channel power accuracy	±1.0 dBm typical	
Supported bandwidth	Up to 100 MHz	
Frequency error	±100 Hz	99% confidence level
Residual EVM (RMS)	2.0 % typical	Data EVM

5G NR Signal Analyzer (S041) continued

Measurements continued		
Channel power Channel power Spectral density Peak to average power	Power vs. time Frame average power Subframe power Slot average power Transient period length Off power level	Channel scanner (up to 8) Channel scanner bar SS-RSRP Channel power Channel scanner summary Cell ID Center frequency SS-RSRP/SS-RSRQ Channel power SS-RSRP SS-RSRQ
Occupied bandwidth Occupied bandwidth Integrated power Occupied power	Constellation PDSCH/Data QPSK EVM PDSCH/Data 16QAM EVM PDSCH/Data 64QAM EVM PDSCH/Data 256QAM EVM Data EVM RMS, Peak Frequency error	Beam scanner (up to 8) Beam scanner bar Cell ID/Beam index SS-RSRP SS-RSRQ PSS/SSS power
Spectrum emission Reference power Peak level at defined range		
ACLR Reference power Abs power at defined range Rel power at defined range		Beam scanner summary Cell, Group, Sector ID Beam index SS-RSRP SS-RSRQ PSS/SSS power
Multi-ACLR Lowest reference power Highest reference power Abs power at defined range Rel power at defined range		Route map SS-RSRP SS-RSRQ PSS power SSS Power
Spurious emissions Peak frequency at defined range Peak level at defined range		

RFoCPRI Interference Analyzer (Option S050, S051)

General Parameters		
Optical Interface	Dual SFP/SFP+ (supports all MSA compliant SFP modules)	Supported with CA5000-F001-O and CA5000-F002-O
Line rates	CPRI Rate 1 to 7	Option S050
	CPRI Rate 8	Option S051
Resolution Bandwidth (RBW)	- 3dB bandwidth	10 kHz to 100 kHz with 1-3 step 7.5kHz
	Accuracy	±10% (nominal)
Video Bandwidth (VBW)	- 3dB bandwidth	10 kHz to 100 kHz with 1-3 step 7.5kHz
	Accuracy	±10% (nominal)
CPRI Parameters	IQ Sample width	4 – 20 bits
	Mapping Method	1 and 3
	TX clock	Internal, External, Recovered
	Port Type	Master, Slave
	Sampling Frequency	N x 3.84 MHz, where N=1 to 8

RFoCPRI Interference Analyzer (Option S050, S051) continued

Measurements		
Link Status	LOS, LOF, SDI, RAI, Optic RX Level	Port 1 and Port 2
SFP Information	Wavelength, Vendor, Vendor PN, Vendor Rev, Power level type, Diagnostic byte, Nominal rate, Min rate, Max RX level, Max TX level	Port 1 and Port 2
Interference Analyzer	Spectrum	Single, Dual, and Quad Chart
	Spectrogram	Single and Dual spectrum Chart with 2-D and 3-D waterfall diagram
	Interference ID	
	Sound Indicator	
	PRB Table	
	Spectrum Replayer	
	IQ Activity Scan	

General Information

RF in		
Connector type	Option F001: Type-N, female	
	Option F002: 2.92 mm, male	
Impedance	50 Ω nominal	
Damage level	FR1 Band: +37 dBm, \pm 50 VDC	Average CW power
	FR2 Band: +27 dBm, \pm 50 VDC	Average CW power
Trigger in/out, GPS		
Connector type	SMA, female	
Impedance	50 Ω nominal	
Reference clock in/out		
Connector type	SMA, female	
Impedance	50 Ω nominal	
Frequency	10 MHz, 13 MHz, 15 MHz	
Input range	-5 to +5 dBm	
USB		
USB host	Type A, 2 ports USB2.0	
USB client	Mini USB, 1 port	
	Used for SCPI programming, USBTMC, and connection to AppSW	
SFP cage with optic HW		
Port1	SFP/SFP+ compatible	
Port2	SFP/SFP+ compatible	
LAN	RJ45, 100/1000 Base-T	
LAN		
RJ45, 1000 Base-T		
Used for SCPI programming, remote control and connection to AppSW		
Audio jack		
3.5 mm headphone jack		
Built-in speaker		
Display		
Type	10" capacitive touch screen	
Resolution	1280 x 800	
Power		
Connector	Rectangular DC jack	
External DC input	19 VDC	
Power consumption	Option F001 54 W	
	Option F002 64 W	

General Information continued

Battery		
Type	14.4 V, 6800 mAh (Lithium ion)	Accepts two batteries
Operating time	Option F001 standard (one battery): > 2:00 hrs typical Optional secondary battery: > 4:10 hrs typical	
	Option F002 standard (one battery): > 1:40 hrs typical Optional secondary battery: > 3:30 hrs typical	
Charging time	100 % charging Standard (one battery): > 2:30 hrs Optional secondary battery: > 4:30 hrs	
	Up to 80 % charging Standard (one battery): > 1:40 hrs Optional secondary battery: > 3:20 hrs	
Charging temperature	-10 to 45°C (14 to 113°F) ≤ 85% RH	
Discharging temperature	-20 to 55°C (-4 to 131°F) ≤ 85% RH	
Storage temperature	-20 to 60°C (-4 to 140°F)	
Operating temperature		
AC power	0 to 40°C (32 to 104°F)	Battery charging
Battery	-10 to 55°C (14 to 131°F)	Without optic HW
	-10 to 40°C (14 to 104°F)	With optic HW
Storage temperature		
-20 to 60 °C (-4 to 140 °F)		
Maximum humidity		
95% RH (noncondensing)		
Memory		
Internal	Maximum 4 GB	
External	Limited by size of USB/SD flash drive	
	SD card (not supplied), size ≤ 32 Gbyte	
Data storage		
Internal	> 1000 instrument setups and traces	
External	> 5000 instrument setups and traces	
Environmental		
Vibration	MIL-PRF-28800F Class 2	
Shock	MIL-PRF-28800F	
Bench handling	MIL-PRF-28800F	
Transit drop	MIL-PRF-28800F Class 2	
EMC		
IEC/EN 61326-1:2006 (complies with European EMC)		
CISPR11:2009 +A1:2010		
ESD		
IEC/EN 61000-4-2		

General Information continued

Size and weight (Standard configuration)	
Weight (with one battery)	Option F001: < 5.9 kg (13.00 lb.)
	Option F002: < 6.2 kg (13.66 lb.)
Size (W x H x D)	309 mm x 241 mm x 113 mm with top bumper
	309 mm x 225 mm x 113 mm without top bumper
Warranty	
3 years	
Recommended calibration cycle	
1 year	

Ordering Information

Part number	Description	Note
CA5000	CellAdvisor 5G Includes: Spectrum analyzer, RF power meter	Requires one of internal hardware options
Internal hardware option		
CA5000-F001	Frequency for 5G FR1 up to 6 GHz	
CA5000-F002	Frequency for 5G FR1 up to 6 GHz and 5G FR2 up to 40 GHz	
CA5000-F001-O	Frequency for 5G NR FR1 up to 6 GHz with optic HW	
CA5000-F002-O	Frequency for 5G NR FR1 up to 6 GHz and FR2 up to 40 GHz with optic HW	
Hardware upgrade options		
	Requires factory return	
CA5000-FU02	Frequency upgrade to FR2 up to 40 GHz	Requires F001 or F001-O
CA5000-OU01	Upgrade optic hardware	
Bandwidth range		
CA5000-B100	100 MHz/100 MHz analysis bandwidth	
Options		
CA5000-S002	GPS connectivity with antenna	
CA5000-S003	Bluetooth connectivity	
CA5000-S004	Wi-Fi connectivity	
CA5000-S010	50 MHz bandwidth real time spectrum analyzer	
CA5000-S011	100 MHz bandwidth real time spectrum analyzer	Requires B100
CA5000-S013	Interference analyzer	
CA5000-S014	Route map	
CA5000-S015	Gated sweep	
CA5000-S016	Channel scanner	
CA5000-S032	LTE/LTE-A FDD signal analyzer	
CA5000-S033	LTE/LTE-A TDD signal analyzer	
CA5000-S040	5G TF signal analyzer	Requires B100
CA5000-S041	5G NR signal analyzer	Requires B100
CA5000-S050	RFoCPRI line rates 1 to 7 interference analyzer	Requires Optic HW
CA5000-S051	RFoCPRI line rate 8 interference analyzer	Requires Optic HW

Optional Accessories

Accessory - RF cables	
G700050530	RF cable DC to 8 GHz Type-N(m) to Type-N(m), 1.0 m
G700050531	RF cable DC to 8 GHz Type-N(m) to Type-N(f), 1.5 m
G700050532	RF cable DC to 8 GHz Type-N(m) to Type-N(f), 3.0 m
G710050533	RF cable DC to 18 GHz Type-N(m) to SMA(m), 1.5 m
G710050534	RF cable DC to 18 GHz Type-N(m) to QMA(m), 1.5 m
G710050535	RF cable DC to 18 GHz Type-N(m) to SMB(m), 1.5 m
G710050536	RF cable DC to 6 GHz Type-N(m) to DIN(f), 1.5 m
G710050537	RF cable DC to 4 GHz Type-N(m) to 1.0/2.3 (m), 1.5 m
G700050540	Phase-stable RF cable w grip DC to 6 GHz Type-N(m) to Type-N(f), 1.5 m
G700050541	Phase-stable RF cable w grip DC to 6 GHz Type-N(m) to DIN(f), 1.5 m
G710050531	RF cable DC to 18 GHz Type-N(m) to Type-N(f), 1.5 m
G700050550	RF cable DC to 40 GHz, K(m) to K(m), 0.8 m
G700050551	RF cable DC to 40 GHz, K(m) to K(f), 0.8 m
G700050552	RF cable DC to 40 GHz, K(m) to K(f), 1.5 m
Accessory - RF antennas	
G700050340	Mag mount RF omni antenna Type-K(f), 26 GHz to 40 GHz
G700050342	Mag mount RF omni antenna with LNA; Type-K(f); 26 GHz to 40 GHz
G700050350	RF omni antenna Type-N(m); 3300 to 3800 MHz
G700050353	RF omni antenna Type-N(m), 806 to 896 MHz
G700050354	RF omni antenna Type-N(m), 870 to 960 MHz
G700050355	RF omni antenna Type-N(m), 1710 to 2170 MHz
G700050356	RF omni antenna Type-N(m), 720 to 800 MHz
G700050357	RF omni antenna Type-N(m), 2300 to 2700 MHz
G700050363	RF yagi antenna Type-N(f), 1750 to 2390 MHz, 10.2 dBd
G700050365	RF yagi antenna Type-N(f), 866 to 960 MHz, 9.8 dBd
G700050366	RF yagi antenna SMA(f), 700 to 4000 MHz, 1.85 dBd
G700050367	RF yagi antenna SMA(f), 700 to 6000 MHz, 2.85 dBd
G700050370	RF directional horn antenna kit, K(f), 26.5 GHz to 40 GHz, 20 dBi
G700050390	GPS SMA mount antenna
Accessory - RF adapters	
G700050572	Adapter DIN(m) to DIN(m), DC to 7.5 GHz, 50 ohm
G700050573	Adapter Type-N(m) to SMA(f) DC to 18 GHz, 50 ohm
G700050574	Adapter Type-N(m) to BNC(f), DC to 4 GHz, 50 ohm
G700050575	Adapter Type-N(f) to Type-N(f), DC to 18 GHz 50 ohm
G700050576	Adapter Type-N(m) to DIN(m), DC to 7.5 GHz, 50 ohm
G700050577	Adapter Type-N(f) to DIN(f), DC to 7.5 GHz, 50 ohm
G700050578	Adapter Type-N(f) to DIN(m), DC to 7.5 GHz, 50 ohm
G700050579	Adapter DIN(f) to DIN(f), DC to 7.5 GHz, 50 ohm
G700050580	Adapter Type-N(m) to Type-N(m), DC to 11 GHz 50 ohm
G700050581	Adapter N(m) to QMA(f), DC to 6.0 GHz, 50 ohm
G700050582	Adapter N(m) to QMA(m), DC to 6.0 GHz, 50 ohm

Optional Accessories continued

G700050583	Adapter N(m) to 4.1/9.5 MINI DIN(f), DC to 6.0 GHz, 50 ohm
G700050584	Adapter N(m) to 4.1/9.5 MINI DIN(m), DC to 6.0 GHz, 50 ohm
G700050585	Adapter N(m) to 4.3-10(f), DC to 6.0 GHz, 50 ohm
G700050586	Adapter N(m) to 4.3-10(m), DC to 6.0 GHz, 50 ohm
G700050587	Adapter N(f) to SMA(f), DC to 18 GHz, 50 ohm
Accessory - RF filters	
G700050601	Bandpass filter 696 MHz to 716 MHz, N(m) to N(f), 50 ohm
G700050602	Bandpass filter 776 MHz to 788 MHz, N(m) to N(f), 50 ohm
G700050603	Bandpass filter 806 MHz to 849 MHz, N(m) to N(f), 50 ohm
G700050604	Bandpass filter 1710 MHz to 1755 MHz, N(m) to N(f), 50 ohm
G700050605	Bandpass filter 1850 MHz to 1910 MHz, N(m) to N(f), 50 ohm
G700050606	Bandpass filter 703 MHz to 748 MHz, N(m) to N(f), 50 ohm
G700050607	Bandpass filter 832 MHz to 862 MHz, N(m) to N(f), 50 ohm
G700050608	Bandpass filter 880 MHz to 915 MHz, N(m) to N(f), 50 ohm
G700050609	Bandpass filter 1710 MHz to 1785 MHz, N(m) to N(f), 50 ohm
G700050610	Bandpass filter 1920 MHz to 1980 MHz, N(m) to N(f), 50 ohm
G700050611	Bandpass filter 2500 MHz to 2570 MHz, N(m) to N(f), 50 ohm
G700050612	Bandpass filter 663 MHz to 698 MHz, N(m) to N(f), 50 ohm
G700050613	Bandpass filter 3300 MHz to 3800 MHz, N(m) to N(f), 50 ohm
Accessory - RF power sensors	
JD731B	Directional power sensor (peak and average power) 300 to 3800 MHz
JD732B	Terminating power sensor (Average Power) 20 to 3800 MHz
JD733A	Directional power sensor (peak and average power) 150 to 3500 MHz
JD734B	Terminating power sensor (peak power) 20 to 3800 MHz
JD736B	Terminating power sensor (average/peak power) 20 to 3800 MHz
Accessory - RF miscellaneous	
G710050581	Attenuator 40 dB, 100 W, DC to 4 GHz (unidirectional)
G710050585	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)
G710050586	RF combiner, 700 to 4000 MHz, Type-N(f) to Type-N(m)
G710050587	4x1 RF combiner, 700 to 4000 MHz, Type-N(f) to Type-N(m)
JD70050007	AntennaAdvisor handle
Accessory - general	
G700050431	CellAdvisor 5G soft carrying case
G700050150	98 Wh Lithium-Ion Battery
G700050125	CA5G Automotive cigarette lighter DC/DC adapter
G700050126	CA5G AC/DC power adapter 160 W 19 V
G700050433	CA5G backpack carrying case with monopod
G700050434	CA5G harness for indoor application

Accessory - OTDR Modules	
E4106MA2-PC / E4106MA2-APC	1310/1625 nm, PC or APC connector - Short/medium-haul qualification
E4126MA2-PC / E4126MA2-APC	1310/1550 nm, PC or APC connector - Short/medium-haul qualification
E4136MA2-PC / E4136MA2-APC	1310/1550/1625 nm, PC or APC connector - Short/medium-haul qualification
E4126MA3-PC / E4126MA3-APC	1310/1550 nm - Short/medium/long-haul qualification
E4136MA3-PC / E4136MA3-APC	1310/1550/1625 nm - Short/medium/long-haul qualification
E4146QUAD	Multimode 850/1300 nm & Singlemode 1310/1550 nm - Short/medium-haul qualification
E41DWDMC-PC / E41DWDMC-APC	Tunable DWDM C-band 1528 nm to 1568 nm, PC or APC connector- Short/medium/long-haul qualification



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