

# CellAdvisor 5G

## 5G analyzer CA5000 Specifications

**Portable Real-Time Spectrum Analyzer: NR FR1 up to 6 GHz**

**NR FR1 up to 6 GHz and FR2 up to 40 GHz 9 kHz to 18.5 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\*\*\***

**Interference hunting with InterferenceAdvisor software**



### 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   |   | 9 kHz to 6 GHz   |
| Option F002   |   | 9 kHz to 6 GHz and 24 GHz to 40 GHz  |
| Option F018   |   | 9 kHz to 18.5 GHz  |
| Frequency reference   |   |  |
| Accuracy  |   | ±0.05 ppm (0 to 50 °C (32 to 122 °F)) + aging  |
| Accuracy with GPS   |   | ±25 ppb                      GPS lock  |
|   |   | ±50 ppb                      Hold over (72 hours)  |
| Aging   |   | ±0.5 ppm/year  |
|   |   | ±25 ppb with GPS   |
| Frequency reference   |   |  |
| ± (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 option  |
| Resolution  |   | 1 Hz   |
| Accuracy  |   | ±(2 x RBW centering + 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<br>RBW 100 kHz   |
| Sweep time  |   | Nominal  |
| Range   | 0.4 ms to 1000 s<br>24 μs to 200 s                  | zero span  |
| Accuracy  | ±2 %  | zero span  |
| Type  | Continuous, Single                                  |  |
| Mode  | Gated sweep<br>(requires option S015), Normal, Fast |  |
| Trigger   |   |  |
| Trigger source  |   | Free run, Video, External  |
| Trigger delay   |   | Range: 0 to 200 s  |
|   |   | Resolution: 6 μs   |
| Resolution bandwidth (RBW)  |   | Nominal  |
| Range   | 1 Hz to 3 MHz*                                      | - 3 dB bandwidth<br>1-3-10 sequence  |
| Accuracy  | ±10%  |  |
| Video bandwidth (VBW)   |   | Nominal  |
| Range   | 1 Hz to 3 MHz                                       | - 3 dB bandwidth<br>1-3-10 sequence  |
| Accuracy  | ±10%  |  |

## AMPLITUDE ACCURACY AND RANGE SPECIFICATIONS

| Amplitude range  |   |                             |
|--|---|-----------------------------|
| Measurement range  | 9 kHz to 6 GHz: DANL to +25 dBm   |                             |
|  | > 6 GHz to 18.5 GHz: DANL to +25 dBm  |                             |
|  | 24 GHz to 40 GHz: DANL to +15 dBm   |                             |
| Input attenuator range   | 9 kHz to 18.5 GHz: 0 to 55 dB in 5 dB steps   |                             |
|  | 24 GHz to 40 GHz: 0 to 50 dB in 5 dB steps  |                             |
| Preamplifier   |   |                             |
|  | <b>Nominal</b>  |                             |
| Frequency range  | 10 MHz to 6 GHz   |                             |
|  | >6 GHz to 18.5 GHz  |                             |
|  | 24 GHz to 40 GHz  |                             |
| Gain   | 20 dB   |                             |
| Max RF input operating level   |   |                             |
|  | 9 kHz to 6 GHz: +25 dBm, ±50 VDC  | Average CW power            |
|  | > 6 GHz to 18.5 GHz: +25 dBm, ±50 VDC   | Average CW power            |
|  | 24 GHz to 40 GHz: +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, dBμV, V, mV, W, mW  |                             |
| Reference level  |   |                             |
| Range  | -150 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<br>Center, Start, Stop |                             |
| Absolute amplitude accuracy  |   |                             |
| Preamplifier off: input signal ≥ -50 dBm, auto-coupled, 15-minute warm-up          |   |                             |
| Preamplifier on: -90 dBm < input signal < -50 dBm, auto-coupled, 15-minute warm-up |   |                             |
| 250 kHz to 6 GHz   | ± 1.0 dB, ± 0.5 dB (T)  | 20 to 30 °C (68 to 86 °F)   |
|  | ± 2.0 dB, ± 1.2 dB (T)  | -10 to 55 °C (14 to 131 °F) |
| >6 GHz to 18.5 GHz   | ± 1.5 dB, ± 0.5 dB (T)  | 20 to 30 °C (68 to 86 °F)   |
|  | ± 2.5 dB, ± 1.2 dB (T)  | -10 to 55 °C (14 to 131 °F) |
| 24 GHz to 40 GHz   | ± 1.5 dB, ± 0.8 dB (T)  | 20 to 30 °C (68 to 86 °F)   |
|  | ± 3.3 dB, ± 1.5 dB (T)  | -10 to 55 °C (14 to 131 °F) |

| Input VSWR   |                           | Nominal                |                |
|--|---------------------------|------------------------|----------------|
| 10 MHz to 6 GHz: 1.8:1   | @ 10 dB Attenuation       |                        |                |
| >6 GHz to 18.5 GHz: 2.0:1  |                           |                        |                |
| 24 GHz to 40 GHz: 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   | 10 MHz to 3.0 GHz         | -142 dBm, -145 dBm (T) |                |
|  | >3.0 GHz to 4.5 GHz       | -140 dBm, -143 dBm (T) |                |
|  | >4.5 GHz to 6.0 GHz       | -135 dBm, -138 dBm (T) |                |
|  | >6 GHz to 13.3 GHz        | -120 dBm, -123 dBm (T) |                |
|  | >13.3 GHz to 17 GHz       | -115 dBm, -118 dBm (T) |                |
|  | >17 GHz to 18.0 GHz       | -112 dBm, -115 dBm (T) |                |
|  | >18 GHz to 18.5 GHz       | -107 dBm, -110 dBm (T) |                |
|  | 24 GHz to 25 GHz          | -128 dBm, -132 dBm (T) |                |
| Preamplifier on  | >25 GHz to 30 GHz         | -130 dBm, -135 dBm (T) |                |
|  | >30 GHz to 40 GHz         | -125 dBm, -130 dBm (T) |                |
|  | 10 MHz to 3.0 GHz         | -160 dBm, -165 dBm (T) | Preamp 1       |
|  | >3.0 GHz to 6.0 GHz       | -155 dBm, -160 dBm (T) | Preamp 1       |
|  | >6 GHz to 13.3 GHz        | -143 dBm, -148 dBm (T) | Preamp 1       |
|  | >13.3 GHz to 17 GHz       | -135 dBm, -138 dBm (T) | Preamp 1       |
|  | >17 GHz to 18 GHz         | -130 dBm, -135 dBm (T) | Preamp 1       |
|  | >18 GHz to 18.5 GHz       | -127 dBm, -130 dBm (T) | Preamp 1       |
|  | 10 MHz to 3.0 GHz         | -163 dBm, -168 dBm (T) | Preamp 1 and 2 |
|  | >3.0 GHz to 6.0 GHz       | -161 dBm, -165 dBm (T) | Preamp 1 and 2 |
|  | >6 GHz to 13.3 GHz        | -160 dBm, -163 dBm (T) | Preamp 1 and 2 |
|  | >13.3 GHz to 17 GHz       | -155 dBm, -158 dBm (T) | Preamp 1 and 2 |
|  | >17 GHz to 18 GHz         | -152 dBm, -155 dBm (T) | Preamp 1 and 2 |
|  | >18 GHz to 18.5 GHz       | -147 dBm, -150 dBm (T) | Preamp 1 and 2 |
|  | >24 GHz to 40 GHz         | -148 dBm, -153 dBm (T) | DNC Preamp     |
| Second harmonic distortion   |                           |                        |                |
|  | 50 MHz to 4.5 GHz         | < -65 dBc, typical     | Input -30 dBm  |
|  | >4.5 GHz to 6.0 GHz       | < -75 dBc, typical     | Peak detector  |
|  | >6 GHz to 12 GHz          | < -60 dBc, typical     |                |
|  | >12 GHz to 18.5 GHz       | < -70 dBc, typical     |                |
| Third-order inter-modulation (third-order intercept: TOI)            |                           |                        |                |
|  | 10 MHz to 3.0 GHz         | +9 dBm, typical        |                |
|  | > 3.0 GHz to 6.0 GHz      | +11 dBm, typical       |                |
|  | > 6.0 GHz to 13.3 GHz     | +15 dBm, typical       |                |
|  | > 13.3 GHz to 18.5 GHz    | +10 dBm, typical       |                |
|  | 24 GHz to 40 GHz          | +12 dBm, typical       |                |
| Spur free dynamic range  |                           |                        |                |
| 2/3 (TOI-DANL) in 1 Hz RBW   | 9 kHz to 6 GHz: > 104 dB  | @ 2 Ghz                |                |
|  | 6 GHz to 18 GHz: > 98 dB  | @9 Ghz                 |                |
|  | 24 GHz to 40 GHz: > 95 dB | @ 28 Ghz               |                |

## DYNAMIC RANGE SPECIFICATIONS CONTINUED

| Spurious  |  |   |   |   |                                   |  |         |
|---|--|---|---|---|-----------------------------------|--|---------|
| Inherent residual response  | Input terminated, 0 dB attenuation, Preamp off<br>Sweep Tuned: 10 kHz RBW, 1 kHz VBW, RMS detector<br>Real time: RBW: 30 kHz, VBW: 30 kHz, Peak mode, Span= 100 Mhz  |   |   |   |                                   |  |         |
|   | 9 kHz to 6 GHz<br>Sweep tuned: -95 dBm Typical<br>Real time: -75 dBm Typical<br>Exceptions: -62 dBm @ 5420 MHz<br>Notice Spurs:<br>-77 dBm @ 1520 MHz, 2925 MHz<br>-80 dBm @ 5635 MHz<br>-87 dBm @ 1845 MHz, 3141 MHz<br>3500 MHz, 4495 MHz<br>-89 dBm @ 2280 Mhz  |   |   |   |                                   |  |         |
|   | >6 GHz to 18.5 GHz<br>Sweep tuned: -85 dBm Typical<br>Real time: -70 dBm Typical<br>Notice Spurs:<br>-55 dBm @ 6280 MHz, 9750 MHz<br>-63 dBm @ 10.323375 GHz, 13.343 GHz<br>- 53 dBm @ 12.77 GHz<br>-59 dBm @ 17.55 GHz<br>-43 dBm @ 17.98 GHz   |   |   |   |                                   |  |         |
|   | 24 GHz to 40 GHz<br>Sweep tuned: -80 dBm Typical<br>Real time: -70 dBm Typical<br>Notice Spurs:<br>-72 dBm @ 26.21 GHz<br>-75 dBm @ 31.83 GHz  |   |   |   |                                   |  |         |
| Input-related spurious  | 0 dB attenuation, Input signal= -25 dBm, Preamp off<br>Sweep tuned: Peak detector, Span < 1 Ghz  |   |   |   |                                   |  |         |
|   | <table border="0"> <tr> <td>9 kHz to 6 GHz (10 kHz RBW, 1 kHz VBW)<br/>Sweep tuned: -70 dBc<br/>Notice Spurs:<br/>Spur freq (MHz) = 7 x CF – 6 x Rin - 11<br/>Spur freq (MHz) = 4 x CF – 3 x Rin-41.4</td> <td>carrier offset &gt; 5 MHz<br/>Typical<br/>Span &gt; 9 MHz<br/>1.083 ≤ CF-Rin ≤ 2.583<br/>9.225 ≤ CF-Rin ≤ 11.475<br/>CF: Center Freq (MHz)<br/>Rin: RF Input Freq (MHz)</td> </tr> <tr> <td>&gt; 6 GHz to 18.5 GHz (1 kHz RBW, 100 Hz VBW)<br/>Sweep tuned: -60 dBc</td> <td>carrier offset &gt; 5 MHz<br/>Typical</td> </tr> <tr> <td>24 GHz to 40 GHz (1 kHz RBW, 100 Hz VBW)<br/>Sweep tuned: -60 dBc</td> <td>Typical</td> </tr> </table> | 9 kHz to 6 GHz (10 kHz RBW, 1 kHz VBW)<br>Sweep tuned: -70 dBc<br>Notice Spurs:<br>Spur freq (MHz) = 7 x CF – 6 x Rin - 11<br>Spur freq (MHz) = 4 x CF – 3 x Rin-41.4 | carrier offset > 5 MHz<br>Typical<br>Span > 9 MHz<br>1.083 ≤ CF-Rin ≤ 2.583<br>9.225 ≤ CF-Rin ≤ 11.475<br>CF: Center Freq (MHz)<br>Rin: RF Input Freq (MHz) | > 6 GHz to 18.5 GHz (1 kHz RBW, 100 Hz VBW)<br>Sweep tuned: -60 dBc | carrier offset > 5 MHz<br>Typical | 24 GHz to 40 GHz (1 kHz RBW, 100 Hz VBW)<br>Sweep tuned: -60 dBc | Typical |
| 9 kHz to 6 GHz (10 kHz RBW, 1 kHz VBW)<br>Sweep tuned: -70 dBc<br>Notice Spurs:<br>Spur freq (MHz) = 7 x CF – 6 x Rin - 11<br>Spur freq (MHz) = 4 x CF – 3 x Rin-41.4 | carrier offset > 5 MHz<br>Typical<br>Span > 9 MHz<br>1.083 ≤ CF-Rin ≤ 2.583<br>9.225 ≤ CF-Rin ≤ 11.475<br>CF: Center Freq (MHz)<br>Rin: RF Input Freq (MHz)  |   |   |   |                                   |  |         |
| > 6 GHz to 18.5 GHz (1 kHz RBW, 100 Hz VBW)<br>Sweep tuned: -60 dBc   | carrier offset > 5 MHz<br>Typical  |   |   |   |                                   |  |         |
| 24 GHz to 40 GHz (1 kHz RBW, 100 Hz VBW)<br>Sweep tuned: -60 dBc  | Typical  |   |   |   |                                   |  |         |
| LO feedthrough to input   | 9 kHz to 6 GHz: < -85 dBm<br>>6 GHz to 18.5 GHz: -65 dBm<br>24 GHz to 40 GHz: < -47 dBm  |   |   |   |                                   |  |         |

| Single sideband (SSB) phase noise  |  |
|------------------------------------|--|
|                                    | -98 dBc/Hz, -103 dBc/Hz (T) @ 10 kHz offset @ 1 GHz<br>-105 dBc/Hz, -110 dBc/Hz (T) @ 100 kHz offset<br>-120 dBc/Hz, -125 dBc/Hz (T) @ 1 MHz offset<br>-95 dBc/Hz, -100 dBc/Hz (T) @ 10 kHz offset @ 9 GHz<br>-95 dBc/Hz, -100 dBc/Hz (T) @ 100 kHz offset<br>-110 dBc/Hz, -115 dBc/Hz (T) @ 1 MHz offset<br>-90 dBc/Hz, -95 dBc/Hz (T) @ 10 kHz offset @25 GHz<br>-90 dBc/Hz, -95 dBc/Hz (T) @ 100 kHz offset<br>-110 dBc/Hz, -115 dBc/Hz (T) @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          | Option F001: 10 MHz to 6 GHz                      |
|                          | Option F002: 10 MHz to 6 GHz and 24 GHz to 40 GHz |
|                          | Option F018: 10 MHz to 18.5 GHz                   |
| Span                     | 1 kHz to max frequency of each option             |
| Dynamic range            | 10 MHz to 18.5 GHz: -120 to +25 dBm               |
|                          | 24 GHz to 40 GHz: -120 to +15 dBm                 |
| Maximum power            | 10 MHz to 18.5 GHz: +25 dBm                       |
|                          | 24 GHz to 40 GHz: +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                    | <b>JD731B</b>   | <b>JD733A</b>        |                  |
| 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                 | ±(4% of reading + 0.05 W) <sup>1,2</sup>                |                      |                  |
| Connector type           | Type-N female on both ends                              |                      |                  |
| Terminating power sensor |   |                      |                  |
| Model                    | <b>JD732B</b>   | <b>JD734B</b>        | <b>JD736B</b>    |
| Measurement type         | Average   | Peak                 | Average and Peak |
| Frequency range          | 20 MHz to 3.8 GHz                                       |                      |                  |
| Dynamic range            | -30 to + 20 dBm   |                      |                  |
| Accuracy                 | ±7 % <sup>1</sup>                                       |                      |                  |
| Connector type           | Type-N female   |                      |                  |

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

2 Forward 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<br>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          |

## Wi-Fi Connectivity (Option S004)

| Frequency range                |                                       |   |
|--------------------------------|---------------------------------------|---|
| Option F001                    | 9 kHz to 6 Ghz                        |   |
| Option F002                    | 9 kHz to 6 GHz and 24 GHz to 40 Ghz   |   |
| Option F018                    | 9 kHz to 18.5 GHz                     |   |
| Frequency span                 |                                       |   |
| Option S010                    | 50 MHz real time                      |   |
| Option S011                    | 100 MHz real time                     | Supports panoramic persistence view up to 800 MHz analysis span |
| Acquisition                    |                                       |   |
| IF bandwidth                   | 50 MHz or 100 Mhz                     |   |
| 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) | 33.59 us at normal<br>1.92 us at high | 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<br>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<br>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,<br>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)

| Spectrum display |   |                                    |
|------------------|---|------------------------------------|
| 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)

| Spectrum display  |                         |
|-------------------|-------------------------|
| 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)

| Spectrum display  |   |
|-------------------|---|
| Frequency range   | Option F001: 10 MHz to 6 GHz                      |
|                   | Option F002: 10 MHz to 6 GHz and 24 GHz to 40 GHz |
|                   | Option F018: 10 MHz to 18.5 GHz                   |
| Measurement range | 10 MHz to 18.5 GHz: -110 to +25 dBm               |
|                   | 24 GHz to 40 GHz: -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              | -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                 | ±0.05 ppm   |           |
| Residual EVM                    | 2.0% (typical)  | @ -20 dBm |
| Measurements                    |   |           |
| <b>Channel Power</b>            | <b>Constellation</b>  |           |
| Channel power                   | MBSFN*  |           |
| Spectral density                | RS power  |           |
| Peak to average ratio           | PDSCH/Data* QPSK EVM  |           |
| <b>Occupied Bandwidth</b>       | PDSCH/Data* 16 QAM EVM  |           |
| Occupied bandwidth              | PDSCH/Data* 64 QAM EVM  |           |
| Integrated power                | PDSCH/Data* 256 QAM EVM   |           |
| Occupied power                  | Data EVM RMS  |           |
| <b>Spectrum Emission mask</b>   | Data EVM peak   |           |
| Reference power                 | Frequency error   |           |
| Peak level at defined range     | Time Error  |           |
| <b>ACLR</b>                     | <b>Data Channel</b>   |           |
| Reference power                 | Physical Cell ID, Group ID, Sector ID   |           |
| Absolute power at defined range | MBSFN*  |           |
| Relative power at defined range | Resource block power  |           |
| <b>Multi-ACLR</b>               | 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 | <b>Control Channel</b>  |           |
| <b>Spurious Emissions</b>       | 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*                                |           |
| <b>Power vs. Time (frame)</b>   | Each control channels'  |           |
| Frame average power             | IQ diagram, Modulation format, Frequency error, IQ origin offset,   |           |
| I-Q origin offset, Time Offset  | EVM RMS, EVM peak   |           |
| Subframe power                  | <b>Subframe</b>   |           |
| First slot power                | Physical Cell ID, Group ID, Sector ID   |           |
| Second slot power               | MBSFN*  |           |
| Physical Cell ID, Group ID,     | Subframe power  |           |
| Sector ID                       | 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  |           |

## LTE/LTE-A FDD SIGNAL ANALYZER (S032) CONTINUED

| 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<br>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<br>Absolute power, EVM, phase for P-SS, S-SS, PBCH, PCFICH, RS0, RS1, RS2, Rs3  |
|  | Subframe, P-SS, S-SS, PBCH, RS EVM                    |   |
|  | Data QPSK, 16/64/256 QAM EVM                          |   |
|  | MBSFN RS EVM*   | Frequency error   |
|  | MBSFN*, Physical Cell ID                              | Time alignment error  |
|  | Frequency error, time alignment error                 | Time offset   |
| Subframe summary<br>OFDM symbol power, Frequency error, IQ-origin offset, Data EVM RMS, Data EVM peak EVM RMS, EVM peak  | Antenna port  | <b>Datagram</b><br>Datagram<br>Resource block power<br>Data utilization<br>Resource block allocation<br>Route Map<br>RSRP, RSRQ, RS-SINR, S-SS RSSI<br>P-SS,/S-SS power, S-SS Ec/Io |
|  | <b>Power Statistics CCDF</b>                          |   |
|  | Average power   |   |
|  | Max power   |   |
| <b>Time Alignment Error</b>  | Crest factor  |   |
|  | <b>OTA Channel Scanner (up to 6)</b>                  |   |
| Time alignment error trend   | Frequency or channels                                 |   |
| Time alignment error   | Physical Cell ID, Group ID, Sector ID                 |   |
| RS power difference  | Channel power, RSSI, RSRP, RSRQ                       |   |
| Antenna 0 RS power, EVM, time difference   | RS-SINR, Antenna port                                 |   |
| Antenna 1 RS power, EVM, time difference   | <b>OTA ID Scanner (up to 6)</b>                       |   |
| Antenna 2 RS power, EVM, time difference   | RSRP, RSRQ dominance                                  |   |
| Antenna 3 RS power, EVM, time difference   | S-SS RSSI, S-SS Ec/Io dominance                       |   |
| <b>Data Allocation Map</b>   | 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                             |   |
| Subframe data utilization  | RSRP, RSRQ, RS-SIN, S-SS RSSI, P-SS, S-SS, S-SS Ec/Io |   |
| Resource block power   | <b>Multipath Profile</b>                              |   |
| Data allocation vs subframe  | Physical Cell ID, Group ID, Sector ID                 |   |
|  | Antenna 3 RS Ec/Io, delay                             |   |

## LTE/LTE-A TDD SIGNAL ANALYZER (S033)

| General Parameters                    |  |
|---------------------------------------|--|
| Frequency range                       | Band 33 to 43  |
| Input signal level                    | -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                       | ±0.05 ppm  |
| Residual EVM                          | 2.0% (typical) @ -20 dBm   |
| Measurements                          |  |
| <b>Channel Power</b>                  | <b>Constellation</b>   |
| Channel power                         | MBSFN*   |
| Spectral density                      | RS power   |
| Peak to average ratio                 | PDSCH/Data* QPSK EVM   |
| <b>Occupied Bandwidth</b>             | PDSCH/Data* 16 QAM EVM   |
| Occupied bandwidth                    | PDSCH/Data* 64 QAM EVM   |
| Integrated power                      | PDSCH/Data* 256 QAM EVM  |
| Occupied power                        | Data EVM RMS   |
| <b>Spectrum Emission mask</b>         | Data EVM peak  |
| Reference power                       | Frequency error  |
| Peak level at defined range           | Time error   |
| <b>ACLR</b>                           | <b>Data Channel</b>  |
| Reference power                       | Physical Cell ID, Group ID, Sector ID  |
| Absolute power at defined range       | MBSFN*   |
| Relative power at defined range       | Resource block power   |
| <b>Multi-ACLR</b>                     | 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       | <b>Control Channel</b>   |
| <b>Spurious Emissions</b>             | 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* |
| <b>Power vs. Time (frame)</b>         | 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                      | <b>Subframe</b>  |
| Second slot power                     | Physical Cell ID, Group ID, Sector ID  |
| Physical Cell ID, Group ID, Sector ID | MBSFN*   |
| <b>Power vs. Time (slot)</b>          | 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   |

## LTE/LTE-A TDD SIGNAL ANALYZER (S033) CONTINUED

| Measurements continued  |  |
|---|--|
| Subframe summary<br>OFDM symbol power,<br>Frequency error, time error<br>Data EVM RMS, data EVM peak,<br>RS EVM RMS, RS EVM peak<br>IQ Imbalance                            | <b>Power Statistics CCDF</b>   |
|   | Average power  |
|   | Max power  |
|   | Crest factor   |
| <b>Frame</b>  | <b>OTA Channel Scanner (up to 6)</b>   |
| Physical Cell ID, Group ID, Sector ID   | Frequency or channels  |
| MBSFN*  | Physical Cell ID, Group ID, Sector ID  |
| Frame power   | Channel power, RSSI, RSRP, RSRQ  |
| Channel summary table<br>EVM, relative or absolute power,<br>modulation type for P-SS, S-SS, PBCH,<br>PCFICH, PHICH, PDCCH, RS, MBSFN RS*<br>PBSCH/PMCH QPSK, 16/64/256 QAM | RS-SINR, Antenna port  |
| Subframe summary<br>OFDM symbol power,<br>Frequency error,<br>IQ-origin offset,<br>Data EVM RMS, Data EVM peak<br>EVM RMS, EVM peak   | <b>OTA ID Scanner (up to 6)</b>  |
|   | 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   |
| <b>Time Alignment Error</b>   | <b>Multipath Profile</b>   |
| Time alignment error trend  | Physical Cell ID, Group ID, Sector ID  |
| Time alignment error  | Antenna 0 RS Ec/Io, delay  |
| RS power difference   | Antenna 1 RS Ec/Io, delay  |
| Antenna 0 RS power, EVM, time difference  | Antenna 2 RS Ec/Io, delay  |
| Antenna 1 RS power, EVM, time difference  | Antenna 3 RS Ec/Io, delay  |
| Antenna 2 RS power, EVM, time difference  | <b>Control Channel</b>   |
| Antenna 3 RS power, EVM, time difference  | Physical Cell ID, Group ID, Sector ID  |
| <b>Data Allocation Map</b>  | MBSFN*   |
| Frame data utilization  | RS/EVM power trend   |
| OFDM symbol power   | Control channel table  |
| Data allocation vs frame  | Absolute power, EVM, phase for P-SS, S-SS,<br>PBCH, PCFICH, RS0, RS1, RS2, Rs3 |
| Subframe data utilization   | Frequency error  |
| Resource block power  | Time alignment error   |
| Data allocation vs subframe   | Time offset  |
| <b>Carrier Aggregation</b>  | <b>Datagram</b>  |
| Component carriers: up to 5   | Datagram   |
| Subframe, P-SS, S-SS, PBCH, RS power  | Resource block power   |
| Data QPSK, 16/64/256 QAM power  | Data utilization   |
| MBSFN RS power*   | Resource block allocation  |
| Subframe, P-SS, S-SS, PBCH, RS EVM  | Route Map  |
| Data QPSK, 16/64/256 QAM EVM  | RSRP, RSRQ, RS-SINR, S-SS RSSI   |
| MBSFN RS EVM*   | P-SS,/S-SS power, S-SS Ec/Io   |
| MBSFN*, Physical Cell ID  |  |
| Frequency error, time alignment error   |  |
| Antenna port  |  |

## DSS SIGNAL ANALYZER (S034)

| General parameters                              |   |                        |
|---|---|------------------------|
| Frequency range                                 | LTE FDD: Band 1 to 14, 17 to 26<br>LTE TDD: Band 33 to 43                                 |                        |
| Minimum detectable level                        | LTE: -125 dBm<br>NR: -110 dBm   | S-SS RSRP<br>S-SS RSRP |
| Input signal level                              | Fr1 Band: -70 to +25 dBm  |                        |
| Channel power accuracy                          | ±1.0 dB (typical)   |                        |
| Supported bandwidth                             | 5 MHz, 10 MHz, 15 MHz, and 20 Mhz   |                        |
| Frequency error                                 | ±0.05 ppm   |                        |
| Residual EVM                                    | 2.0 % (typical)   | @ -20 dBm              |
| General parameters                              |   |                        |
| <b>Channel Power</b>                            | <b>Constellation</b>  |                        |
| Channel power                                   | RS power  |                        |
| Spectral density                                | PBCH DMRS power   |                        |
| Peak to average power                           | PDSCH LTE/NR QPSK EVM   |                        |
| <b>Occupied bandwidth</b>                       | PDSCH LTE/NR 16 QAM EVM   |                        |
| Occupied bandwidth                              | PDSCH LTE/NR 64 QAM EVM   |                        |
| Integrated power                                | PDSCH LTE/NR 256 QAM EVM  |                        |
| Occupied power                                  | LTE/NR Data EVM RMS, peak   |                        |
| <b>Spectrum Emission mask</b>                   | Frequency Error, Time error   |                        |
| Reference power                                 | <b>Channel Mapper</b>   |                        |
| Peak level at defined range                     | LTE channels' allocation in RB block<br>P-SS, S-SS, PBCH, RS, PDCCH, PDSCH, PCFICH, PHICH |                        |
| <b>ACLR</b>                                     | NR channels' allocation in RB block<br>P-SS, S-SS, PBCH, PBCH DMRS, PDCCH, PDSCH          |                        |
| Reference power                                 | LTE/NR Physical cell ID, Group ID, Sector ID  |                        |
| Abs power at defined range                      | <b>Control Channel</b>  |                        |
| Rel power at defined range                      | Subframe power  |                        |
| <b>Multi-ACLR</b>                               | Channel summary on EVM, power and mod. type   |                        |
| Lowest reference power                          | LTE control channels (P-SS, S-SS, PBCH, PCFICH<br>PHICH, PDCCH, RS)                       |                        |
| Highest reference power                         | NR control Channels (P-SS, S-SS, PBCH DMRS,<br>PBCH, PDCCH DMRS, PDCCH)                   |                        |
| Abs power at defined range                      | Each control channel's  |                        |
| Rel power at defined range                      | IQ diagram, Modulation format, Frequency error,<br>IQ origin offset, EVM RMS, EVM peak    |                        |
| <b>Spurious Emissions</b>                       | LTE/NR Physical cell ID, Group ID, Sector ID  |                        |
| Peak frequency at defined range                 |   |                        |
| Peak level at defined range                     |   |                        |
| <b>Power vs. Time (frame)</b>                   |   |                        |
| Frame average power                             |   |                        |
| I-Q origin offset, Time offset, Subframe power, |   |                        |
| First slot power, Second slot power             |   |                        |
| LTE Physical cell ID, Group ID, Sector ID       |   |                        |
| <b>Power vs. Time (Slot)</b>                    |   |                        |
| Slot average power                              |   |                        |
| Transition period length                        |   |                        |
| Off power                                       |   |                        |
| LTE Physical cell ID, Group ID, Sector ID       |   |                        |

## DSS SIGNAL ANALYZER (S034) CONTINUED

| Measurements continued   |  |
|--|--|
| <b>Subframe</b>  | <b>OTA Channel Scanner (up to 3)</b>   |
| Subframe   | Channel power and RSRP bar graph   |
| Channel summary on EVM, power and mod. type<br>LTE control channels (P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS) and data channels of QPSK, 16 QAM, 64 QAM, 256 QAM<br>NR control Channels (P-SS, S-SS, PBCH, PBCH DMRS, PDCCH, PDCCH DMRS, PDSCH DMRS) and data channels of QPSK, 16 QAM, 64 QAM, 256 QAM | LTE: PCI, RS RSSI, RS RSRP, RS RSRQ, RS SINR                                 |
|  | NR: PCI, P-SS RSSI, P-SS RSRP, P-SS RSRQ, P-SS SINR                          |
|  | <b>OTA Channel Scanner (up to 3)</b>   |
|  | LTE: PCI, RSRP, RSRQ, P-SS SNR, S-SS SINR, S-SS RSSI, P-SS, S-SS, S-SS Ec/Io |
|  | NR: PCI, SSB index, S-SS RSRP, P-SS RSRP, S-SS SINR, S-SS RSRQ               |
| Subframe summary<br>OFDM symbol power, Frequency error, Time error, LTE/NR Data EVM RMS, peak, RS EVM RMS, peak, IQ imbalance  | <b>OTA Multipath Profile</b>   |
|  | LTE: RS0, RS1, RS2, RS3 Ec/Io, Delay   |
|  | NR: P-SS, S-SS Ec/Io, Delay  |
| LTE/NR Physical cell ID, Group ID, Sector ID   | LTE/NR Physical Cell ID, Group ID, Sector ID                                 |
| <b>Frame</b>   | <b>OTA Control Channel</b>   |
| Frame avg power  | LTE: P-SS, S-SS, PBCH, RS power and EVM                                      |
| Channel summary on EVM, power and mod. type<br>LTE control channels (P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS) and data channels of QPSK, 16 QAM, 64 QAM, 256 QAM<br>NR control Channels (P-SS, S-SS, PBCH, PBCH DMRS, PDCCH, PDCCH DMRS, PDSCH DMRS) and data channels of QPSK, 16 QAM, 64 QAM, 256 QAM | NR: P-SS, S-SS, PBCH power and EVM   |
|  | Frequency error, Time error,   |
|  | Time alignment error   |
|  | LTE/NR Physical Cell ID, Group ID, Sector ID                                 |
|  | <b>OTA Route map</b>   |
|  | RSPR, RSRP, SINR, SNR, PCI   |
| Frame summary<br>OFDM symbol power, Frequency error, Time error, LTE/NR Data EVM RMS, peak, RS EVM RMS, peak   | <b>Freq/Time Error Variation</b>   |
|  | Frequency error trend  |
|  | Time error trend   |
| LTE/NR Physical cell ID, Group ID, Sector ID   | RS0, RS1, RS2, RS3 power trend   |
| <b>Time Alignment Error</b>  |  |
| Time alignment error trend   |  |
| Time alignment error, RS power difference  |  |
| Antenna 0 LTE RS power, EVM, time difference   |  |
| Antenna 1 LTE RS power, EVM, time difference   |  |
| Antenna 2 LTE RS power, EVM, time difference   |  |
| Antenna 3 LTE RS power, EVM, time difference   |  |
| Antenna NR PSS power, EVM, time difference   |  |
| LTE/NR Physical cell ID, Group ID, Sector ID   |  |



## 5G TF SIGNAL ANALYZER (S040)

| General parameters       |   |       |
|--------------------------|---|-------|
| Frequency range          | Fr1 Band: 10 MHz to 6 GHz<br>FR2 Band: 24 GHz to 40 Ghz |       |
| Minimum detectable level | -110 dBm  | BRSRP |
| Input signal level       | Fr1 Band: -75 to +25 dBm<br>FR2 Band: -75 to +15 dBm    |       |
| Channel power accuracy   | ±1.0 dB typical   |       |
| Supported bandwidth      | 100 Mhz   |       |
| Frequency error          | ±0.05 ppm   |       |
| Residual EVM             | 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   |       |
| Beam analyzer            | xPBCH EVM   |       |
|                          | Beam analyzer bar/summary up to 8 beams                 |       |
|                          | Cell ID/Beam index                                      |       |
|                          | BRSRP   |       |
|                          | PSS-RSSI  |       |
| Route map                | BRS-SNR   |       |
|                          | Cell ID/Beam index                                      |       |
|                          | BRSRP   |       |
|                          | PSS-RSSI  |       |

## 5G NR SIGNAL ANALYZER (S041)

| General parameters       |  |                    |
|--------------------------|--|--------------------|
| Frequency range          | Fr1 Band: 410 MHz to 6 GHz<br>FR2 Band: 24 GHz to 40 Ghz |                    |
| Minimum detectable level | Fr1 Band: -120 dBm<br>FR2 Band: -110 dBm                 | SS-RSRP<br>SS-RSRP |
| Input signal level       | Fr1 Band: -70 to +25 dBm<br>FR2 Band: -65 to +15 dBm     |                    |
| Channel power accuracy   | ±1.0 dB typical  |                    |
| Supported bandwidth      | Up to 100 Mhz  |                    |
| Frequency error          | ±0.05 ppm  |                    |
| Residual EVM             | 2.0 % typical  | @ -20 dBm          |

## 5G NR SIGNAL ANALYZER (S041) CONTINUED

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

## 5G TM Signal Analyzer (S042)

| Measurements continued   |   |
|--|---|
| Frequency range  | NR:<br>FR1 Band: 410 MHz to 6 GHz<br>FR2 Band: 24 GHz to 40 GHz   |
| Input signal level   | Fr1 Band: -70 to +25 dBm<br>FR2 Band: -65 to +15 dBm  |
| Channel power accuracy   | ±1.0 dB (typical)   |
| Supported bandwidth  | Up to 100 Mhz   |
| Frequency error  | ±0.05 ppm   |
| Residual EVM   | 2.0 % (typical) @ -20 dBm   |
| Standard   | 3GPP TS 38 series v15.2.0   |
| Measurements   |   |
| <b>BS output power</b><br>BS output power/EIRP power<br>Spectral density<br>Peak to average power                                  | <b>Transmit on/off power</b><br>Symbol average power<br>Transition period length<br>Off power   |
| <b>Occupied bandwidth</b><br>Occupied bandwidth<br>Integrated power<br>Occupied power  | <b>Modulation Quality</b><br>PDSCH QPSK EVM<br>PDSCH 16QAM EVM<br>PDSCH 64QAM EVM<br>PDSCH 256QAM EVM<br>Frequency error  |
| <b>ACLR</b><br>Reference power<br>Abs power at defined range<br>Rel power at defined range   | <b>MIMO Time Alignment Error</b><br>Time alignment error<br>PDSCH DM-RS power difference<br>Antenna 1000: PDSCH DM-RS power, Time offset<br>Antenna 1001: PDSCH DM-RS power, Time offset<br>Antenna 1000/1001 Time offset trend |
| <b>Multi-ACLR</b><br>Lowest reference power<br>Highest reference power<br>Abs power at defined range<br>Rel power at defined range | <b>CA time Alignment Error (up to 8 carriers)</b><br>Time alignment error trend<br>Time alignment error<br>PDSCH DM-RS power difference<br>PDSCH DM-RS power, Time offset   |
| <b>Operation band unwanted emissions</b><br>Reference power<br>Peak level at defined range   |   |
| <b>Transmitter spurious emissions</b><br>Peak frequency at defined range<br>Peak level at defined range                            |   |

## RFoCPRI Interference Analyzer (Option S050, S051)

| General parameters            |  |  |
|-------------------------------|--|--|
| Optical Interface             | Dual SFP/SFP+<br>(supports all MSA compliant SFP modules)  | Supported with CA5000-F001-O<br>and CA5000-F002-O                    |
| Line rates                    | CPRI Rate 1 to 7   | Option S050  |
|                               | CPRI Rate 8  | Option S051  |
| Resolution Bandwidth<br>(RBW) | - 3dB bandwidth  | 10 kHz to 100 kHz with 1-3 step 7.5kHz                               |
|                               | Accuracy   | ±10% (nominal)   |
| Video Bandwidth<br>(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   |
| Measurements                  |  |  |
| Link Status                   | LOS, LOF, SDI, RAI, Optic RX Level   | Port 1 and Port 2  |
| SFP Information               | Wavelength, Vendor, Vendor PN, Vendor Rev,<br>Power level type, Diagnostic byte, Nominal rate,<br>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<br>with 2-D and 3-D waterfall diagram |
|                               | Interference ID  |  |
|                               | Sound Indicator  |  |
|                               | PRB Table  |  |
|                               | Spectrum Replayer  |  |
|                               | IQ Activity Scan   |  |

## NSA ANALYZER (S043)

| General parameters   |   |   |
|--|---|---|
| Frequency range  | LTE-FDD: Band 1 to 14, 17 to 26<br>LTE-TDD: Band 33 to 43   |   |
|  | NR:<br>FR1 Band: 410 MHz to 6 GHz<br>FR2 Band: 24 GHz to 40 GHz   |   |
| Minimum detectable level   | LTE: -125 dBm<br>NR:<br>FR1 Band: -120 dBm<br>FR2 Band: -110 dBm  | SS-RSRP<br><br>SS-RSRP<br>SS-RSRP   |
| Input signal level   | Fr1: -70 to +25 dBm<br>FR2: -65 to +15 dBm  |   |
| Channel power accuracy   | ±1.0 dB (typical)   |   |
| Supported bandwidth  | Up to 100 Mhz   |   |
| Frequency error  | ±0.05 ppm   |   |
| Residual EVM   | 2.0 % (typical)   | @ -20 dBm   |
| Measurements   |   |   |
| <b>NSA Analyzer</b><br>Up to 8 LTE/NR carriers<br>Fast mode: Strongest PCI<br>Normal mode: Multi PCIs<br>NR Analyzer<br>Cell ID/SSB index<br>SS-RSRP/PS-RSRP<br>PS-SNR/SS-SINR/SS-RSRQ<br>LTE Analyzer<br>Cell ID<br>RSRP,RSRQ,PS-SNR,SS-SINR<br>S-SS RSSI, P-SS,S-SS,<br>S-SS Ec/Io | <b>NSA Scanner</b><br>Up to 8 LTE/NR carriers<br>Fast mode<br>NR scanner<br>Strongest Cell ID<br>SS-RSRP/Channel power<br>LTE scanner<br>Strongest Cell ID<br>RSRP/Channel power<br>Normal mode<br>NR scanner<br>Strongest Cell ID/SSB index<br>SS-RSRP/Channel power<br>PBCH EVM<br>Frequency error, Time error<br>LTE scanner<br>Strongest Cell ID<br>RSRP/Channel power<br>RS EVM<br>Frequency error, Time error | <b>Route map</b><br>Up to 8 LTE/NR carriers<br>Fast mode: Strongest PCI<br>Normal mode: Multi PCIs<br>NR Analyzer<br>Cell ID/SSB index<br>SS-RSRP/PS-RSRP<br>PS-SNR/SS-SINR/SS-RSRQ<br>LTE Analyzer<br>Cell ID<br>RSRP,RSRQ,PS-SNR,SS-SINR<br>S-SS RSSI, P-SS,S-SS,S-SS Ec/Io |

## GENERAL INFORMATION

| RF in   |  |         |
|---|--|---------|
| Connector type  | Option F001: Type-N, female  |         |
|   | Option F002: 2.92 mm, male   |         |
|   | Option F018: Type-N, female  |         |
| Impedance   | 50 $\Omega$  | Nominal |
| Damage level  | Option F001: +37 dBm, $\pm$ 50 VDC   |         |
|   | Option F002:<br>9 kHz to 6 GHz: +37 dBm, $\pm$ 50 VDC<br>24 GHz to 40 GHz: +27 dBm, $\pm$ 50 VDC |         |
|   | Option F018: +30 dBm, $\pm$ 50 VDC   |         |
| Average CW power  |  |         |
| Average CW power  |  |         |
| Average CW power  |  |         |
| Trigger in/out, GPS   |  |         |
| Connector type  | SMA, female  |         |
| Impedance   | 50 $\Omega$ nominal  |         |
| Reference clock in/out  |  |         |
| Connector type  | SMA, female  |         |
| Impedance   | 50 $\Omega$ 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  |         |
|   | Option F018: 62 W  |         |

## GENERAL INFORMATION CONTINUED

| <b>Battery</b>                                   |   |                       |
|--|---|-----------------------|
| Type   | 14.4 V, 6800 mAh (Lithium ion)  | Accepts two batteries |
| Operating time                                   | Option F001 standard (one battery): > 2:00 hrs<br>optional (two batteries): > 4:10 hrs              | Typical<br>Typical    |
|  | Option F002 standard (one battery): > 1:40 hrs<br>optional (two batteries): > 3:30 hrs              | Typical<br>Typical    |
|  | Option F018 standard (one battery): > 1:50 hrs<br>optional (two batteries): > 3:40 hrs              | Typical<br>Typical    |
|  | New battery with fully charged battery  |                       |
| Charging time                                    | 100 % charging<br>Standard (one battery): > 2:30 hrs<br>Optional secondary battery: > 4:30 hrs      |                       |
|  | Up to 80 % charging<br>Standard (one battery): > 1:40 hrs<br>Optional secondary battery: > 3:20 hrs |                       |
| Charging temperature                             | 0 to 45°C (32 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)   |                       |
| <b>Operating temperature</b>                     |   |                       |
| 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         |
| <b>Storage temperature</b>                       |   |                       |
| -20 to 60 °C (-4 to 140 °F)                      |   |                       |
| <b>Maximum humidity</b>                          |   |                       |
| 95% RH (noncondensing)                           |   |                       |
| <b>Memory</b>                                    |   |                       |
| Internal   | Maximum 4 GB  |                       |
| External   | Limited by size of USB/SD flash drive   |                       |
|  | SD card (not supplied), size ≤ 32 Gbyte   |                       |
| <b>Data storage</b>                              |   |                       |
| Internal   | > 1000 instrument setups and traces   |                       |
| External   | > 5000 instrument setups and traces   |                       |
| <b>Environmental</b>                             |   |                       |
| Vibration  | MIL-PRF-28800F Class 2  |                       |
| Shock  | MIL-PRF-28800F  |                       |
| Bench handling                                   | MIL-PRF-28800F  |                       |
| Transit drop                                     | MIL-PRF-28800F Class 2  |                       |
| <b>EMC</b>                                       |   |                       |
| IEC/EN 61326-1:2006 (complies with European EMC) |   |                       |
| CISPR11:2009 +A1:2010                            |   |                       |
| <b>ESD</b>                                       |   |                       |
| 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.)           |
|  | Option F018: < 6.0 kg (13.54 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<br>Includes: Spectrum analyzer, RF power meter               | Requires one of internal hardware options |
| Internal hardware option |   |   |
| CA5000-F001              | Frequency for 5G NR FR1 up to 6 Ghz   |   |
| CA5000-F002              | Frequency for 5G NR FR1 up to 6 GHz and FR2 up to 40 GHz                    |   |
| CA5000-F002N             | Frequency for 5G NR FR1 6 GHz and FR2 40 GHz with two RF ports              |   |
| CA5000-F018              | Frequency 9 kHz to 18.5 GHz   |   |
| CA5000-F030              | Frequency 9 kHz to 30 GHz with two RF ports                                 |   |
| CA5000-F044              | Frequency 9 kHz to 44 GHz with two RF ports                                 |   |
| 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      |   |
| CA5000-F002N-O           | Frequency for 5G NR FR1 6 GHz and FR2 40 GHz with optic HW and two RF ports |   |
| CA5000-F018-O            | Frequency 9 kHz to 18.5 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-FU18              | Frequency upgrade to 18.5 GHz   | Requires F001 or F001-O                   |
| CA5000-OU01              | Upgrade optic hardware  |   |
| CA5000-PU01              | Upgrade from one RF port to two RF ports for F002 or F002-O                 | Requires F002 or F002-O                   |
| 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-S034              | DSS Signal Analyzer   | Requires S032 or S033                     |
| CA5000-S040              | 5G TF signal analyzer   | Requires B100                             |
| CA5000-S041              | 5G NR signal analyzer   | Requires B100                             |
| CA5000-S042              | 5G NR TM signal analyzer  | Requires S041                             |
| CA5000-S043              | 5G NSA analyzer   | Requires S041                             |
| CA5000-S044              | 5G PDSCH analysis   | Requires S041                             |
| CA5000-S050              | RFoCPRI line rates 1 to 7 interference analyzer                             | Requires Optic HW                         |
| CA5000-S051              | RFoCPRI line rate 8 interference analyzer                                   | Requires Optic HW                         |
| SAA-ADVISOR              | Smart Access Anywhere for CellAdvisor products                              |   |



## 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        |
| G700050344              | Mag mount RF omni antenna SMF(f), 600 MHz to 6 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                          |
| 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                           |

## OPTIONAL ACCESSORIES CONTINUED

| 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<br>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  |
| G700050700                   | CA5G hard carrying case with wheels  |
| 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                                |
| 41DWDMC-PC / E41DWDMC-APC    | Tunable DWDM C-band 1528 nm to 1568 nm, PC or APC connector Short/medium/long-haul qualification                 |