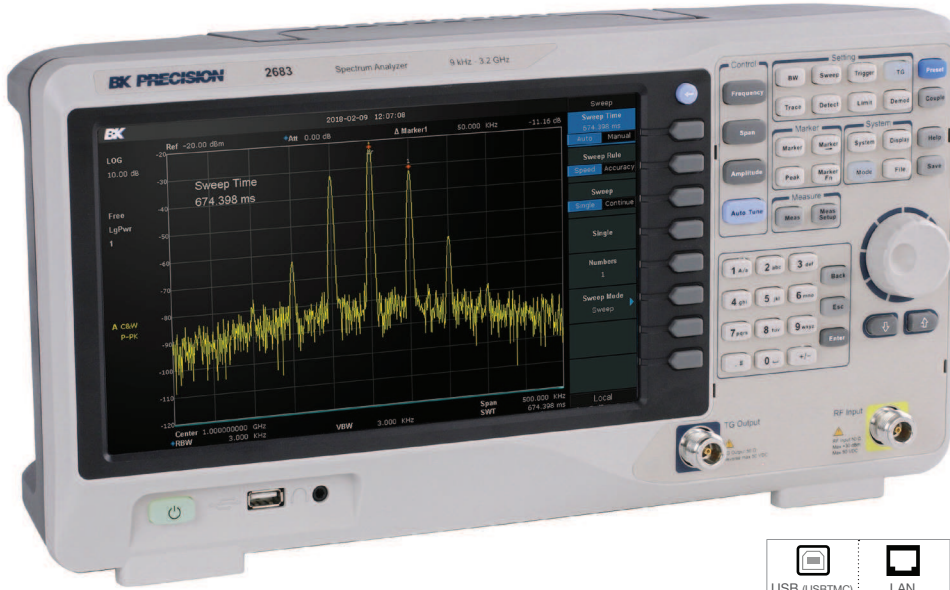


# Spectrum Analyzers

## 2680 Series



### Features & benefits

- Frequency range: 9 kHz to 2.1 or 3.2 GHz
- High Sensitivity -161 dBm/Hz displayed average noise level (DANL)
- Low phase noise of -98 dBc/Hz @ 10 kHz offset
- Low level uncertainty of  $\pm 0.7$  dB
- 1 Hz minimum resolution bandwidth (RBW)
- Pre-amplifier and tracking generator standard on all models
- 10.1" wide-screen 1024 x 600 color display
- LAN and USBTMC connectivity
- USB host port to store and recall waveform data, setups, and screen captures

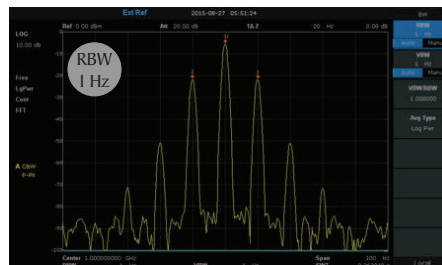
### Options

- Reflection measurement
- EMI pre-compliance

The 2680 Series of spectrum analyzers delivers performance and functionality in a lightweight, compact design, suitable for lab and field use. The large 10.1" wide-screen color display allows the user to visualize the waveform and make precision measurements such as third order intercept, occupied bandwidth, 2D and 3D spectrum monitor.

The 2680 Series provides a standard pre-amplifier and tracking generator in both the 2.1 and 3.1 GHz models. The series also includes 1 Hz minimum RBW and advanced measurements, which make these analyzers perfect for applications in 2 way radio, site surveying, EMI pre-compliance, characterizing the frequency response of RF devices and more.

### 1 Hz minimum resolution bandwidth (RBW)

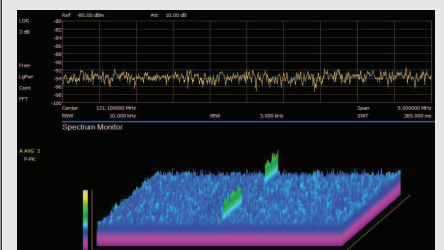
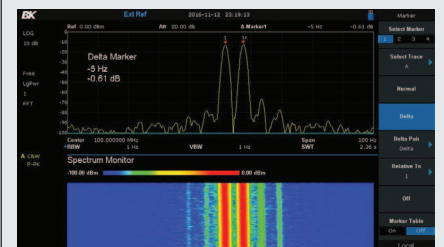


Low resolution bandwidth helps differentiate between adjacent signals

### Standard

#### Advanced measurements

- Channel Power
- Adjacent Channel Power
- Occupied Bandwidth
- Total Power
- Third-Order-Intercept
- 2D and 3D Spectrum Monitor



| Models                | 2682             | 2683             |
|-----------------------|------------------|------------------|
| Frequency Range       | 9 kHz to 2.1 GHz | 9 kHz to 3.2 GHz |
| Tracking Generator    | ✓                | ✓                |
| Pre-amplifier         | ✓                | ✓                |
| Advanced Measurements | ✓                | ✓                |

## Front panel

### LCD display

10.1 inch TFT high resolution color display to view critical detail in the spectrum

### Menu control keys

Provide quick access to the most common functions in the current mode

### Function keys

Setup measurement modes and activate context based help for each key which also includes SCPI information where applicable

### Control keys

Use the rotary knob, arrow keys or alpha numeric keys to adjust values

### Power switch

### USB host port

Store or recall analyzer settings and save screen captures

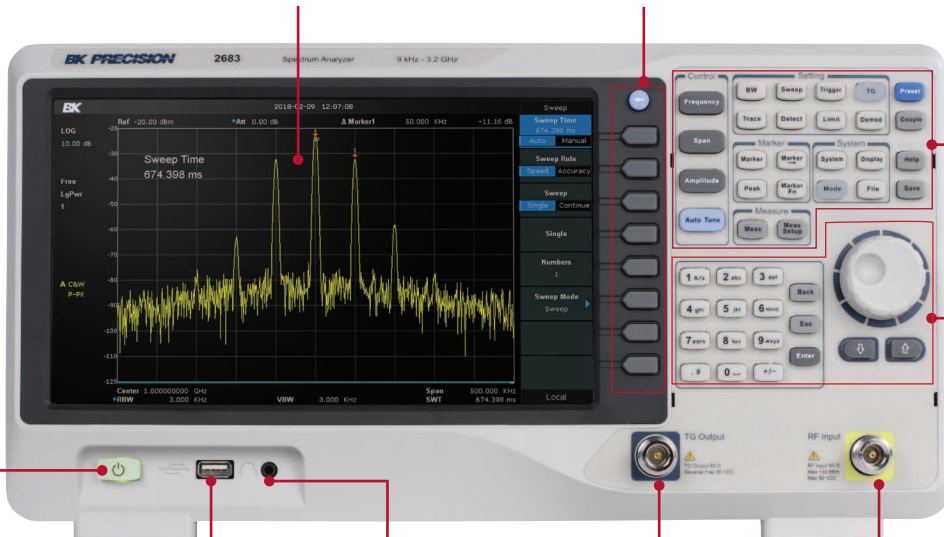
### Earphone jack

Listen to demodulated AM or FM signals

### Tracking generator output

For gain/loss, antenna, and cable measurements. Standard on all models

### RF input



## Side & rear panel

### Remote interface

USB and LAN connections

### 10 MHz REF input/output

Synchronize multiple instruments

### Kensington security slot

Secure your spectrum analyzer and prevent theft

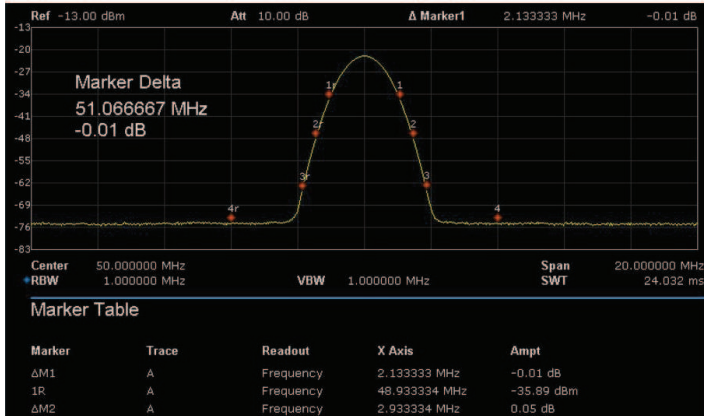
### Trigger input

External TTL signal to initiate sweep



## Operation highlights

### Delta markers



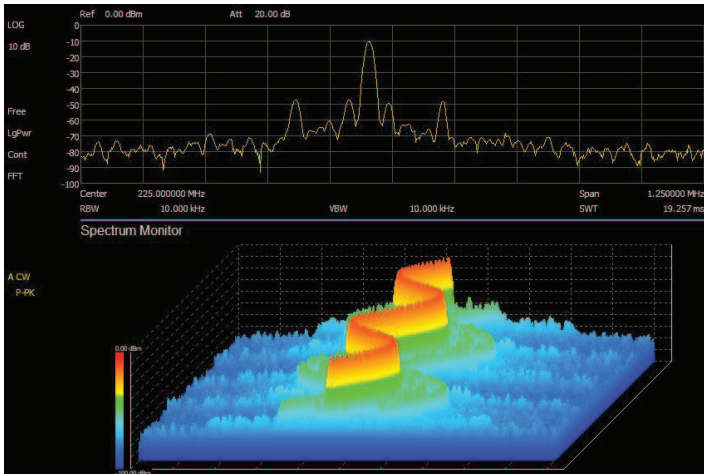
Powerful delta markers can be used to select amplitude, span, stop, start or center frequency, measure noise level, amplitude or frequency.

### Low displayed average noise level (DANL)



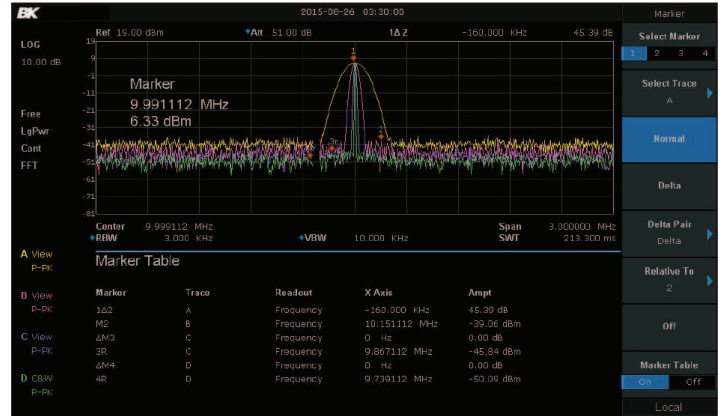
Take advantage of the preamp and -161 dBm DANL to measure low level signals accurately.

### Spectrum monitor



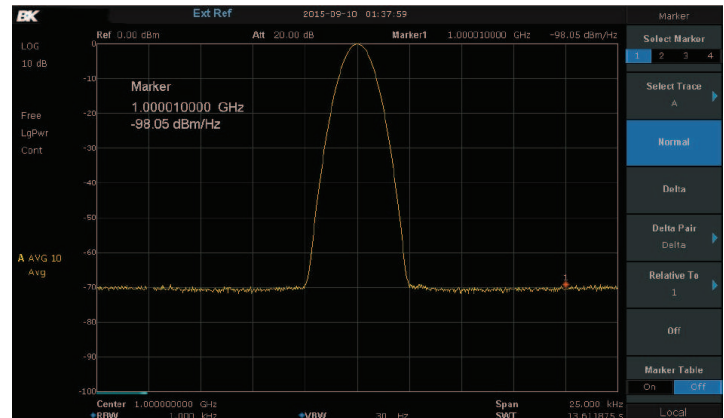
The 2D and 3D spectrum monitor features are standard on the 2.1 GHz and 3.2 GHz models. The 3D spectrum monitor can be displayed using the provided PC software, while the 2D is viewable on the spectrum analyzer screen and in the PC software. This feature shows how the frequency content of a signal changes over time by representing the power intensity with a color gradient.

### Four independent traces and markers



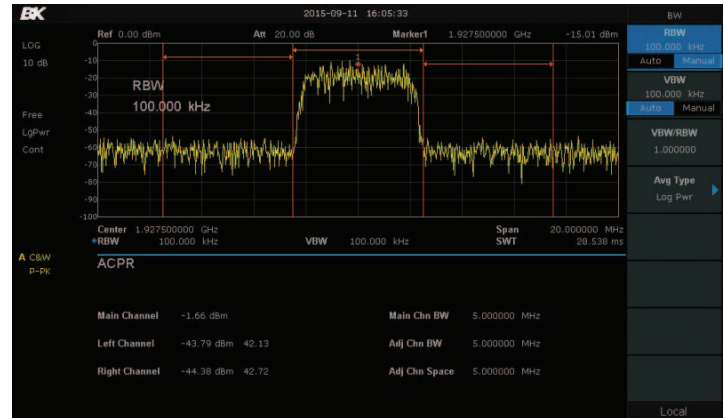
Capture snapshots, continuously update the maximum or minimum value, and perform math on all 4 individually colored traces.

### Low phase noise for accurate measurements



Phase noise -98 dBc/Hz@1 GHz, offset 10 kHz.

### Adjacent channel power ratio (ACPR)



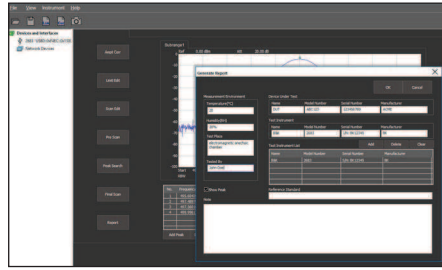
In today's crowded spectrum, ACPR measurements are critical to ensure compliance with regulations. The 2680 series displays the main channel power, left and right channel power as well as bandwidth for each channel on screen for ease of determining the total power being transmitted and the spectrum being used.



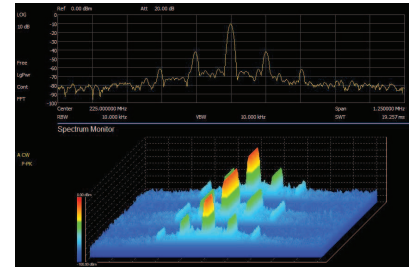
## Spectrum Analyzers 2680 Series

### PC software

Expand control of the spectrum analyzer with front panel emulation. Create, load or save user defined limit and correction files, save screen captures and store readings from the included software.



Generate test reports

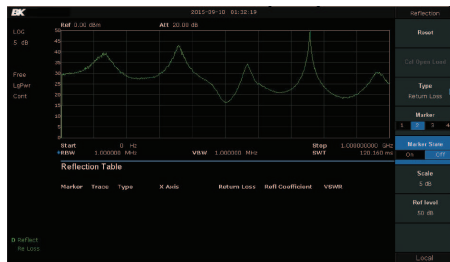


Use 3D spectrum monitoring with the PC software.

## Options

### Reflection measurement option

This option enables VSWR, reflection coefficient, and return loss measurements for tuning and determining the efficiency of antennas, filters, or RF transmission modules.



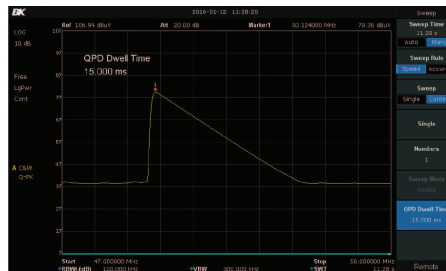
Visualize return loss, reflection coefficient, and VSWR of your DUT.



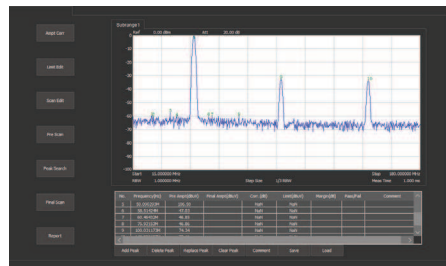
Reflection bridge

### EMI pre-compliance option

This option enables the instrument's EMI measurement function which includes pre-defined bandwidth set points of 200 Hz, 9 kHz and 120 kHz, a -6dB EMI filter, and the quasi-peak detector as specified by CISPR 16-1.



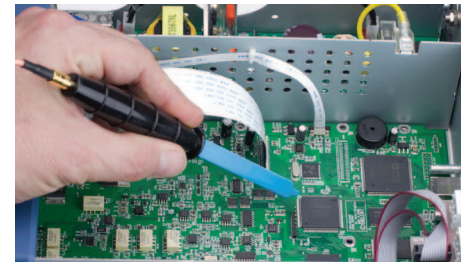
Quasi-peak detection with dwell time helps identify non-compliant emissions.



Use the provided EMI software (available for download at [www.bkprecision.com](http://www.bkprecision.com)) to configure the spectrum analyzer, perform prescan, peak search, final scan and generate reports of your pre-compliance tests.

### Near field probe kit

The RF energy radiating from a device can be detected and measured with near field probes and the spectrum analyzer. The wide band amplifier can be connected between the probe and the 2680 Series to increase the dynamic range of the measurement system. The probes can also be used to test RF immunity by inducing signal into the circuit.



Use near field probes to help track down emissions.



Magnetic (H) and electric (E) near field probes with 40 dB pre-amplifier

### Buy now, upgrade later

Install the licenses at any time or try before you buy with the 30 day trial license on each instrument. Installation is quick and easily done within the spectrum analyzer menu. To purchase a license key, please fill out the license request form which can be found on the 2680 Series accessory page on our website [www.bkprecision.com](http://www.bkprecision.com).

### Order information for instrument options

| Order number | Description   |
|--------------|---|
| EMI2680      | License key, activates EMI measurements with Quasi-peak             |
| RFL2680      | License key, activates reflection measurements                      |
| RB2680       | Reflection bridge with adapters                                     |
| PR262        | 1 electric and 3 magnetic field probes with amplifier and SMA cable |

## Specifications

Specifications are valid under the following conditions: The instrument is within the calibration period, has been stored between 0 and 50°C for at least 2 hours prior to use, and has been powered on and warmed up for at least 40 minutes. The specifications include the measurement uncertainty, unless otherwise noted.

**Specifications:** All products are guaranteed to meet published specifications when operating temperatures from 5 to 45°C, unless otherwise noted.

**Typical:** Performance deemed typical implies that 80 percent of the measurement results will meet the typical published performance with a 95th percentile confidence level at room temperature (approximately 25°C). Typical performance is not warranted and does not include measurement uncertainty.

**Nominal:** The expected performance or design attribute.

| Series                               | 2682  | 2683             |
|--------------------------------------|---|------------------|
| <b>Frequency characteristics</b>     |   |                  |
| Frequency Range                      | 9 kHz to 2.1 GHz  | 9 kHz to 3.2 GHz |
| Frequency Resolution                 | 1 Hz  |                  |
| Frequency Span                       | 0 Hz, 100 Hz to 2.1 or 3.2 GHz  |                  |
| Frequency Span Accuracy              | ±Span / (number of sweep points -1)   |                  |
| <b>Internal reference source</b>     |   |                  |
| Reference Frequency                  | 10 MHz  |                  |
| Initial Calibration Accuracy         | <1 ppm  |                  |
| Temperature Stability                | <1 ppm/year, 0 °C to +50 °C   |                  |
| Frequency Aging Rate                 | <0.5 ppm/first year, 3.0 ppm/20 year  |                  |
| Frequency Reference Accuracy         | ±[(time since last adjustment × frequency aging rate) + temperature stability + calibration accuracy]                   |                  |
| <b>Marker</b>                        |   |                  |
| Marker Resolution                    | Span / (number of sweep points -1)  |                  |
| Marker Uncertainty                   | ± [frequency indication × frequency reference uncertainty + 1% × span + 10% × resolution bandwidth + marker resolution] |                  |
| Frequency Counter Resolution         | 1 Hz  |                  |
| Frequency Counter Uncertainty        | ± [frequency indication × frequency reference accuracy + counter resolution]  |                  |
| <b>Bandwidths</b>                    |   |                  |
| Resolution Bandwidth (-3 dB)         | 1 Hz to 1 MHz, in 1-3-10 sequence   |                  |
| Resolution Filter Shape Factor       | <4.8:1 (60 dB: 3 dB), Gaussian-like   |                  |
| RBW Uncertainty                      | <5%   |                  |
| Video Bandwidth (-3 dB)              | 1 Hz to 3 MHz, in 1-3-10 sequence   |                  |
| VBW Uncertainty                      | <5%   |                  |
| <b>Amplitude and level</b>           |   |                  |
| Measurement Range (preamplifier off) | DANL to +10 dBm, 100 kHz to 1 MHz<br>DANL to +20 dBm, 1 MHz to 3.2 GHz  |                  |
| Reference Level                      | -100 dBm to +30 dBm, 1 dB steps   |                  |
| Preamplifier                         | 20 dB (nom.), 9 kHz to 3.2 GHz  |                  |
| Input Attenuation                    | 0 to 51 dB, 1 dB steps  |                  |
| Maximum Input DC Voltage             | ±50 Vdc   |                  |
| Maximum Average RF Power             | 30 dBm, 3 minutes, $f_c \geq 10$ MHz, attenuation >20 dBm, preamplifier off   |                  |
| Maximum Damage Level                 | 33 dBm, $f_c \geq 10$ MHz, attenuation >20 dBm, preamplifier off  |                  |

| Displayed average noise level (DANL)                                   |   |                           |                           |
|--|---|---------------------------|---------------------------|
| 20 °C to 30 °C, attenuation = 0 dB, sample detector, trace average >50 |   |                           |                           |
|  |   | RBW=10 Hz                 | Normalization to 1 Hz     |
| Preamp Off   | 9 kHz to 100 kHz  | -100 dBm (nom.)           | -100 dBm (nom.)           |
|  | 100 kHz to 1 MHz  | -97 dBm, -101 dBm (typ.)  | -107 dBm, -111 dBm (typ.) |
|  | 1 MHz to 10 MHz   | -122 dBm, -126 dBm (typ.) | -132 dBm, -136 dBm (typ.) |
|  | 10 MHz to 200 MHz   | -127 dBm, -131 dBm (typ.) | -137 dBm, -141 dBm (typ.) |
|  | 200 MHz to 2.1 GHz  | -125 dBm, -129 dBm (typ.) | -135 dBm, -139 dBm (typ.) |
|  | 2.1 GHz to 3.2 GHz  | -116 dBm, -122 dBm (typ.) | -126 dBm, -132 dBm (typ.) |
| Preamp On  | 9 kHz to 100 kHz  | -107 dBm (nom.)           | -117 dBm (nom.)           |
|  | 100 kHz to 1 MHz  | -122 dBm, -127 dBm (typ.) | -132 dBm, -137 dBm (typ.) |
|  | 1 MHz to 10 MHz   | -138 dBm, -144 dBm (typ.) | -148 dBm, -154 dBm (typ.) |
|  | 10 MHz to 200 MHz   | -146 dBm, -151 dBm (typ.) | -156 dBm, -161 dBm (typ.) |
|  | 200 MHz to 2.1 GHz  | -145 dBm, -148 dBm (typ.) | -155 dBm, -158 dBm (typ.) |
|  | 2.1 GHz to 3.2 GHz  | -135 dBm, -139 dBm (typ.) | -145 dBm, -149 dBm (typ.) |
| <b>Phase noise</b>   |   |                           |                           |
| Carrier Offset   | $f_c = 1$ GHz, 20 °C ~30 °C   |                           |                           |
| 10 kHz   | <-95 dBc/Hz, <-98 dBc/Hz (typ.)   |                           |                           |
| 100 kHz  | <-96 dBc/Hz, <-97 dBc/Hz (typ.)   |                           |                           |
| 1 MHz  | <-115 dBc/Hz, <-117 dBc/Hz (typ.)   |                           |                           |
| <b>Level display</b>   |   |                           |                           |
| Logarithmic Level Axis   | 10 dB to 100 dB   |                           |                           |
| Linear Level Axis  | 0 to reference level  |                           |                           |
| Units of Level Axis  | dBm, dBmV, dBµV, dBµA, V, W   |                           |                           |
| Number of Display Points   | 751   |                           |                           |
| Number of Traces   | 4   |                           |                           |
| Trace Detectors  | Positive-Peak, Negative-Peak, Sample, Normal, Average (Voltage/RMS/Video), Quasi-Peak (with EMI option) |                           |                           |
| Trace Functions  | Clear Write, Max Hold, Min Hold, View, Blank, Average   |                           |                           |

## Specifications (continued)

| Frequency response                            |   |                          |
|---|---|--------------------------|
| Preamplifier                                  | Off   | ±0.8 dB,<br>±0.4 dB typ. |
|   | On  | ±0.9 dB,<br>±0.5 dB typ. |
| Error and accuracy                            |   |                          |
| Resolution Bandwidth<br>Switching Uncertainty | 1 Hz RBW<br>Logarithmic resolution ±0.2 dB,<br>Linear resolution ±0.01, nom.  |                          |
| Input Attenuation<br>Switching Uncertainty    | 20 °C to 30 °C, $f_c = 50$ MHz, preamp off,<br>Relative to 20 dB, 1 to 51 dB attenuation ±0.5 dB  |                          |
| Absolute Amplitude Accuracy                   | Preamplifier off: ±0.4 dB, input signal -20 dBm<br>Preamplifier on: ±0.5 dB, input signal -40 dBm   |                          |
| Total Amplitude Accuracy                      | ±0.7 dB<br>20 °C to 30 °C, $f_c > 100$ kHz, input signal -50 dBm<br>to 0 dBm, RBW = 1 kHz, VBW = 1 kHz, peak<br>detector, attenuation = 20 dB, preamp off,<br>95th percentile reliability |                          |
| RF Input VSWR                                 | <1.5 nom.<br>Input attenuation 10 dB, 1 MHz to 3.2 GHz  |                          |
| Distortion and spurious responses             |   |                          |
| Second Harmonic Distortion                    | -65 dBc<br>$f_c \geq 50$ MHz, Mixer Level -30 dBm,<br>attenuation = 0 dB, preamp off, 20 °C to 30 °C  |                          |
| Third-Order Intercept                         | +10 dBm<br>$f_c \geq 50$ MHz, two -20 dBm tones at input mixer<br>spaced by 100 kHz, attenuation = 0 dB, preamp off,<br>20 °C to 30 °C  |                          |
| 1 dB Gain Compression                         | >-5 dBm, nom.<br>$f_c \geq 50$ MHz, attenuation = 0 dB, preamp off,<br>20 °C to 30 °C   |                          |
| Residual Response                             | <-90 dBm, typ.<br>input terminated = 50 $\Omega$ , attenuation = 0 dB,<br>20 °C to 30 °C  |                          |
| Input Related Spurious                        | <-65 dBc<br>Mixer level = -30 dBm, 20 °C to 30 °C   |                          |
| Sweep and trigger                             |   |                          |
| Sweep Time                                    | 1 ms to 3000 s  |                          |
| Sweep Accuracy                                | Accuracy, Speed   |                          |
| Sweep Mode                                    | Sweep, FFT  |                          |
| Sweep Rule                                    | Single, Continuous  |                          |
| Trigger Source                                | Free, Video, External   |                          |
| External Trigger                              | 5 V TTL level, 1 k $\Omega$ , BNC-female,<br>rising edge/falling edge   |                          |

| Tracking generator                      |   |                    |
|---|---|--------------------|
| Frequency Range                         | 100 kHz to 2.1 GHz  | 100 kHz to 3.2 GHz |
| Output Level                            | -20 dBm to 0 dBm  |                    |
| Output Level Resolution                 | 1 dB  |                    |
| Output Flatness                         | ±3 dB   |                    |
| Output Maximum<br>Reserve Level         | Mean power: 30 dBm, DC: ±50 Vdc   |                    |
| EMI Pre-compliance option (EMI2680)     |   |                    |
| Resolution Bandwidth (6 dB)             | 200 Hz, 9 kHz, 120 kHz  |                    |
| Detector                                | Quasi-peak (following CISPR 16-1-1)   |                    |
| Dwell Time                              | 0 $\mu$ s to 10 s   |                    |
| Reflection measurement option (RFL2680) |   |                    |
| Measurements                            | VSWR, Return loss, Reflect coefficient  |                    |
| RF and 10 MHz input/output              |   |                    |
| Front panel RF input                    | 50 $\Omega$ , N-female  |                    |
| Front panel TG output                   | 50 $\Omega$ , N-female  |                    |
| 10 MHz reference output                 | 10 MHz, >0 dBm, 50 $\Omega$ , BNC-female  |                    |
| 10 MHz reference input                  | 10 MHz, -5 dBm to +10 dBm, 50 $\Omega$ , BNC-female                                 |                    |
| General                                 |   |                    |
| AC Input                                | 100 V - 240 V, 50 Hz/60 Hz/400 Hz AC  |                    |
| Display                                 | TFT LCD, 1024 x 600 (waveform area 751 x 501),<br>10.1"                             |                    |
| I/O Interface                           | USB host (type A) USB 2.0<br>USB device (type B) USB 2.0<br>LAN 10/100 Base T, RJ45 |                    |
| Temperature                             | Operating: 0 °C to 50 °C<br>Storage: -20 °C to 70 °C                                |                    |
| Humidity                                | 0 °C to 30 °C, ≤95% RH<br>30 °C to 50 °C, ≤75% RH                                   |                    |
| Safety                                  | EN 61010-1:2010, Low Voltage Directive (LVD)<br>2014/35/EU                          |                    |
| Electromagnetic Compatibility           | EN 61326-1:2013, EMC Directive 2014/30/EU   |                    |
| Dimensions (W x H x D)                  | 15.47" x 8.15" x 4.59"<br>(393 mm x 207 mm x 116.5 mm)                              |                    |
| Weight                                  | 10.1 lb (4.60 kg)   |                    |
| Warranty                                | 3 years   |                    |
| Included Accessories                    | Power cord, certificate of calibration  |                    |
| Optional Accessories                    | EMC Near-field probes (PR262),<br>reflection bridge (RB2680)                        |                    |