



RIGOL

# RSA800 Series

Real-Time Spectrum Analyzer

Data Sheet  
DSD36102-1110  
2026.08

# Product Features

- Six working modes: GPSA, RTSA, VSA, EMI, ADM and PNOISE
- Frequency range: 5 kHz to 14 GHz
- Excellent DANL (Displayed Average Noise Level)
- Good phase noise performance
- High-precision amplitude measurement error
- Multiple analysis bandwidth options
- Excellent SFDR
- Powerful real-time spectrum analysis function
- Display different types of measurement values in multi-pane windowing form
- Built-in tracking generator output
- Appearance and Dimensions: 265.35 mm (W) × 161.75 mm (H) × 77.38 mm (D)
- Interfaces: USB, LAN, and HDMI
- Power supply: Type-C adapter; supports power bank
- Support standard SCPI instruction sets

RSA800 Series Real-Time Spectrum Analyzer is a real-time spectrum analyzer product launched by RIGOL. It features excellent test dynamic range, phase noise, amplitude accuracy, and test speed, and supports functions including spectrum analysis, real-time spectrum analysis, vector signal analysis, and phase noise analysis, meeting diverse signal testing and analysis requirements.

The RSA800 series products offer robust system expansion capabilities, enabling test system integration and secondary development through various digital and analog output interfaces. With a compact and portable form factor, the instrument is suitable for laboratory, educational, and field testing environments, and supports power bank supply for mobile testing applications.

With its stable performance and flexible application modes, the RSA800 series can be widely used in R&D, production, and maintenance testing across fields such as wireless communications, automotive electronics, and the Internet of Things (IoT).

# RSA800 Series Technical Specifications

Six working modes: GPSA, RTSA, VSA, EMI, ADM and PNOISE

| Model                                   | RSA804                                                    | RSA808           | RSA814          |
|-----------------------------------------|-----------------------------------------------------------|------------------|-----------------|
| Frequency Range                         | 5 kHz to 4.5 GHz                                          | 5 kHz to 8.5 GHz | 5 kHz to 14 GHz |
| Amplitude Range                         | DANL to +20 dBm                                           |                  |                 |
| 1 GHz Phase Noise                       | 10 kHz offset, <-110 dBc/Hz, -112 dBc/Hz (typ.)           |                  |                 |
| 1 GHz DANL<br>normalized to 1 Hz        | -145 dBm (typ.) with PA off<br>-168 dBm (typ.) with PA on |                  |                 |
| RBW                                     | 1 Hz to 10 MHz                                            |                  |                 |
| VBW                                     | 1 Hz to 10 MHz                                            |                  |                 |
| Third-order Intercept (TOI)<br>1GHz     | +20 dBm (typ.)                                            |                  |                 |
| Max. Analysis Bandwidth                 | 40 MHz                                                    |                  |                 |
| Max.<br>Real-Time Bandwidth             | 40 MHz                                                    |                  |                 |
| Measurement Functions                   | GPSA, RTSA, VSA, EMI, ADM, PNOISE                         |                  |                 |
| Tracking Generator Output<br>Power      | - 40dBm to +0dBm                                          |                  |                 |
| Appearance<br>and Dimensions            | 265.35 mm (W) × 161.75 mm (H) × 77.38 mm (D)              |                  |                 |
| I/O                                     | LAN, USB, HDMI                                            |                  |                 |
| Screen                                  | 7-inch 1024×600 HD touch display                          |                  |                 |
| Programming<br>Control Instruction Sets | Support standard SCPI instruction sets                    |                  |                 |

## Specifications

- **Specifications are valid under the following conditions:** the instrument is within the calibration period; stored for at least two hours at 0°C to 40°C temperature; 40-minute warm-up. Unless otherwise noted, the specifications in the manual include the measurement uncertainty.
- **Typical (typ.):** typical performance, which 80 percent of the measurement results will meet at room temperature (approximately 25°C). The data are not warranted and do not include the measurement uncertainty.
- **Nominal (nom.):** the expected mean or average performance or a designed attribute (such as the 50  $\Omega$  connector). The data are not warranted and are measured at room temperature (approximately 25°C).
- **Measured (meas.):** an attribute measured during the design phase and can be compared with the expected performance, e.g. the amplitude drift varies with time. The data are not warranted and are measured at room temperature (approximately 25°C).

### Note:

All charts in this manual are the measurement results of multiple instruments at room temperature unless otherwise noted. All the specifications (except tracking generator specifications) listed in this manual are obtained with tracking generator off.

## Measurement Mode and Product Model Adaptation Table

|        | RSA804 | RSA808 | RSA814 |
|--------|--------|--------|--------|
| GPSA   | √      | √      | √      |
| RTSA   | √      | √      | √      |
| VSA    | ○      | ○      | ○      |
| EMI    | ○      | ○      | ○      |
| ADM    | ○      | ○      | ○      |
| PNOISE | ○      | ○      | ○      |

**NOTE:** √ indicates standard configuration; ○ indicates optional configuration.

## All Measurement Modes

| Model                        | RSA804                                                                                                                            | RSA808           | RSA814          |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------|-----------------|
| Frequency Range              | 5 kHz to 4.5 GHz                                                                                                                  | 5 kHz to 8.5 GHz | 5 kHz to 14 GHz |
| Internal Reference Frequency |                                                                                                                                   |                  |                 |
| Reference Frequency          | 10 MHz                                                                                                                            |                  |                 |
| Accuracy                     | $\pm[(\text{time since last calibration} \times \text{aging rate}) + \text{temperature stability} + \text{calibration accuracy}]$ |                  |                 |
| Initial Calibration Accuracy | 1 ppm                                                                                                                             |                  |                 |
| Temperature Stability        | 0°C to 40°C, with the reference 25°C                                                                                              |                  |                 |
|                              | <0.5 ppm                                                                                                                          |                  |                 |
| Aging Rate                   | <0.5 ppm/year                                                                                                                     |                  |                 |

# GPSA Mode

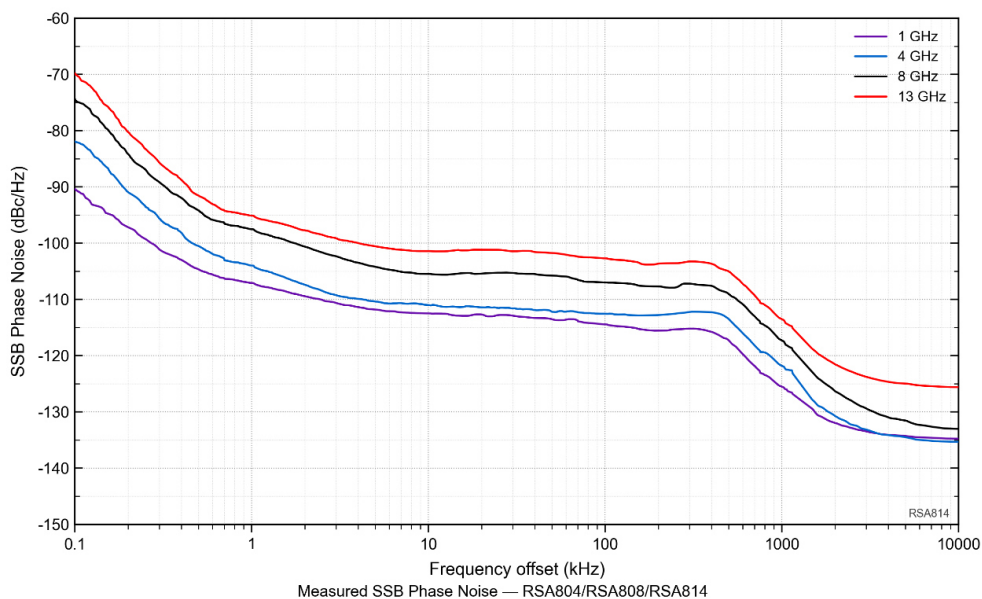
## Frequency

| Frequency Readout Accuracy   |                                                                                                                                                                                           |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Marker Frequency Resolution  | span/(number of sweep points - 1)                                                                                                                                                         |
| Marker Frequency Uncertainty | $\pm(\text{marker frequency readout} \times \text{reference frequency accuracy} + 1\% \times \text{span} + 10\% \times \text{resolution bandwidth} + \text{marker frequency resolution})$ |

| Frequency counter (RBW = 1 kHz, Freq = 1 GHz) |                                                                                                               |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Resolution                                    | 1 Hz (Max.)                                                                                                   |
| Uncertainty                                   | $\pm(\text{marker frequency readout} \times \text{reference frequency accuracy} + \text{counter resolution})$ |

| Frequency Span |                                                                                   |
|----------------|-----------------------------------------------------------------------------------|
| Range          | 0 Hz, 10 Hz to maximum frequency                                                  |
| Resolution     | 2 Hz                                                                              |
| Uncertainty    | $\pm[0.1\% \times \text{span} + \text{span}/(\text{number of sweep points} - 1)]$ |

| SSB Phase Noise                           |        |                                   |
|-------------------------------------------|--------|-----------------------------------|
| 20°C to 30°C, fc = 1 GHz, sample detector |        |                                   |
| Carrier Offset                            | 1 kHz  | <-100 dBc/Hz, <-102 dBc/Hz (typ.) |
|                                           | 10 kHz | <-110 dBc/Hz, <-112 dBc/Hz (typ.) |
|                                           | 1 MHz  | <-120 dBc/Hz, <-122 dBc/Hz (typ.) |
|                                           | 10 MHz | <-130 dBc/Hz (typ.)               |



SSB Phase Noise

| Residual FM                     |               |
|---------------------------------|---------------|
| 20°C to 30°C, RBW = VBW = 1 kHz |               |
| Residual FM                     | <10 Hz (nom.) |

| Bandwidth                                                  |                                    |
|------------------------------------------------------------|------------------------------------|
| Set "Sweep Type" to "Accurate"                             |                                    |
| Resolution Bandwidth (-3 dB)                               | 1 Hz to 10 MHz, in 1-3-10 sequence |
| RBW Accuracy                                               | 10 MHz, <10%                       |
|                                                            | 1 Hz to 3 MHz, <3%                 |
| Resolution filter shape factor (60 dB:3 dB) <sup>[1]</sup> | ≤5 (nom.)                          |
| Video Bandwidth (-3 dB)                                    | 1 Hz to 10 MHz, in 1-3-10 sequence |
| Resolution Bandwidth (-6 dB)                               | 200 Hz, 9 kHz, 120 kHz, 1 MHz      |

## Amplitude

| Measurement Range |                                                 |
|-------------------|-------------------------------------------------|
| Range             | $f_c \geq 10$ MHz                               |
|                   | Displayed Average Noise Level (DANL) to +20 dBm |

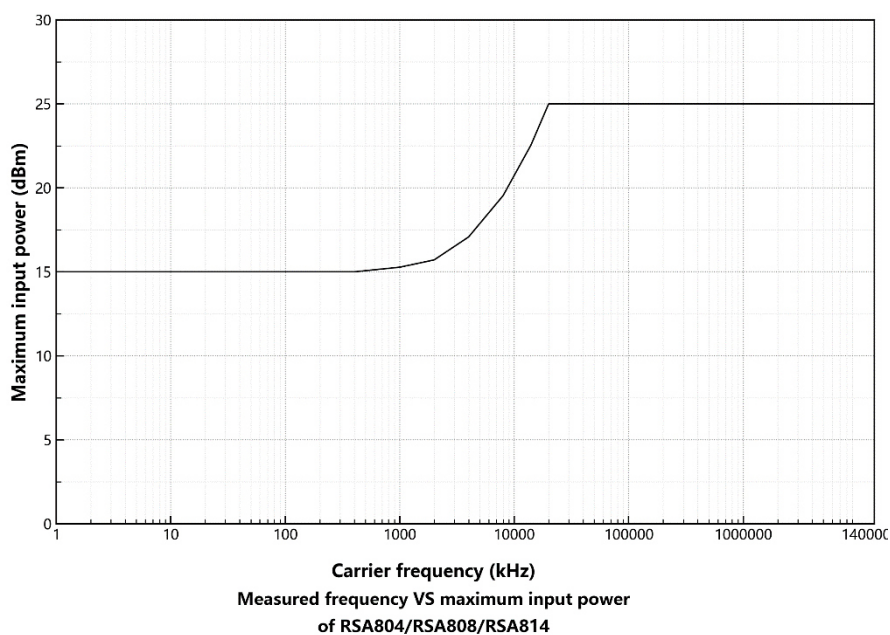
| Maximum Safe Input Level <sup>[2]</sup> |                                     |
|-----------------------------------------|-------------------------------------|
| DC Voltage                              | 35 V                                |
| CW RF Power                             | +20 dBm, attenuator = 30 dB, PA off |
|                                         | -10 dBm, attenuator = 30 dB, PA on  |

| Maximum Damage Level |         |
|----------------------|---------|
| CW RF Power          | +25 dBm |

### Note:

[1]: For RBW > 100 kHz, direct measurement of filter characteristics near -60 dB is not feasible due to SNR constraints.

[2]: When  $f_c < 20$  MHz, the maximum safe input level is reduced.

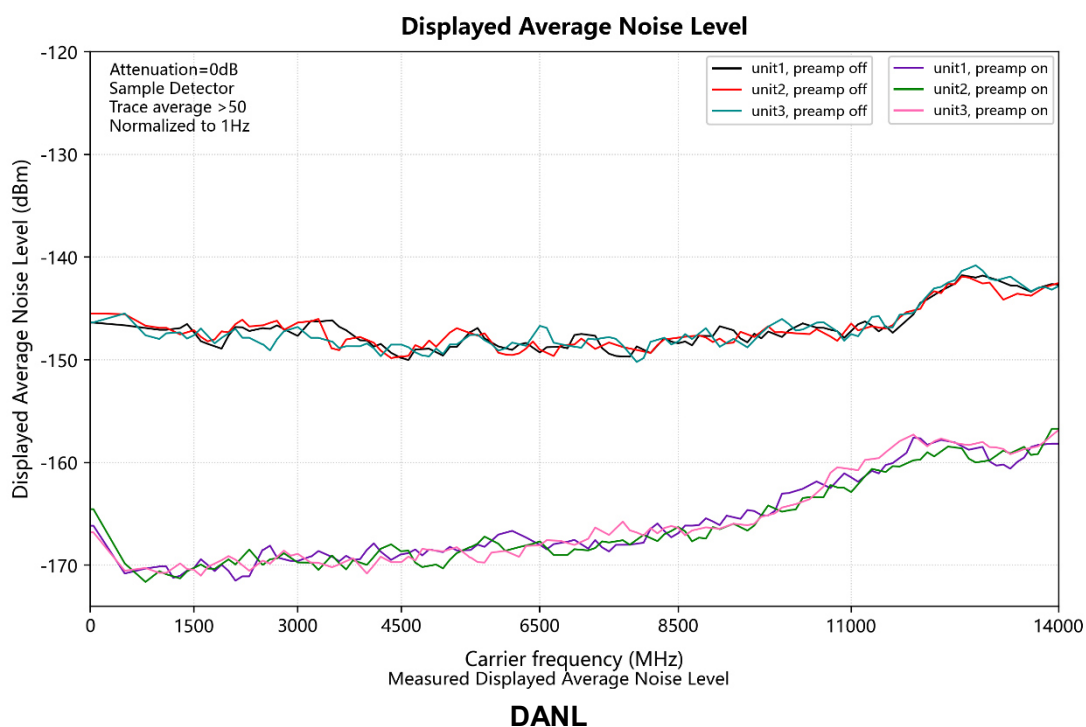


### Maximum Damage Level

#### Displayed Average Noise Level (DANL)

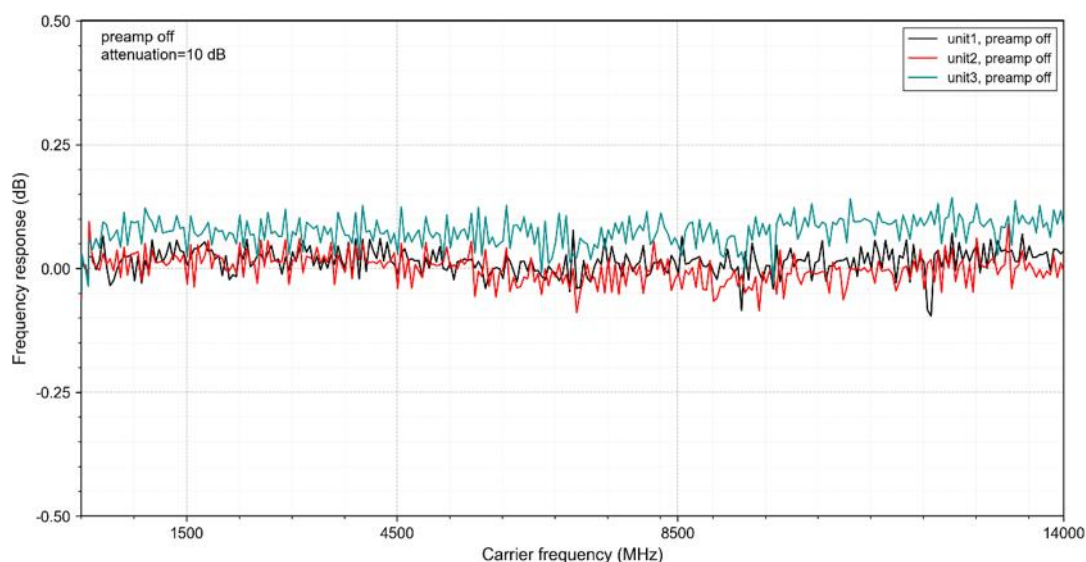
Attenuation = 0 dB, sample detector, trace averages  $\geq 50$ , tracking generator off, normalized to 1 Hz, 20°C to 30°C, input impedance = 50  $\Omega$ .

|        |                            |                             |
|--------|----------------------------|-----------------------------|
| PA Off | 5 kHz < f $\leq$ 100 kHz   | <-120 dBm (typ.)            |
|        | 100 kHz < f $\leq$ 4.5 GHz | <-140 dBm, <-143 dBm (typ.) |
|        | 4.5 GHz < f $\leq$ 8.5 GHz | <-142 dBm, <-145 dBm (typ.) |
|        | 8.5 GHz < f $\leq$ 11 GHz  | <-140 dBm, <-143 dBm (typ.) |
|        | 11 GHz < f $\leq$ 14 GHz   | <-135 dBm, <-138 dBm (typ.) |
| PA On  | 1 MHz < f $\leq$ 100 MHz   | <-155 dBm, <-158 dBm (typ.) |
|        | 100 MHz < f $\leq$ 4.5 GHz | <-165 dBm, <-168 dBm (typ.) |
|        | 4.5 GHz < f $\leq$ 8.5 GHz | <-162 dBm, <-165 dBm (typ.) |
|        | 8.5 GHz < f $\leq$ 11 GHz  | <-155 dBm, <-158 dBm (typ.) |
|        | 11 GHz < f $\leq$ 14 GHz   | <-150 dBm, <-153 dBm (typ.) |



| Level Display            |                                                                                                     |
|--------------------------|-----------------------------------------------------------------------------------------------------|
| Logarithmic Scale        | 1 dB to 200 dB                                                                                      |
| Linear Scale             | 0 to reference level                                                                                |
| Number of display points | 801                                                                                                 |
| Number of traces         | 6                                                                                                   |
| Detector Type            | Normal, pos-peak, neg-peak, sample, RMS average, voltage average, Quasi-peak, EMI CISPR RMS average |
| Trace Type               | Clear write, max hold, min hold, average, view, blank                                               |
| Scale Unit               | dBm, dBmV, dBuV, nV, uV, mV, V, pW, nW, uW, mW, W, mA, uA, A                                        |

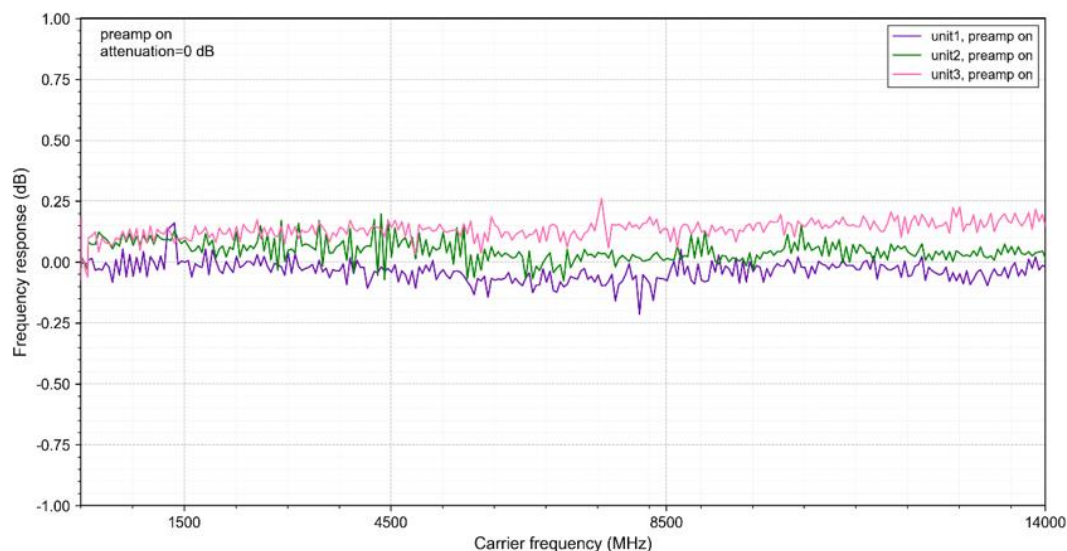
| Frequency Response |                                                       |                         |
|--------------------|-------------------------------------------------------|-------------------------|
| PA Off             | attenuation = 10 dB, relative to 50 MHz, 20°C to 30°C |                         |
|                    | 9 kHz < f ≤ 100 kHz                                   | <0.3 dB (typ.)          |
|                    | 100 kHz < f ≤ 4.5 GHz                                 | <0.5 dB, <0.3 dB (typ.) |
|                    | 4.5 GHz < f ≤ 8.5 GHz                                 | <0.7 dB, <0.5 dB (typ.) |
|                    | 8.5 GHz < f ≤ 14 GHz                                  | <0.9 dB, <0.7 dB (typ.) |



Measured frequency response of RSA804/RSA808/RSA814

**Frequency Response (attenuation = 10 dB, PA off)**

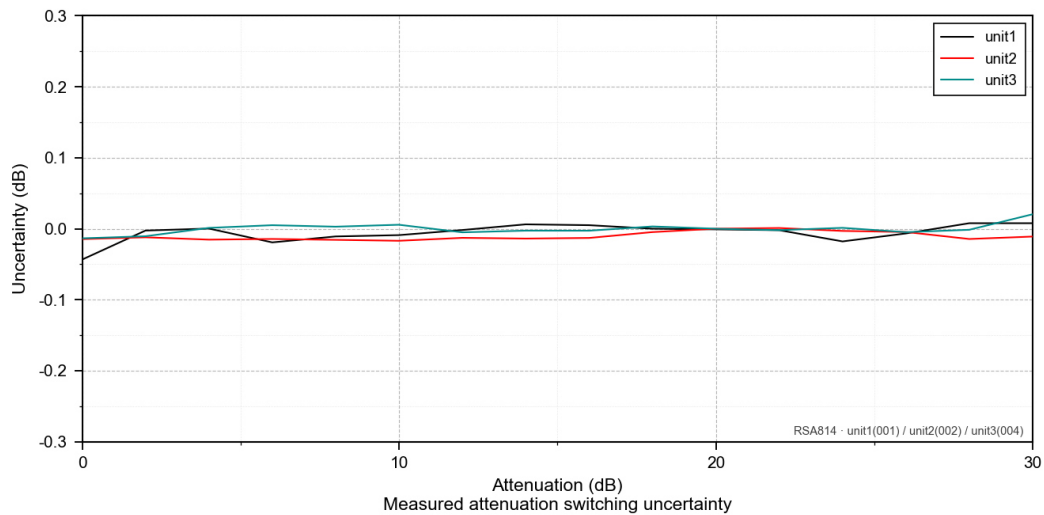
| Frequency Response |                                                      |                         |
|--------------------|------------------------------------------------------|-------------------------|
| PA On              | attenuation = 0 dB, relative to 50 MHz, 20°C to 30°C |                         |
|                    | 1 MHz < f ≤ 4.5 GHz                                  | <0.7 dB, <0.5 dB (typ.) |
|                    | 4.5 GHz < f ≤ 8.5 GHz                                | <0.9 dB, <0.7 dB (typ.) |
|                    | 8.5 GHz < f ≤ 14 GHz                                 | <1.1 dB, <0.9 dB (typ.) |



Measured frequency response of RSA804/RSA808/RSA814

**Frequency Response (attenuation = 0 dB, PA on)**

| Input Attenuation Switching Uncertainty |                                                                  |
|-----------------------------------------|------------------------------------------------------------------|
| Setting Range                           | 0 dB to 30 dB, step 2 dB                                         |
| Switching Uncertainty                   | fc = 50 MHz, relative to 10 dB attenuation, PA off, 20°C to 30°C |
|                                         | <0.3 dB                                                          |



### Switching Uncertainty

| Absolute Amplitude Accuracy |                                                                                          |
|-----------------------------|------------------------------------------------------------------------------------------|
| Uncertainty                 | fc = 50 MHz, peak detector, PA off, 10 dB attenuation, input level -10 dBm, 20°C to 30°C |
|                             | <0.3 dB                                                                                  |

| Reference Level |                   |                                              |
|-----------------|-------------------|----------------------------------------------|
| Range           | Logarithmic Scale | -170 dBm to +20 dBm, step 0.01 dB            |
|                 | Linear Scale      | 707 pV to 2.24 V, 0.11% (0.01 dB) resolution |

| RBW Switching |                                                        |         |
|---------------|--------------------------------------------------------|---------|
| Uncertainty   | Set "Sweep Type" to "Accurate", relative to 30 kHz RBW |         |
|               | 1 Hz to 1 MHz                                          | <0.1 dB |
|               | 3 MHz, 10 MHz                                          | <0.3 dB |

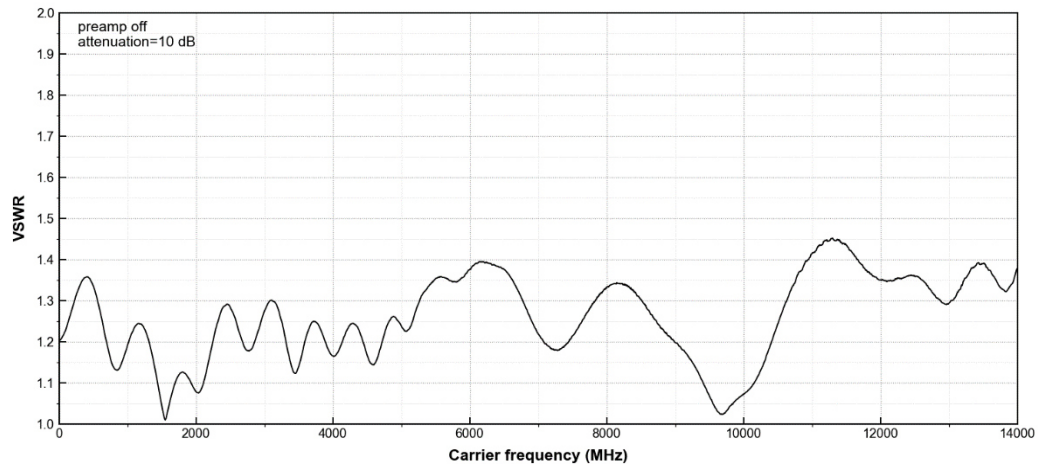
| Preamplifier    |                  |                  |                 |
|-----------------|------------------|------------------|-----------------|
|                 | RSA804           | RSA808           | RSA814          |
| Frequency Range | 1 MHz to 4.5 GHz | 1 MHz to 8.5 GHz | 1 MHz to 14 GHz |
| Gain            | 25 dB (nom.)     |                  |                 |

| Level Measurement Uncertainty                                                                                                            |                       |                 |
|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------|
| 95% confidence, S/N > 20 dB, RBW and VBW both 1 kHz, PA off, 10 dB attenuation, -50 dBm < input level ≤ 0 dBm, fc > 10 MHz, 20°C to 30°C |                       |                 |
| Level Measurement Uncertainty                                                                                                            | 10 MHz < f ≤ 4.5 GHz  | < 0.8 dB (nom.) |
|                                                                                                                                          | 4.5 GHz < f ≤ 8.5 GHz | < 1.0 dB (nom.) |
|                                                                                                                                          | 8.5 GHz < f ≤ 14 GHz  | < 1.8 dB (nom.) |

## RF Input VSWR

Attenuation  $\geq 10$  dB, preamp off

|      |                                              |             |
|------|----------------------------------------------|-------------|
| VSWR | $10 \text{ MHz} \leq f \leq 4.5 \text{ GHz}$ | <1.5 (nom.) |
|      | $4.5 \text{ GHz} < f \leq 8.5 \text{ GHz}$   | <1.7 (nom.) |
|      | $8.5 \text{ GHz} < f \leq 14 \text{ GHz}$    | <1.9 (nom.) |



VSWR

## Distortion

### Second Harmonic Intercept

|                                 |                                                       | RSA804  | RSA808  | RSA814  |
|---------------------------------|-------------------------------------------------------|---------|---------|---------|
| Second Harmonic Intercept (SHI) | Input signal level: -20 dBm, attenuator: 0 dB, PA off |         |         |         |
|                                 | $10 \text{ MHz} \leq f \leq 2.25 \text{ GHz}$         | +45 dBm | +45 dBm | +45 dBm |
|                                 | $2.25 \text{ GHz} < f \leq 4.25 \text{ GHz}$          |         | +45 dBm | +45 dBm |
|                                 | $4.25 \text{ GHz} < f \leq 7 \text{ GHz}$             |         |         | +30 dBm |

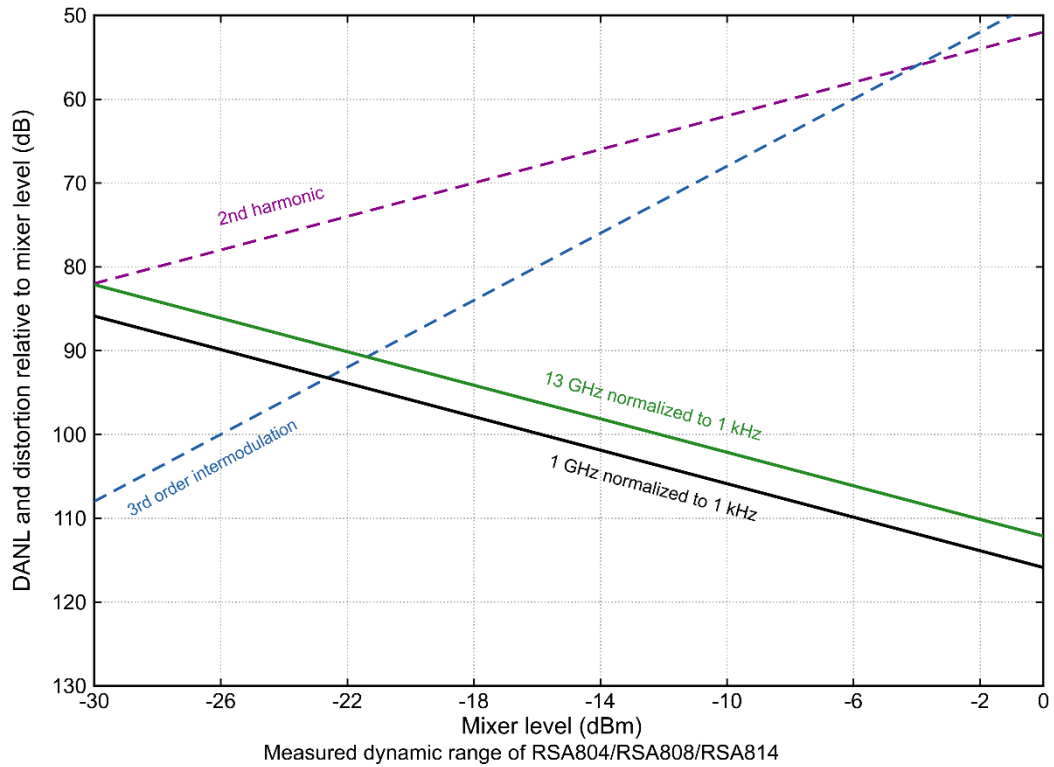
### Third-order Intercept

|                             |                                                                                                                       | RSA804                     | RSA808                     | RSA814                     |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------|----------------------------|
| Third-order Intercept (TOI) | Input a two-tone signal with a frequency spacing of 200 kHz and signal amplitude of -20 dBm, 0 dB attenuation, PA off |                            |                            |                            |
|                             | $10 \text{ MHz} \leq f \leq 4.5 \text{ GHz}$                                                                          | +18 dBm,<br>+20 dBm (typ.) | +18 dBm,<br>+20 dBm (typ.) | +18 dBm,<br>+20 dBm (typ.) |
|                             | $4.5 \text{ GHz} < f \leq 8.5 \text{ GHz}$                                                                            |                            | +14 dBm,<br>+16 dBm (typ.) | +14 dBm,<br>+16 dBm (typ.) |
|                             | $8.5 \text{ GHz} < f \leq 14 \text{ GHz}$                                                                             |                            |                            | +12 dBm,<br>+14 dBm (typ.) |

| P1 dB                             |                                       |
|-----------------------------------|---------------------------------------|
| 1 dB gain compression (P1 dB) [1] | fc ≥ 50 MHz, 0 dB attenuation, PA off |
| Dual-tone Test                    | 0 dBm (nom.)                          |

**Note:**

[1]: The frequency interval of the two-tone signals should be greater than 20 MHz.



**Distortion**

| Spurious Response                |                                                           |
|----------------------------------|-----------------------------------------------------------|
| Residual Response <sup>[1]</sup> | 50 Ω termination at input, 0 dB attenuation, 20°C to 30°C |
|                                  | <-100 dBm (typ.)                                          |
| Intermediate Frequency           | <-100 dBc (typ.)                                          |
| System-related Sideband          | Carrier offset = 1 kHz                                    |
|                                  | <-60 dBc (typ.)                                           |
| Input-related Spurious           | mixer level -30 dBm                                       |
|                                  | <-90 dBc (typ.)                                           |
| Image spurious                   | mixer level -10 dBm                                       |
|                                  | <-90 dBc (typ.)                                           |

**Note:**

[1]: Excluding the internal 100 MHz system clock and its harmonics.

## Sweep

| Sweep                  |                                                                                |                      |
|------------------------|--------------------------------------------------------------------------------|----------------------|
| Sweep Time             | Span $\geq$ 10 Hz                                                              | 1 ms to 4,000 s      |
|                        | zero span                                                                      | 1 $\mu$ s to 6,000 s |
| Sweep Time Uncertainty | Span $\geq$ 10 Hz, RBW $\geq$ 1 kHz                                            | 5% (nom.)            |
|                        | zero span (sweep time > 1ms)                                                   | 5% (nom.)            |
| Sweep Mode             | Continuous, single                                                             |                      |
| Sweep Points           | EMI mode: 101 to 100,001, default 801 Other modes: 101 to 100,001, default 801 |                      |

## Trigger

| Trigger                  |                                   |                   |
|--------------------------|-----------------------------------|-------------------|
| Trigger Source           | Free run, external trigger, video |                   |
| Trigger Delay            | Span $\geq$ 10 Hz                 | 0 ms to 500 ms    |
|                          | zero span                         | -150 ms to 500 ms |
| Trigger Delay Resolution | 0.1 $\mu$ s                       |                   |

## Tracking Generator

| TG Output <sup>[1]</sup> |                    |                   |                  |
|--------------------------|--------------------|-------------------|------------------|
|                          | RSA804             | RSA808            | RSA814           |
| Frequency Range          | 100 kHz to 4.5GHz  | 100 kHz to 8.5GHz | 100 kHz to 14GHz |
| Output Level Range       | -40 dBm to 0 dBm   |                   |                  |
| Output Level Resolution  | 1 dB               |                   |                  |
| Output Flatness          | Relative to 50 MHz |                   |                  |
|                          | $\pm$ 3 dB (nom.)  |                   |                  |

## RTSA Application

| RTSA                                                         |                                                                      |                |                |
|--------------------------------------------------------------|----------------------------------------------------------------------|----------------|----------------|
| Real-Time Bandwidth (Max.)                                   | $5 \text{ kHz} \leq f \leq 100 \text{ MHz}$                          |                | 20 MHz         |
|                                                              | $100 \text{ MHz} < f \leq 14 \text{ GHz}$                            |                | 40 MHz         |
| Min. Signal Duration for 100% POI at the Full-Scale Accuracy | maximum span; default Kaiser Window                                  |                |                |
|                                                              | 5.62 $\mu\text{s}$                                                   |                |                |
| Detector Type                                                | Pos-peak, neg-peak, sample, voltage average                          |                |                |
| Number of Traces                                             | 6                                                                    |                |                |
| Window Type                                                  | Hanning, Blackman-Harris, Rectangular, Flattop, Kaiser, and Gaussian |                |                |
| RBW                                                          | Provides 6 RBWs for each window, except the Rectangular; Span        |                |                |
|                                                              | Span                                                                 | Min. bandwidth | Max. bandwidth |
|                                                              | 40 MHz                                                               | 100.46 kHz     | 3.21 MHz       |
|                                                              | 20 MHz                                                               | 50.22 kHz      | 1.607 MHz      |
| Max. Sample Rate                                             | 51.15 Msa/s                                                          |                |                |
| FFT Rate                                                     | 199804 frames/s                                                      |                |                |
| Number of Markers                                            | 8                                                                    |                |                |
| Amplitude Resolution                                         | 0.01 dB                                                              |                |                |
| Frequency Point                                              | 801                                                                  |                |                |
| Acquisition Time                                             | Max. Sample Rate                                                     |                |                |
|                                                              | $\geq 100 \mu\text{s}$                                               |                |                |

| Min. signal duration for 100% POI at different RBWs, with the unit $\mu\text{s}$ |         |         |         |         |        |        |
|----------------------------------------------------------------------------------|---------|---------|---------|---------|--------|--------|
| Span                                                                             | RBW1    | RBW2    | RBW3    | RBW4    | RBW5   | RBW6   |
| 40 MHz                                                                           | 25.005  | 14.996  | 9.991   | 7.488   | 6.237  | 5.620  |
| 20 MHz                                                                           | 45.005  | 24.985  | 14.976  | 9.971   | 7.469  | 6.217  |
| 10 MHz                                                                           | 85.005  | 44.966  | 24.946  | 14.936  | 9.932  | 7.429  |
| 1 MHz                                                                            | 812.513 | 412.122 | 211.926 | 111.828 | 61.780 | 36.755 |

| Amplitude          |                                                       |
|--------------------|-------------------------------------------------------|
| Amplitude Flatness | 40 MHz BW, Only applicable to the Normal measurement. |
|                    | $\pm 0.5 \text{ dB (nom.)}$                           |
| SFDR               | $< -60 \text{ dBc (typ.)}$                            |

| <b>Density</b>                  |                            |
|---------------------------------|----------------------------|
| 0 to 100% (with a step of 0.1%) | Min. Span                  |
| Min. Span                       | 5 kHz                      |
| 32 ms to 10 s                   | Maximum Acquisition Volume |

| <b>Spectrogram</b>               |        |
|----------------------------------|--------|
| Maximum Acquisition Volume       | 10000  |
| Dynamic Range Covered with Color | 200 dB |

| <b>PVT</b>        |             |
|-------------------|-------------|
| Min. Capture Time | 100 $\mu$ s |
| Max. Capture Time | 40 s        |

| <b>Trigger</b>     |                                                         |
|--------------------|---------------------------------------------------------|
| Trigger Source     | Free run, external, IF power (time), FMT                |
| FMT                |                                                         |
| Trigger Diagram    | density, spectrogram, normal                            |
| Trigger Resolution | 0.5 dB                                                  |
| Trigger Condition  | Enter, Leave, Inside, Outside, Enter-Leave, Leave-Enter |

## VSA Application

| VSA                       |                                                                                                                                                                                                                                                                     |        |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Analysis Bandwidth (Max.) | 5 kHz ≤ f ≤ 100 MHz                                                                                                                                                                                                                                                 | 20 MHz |
|                           | 100 MHz < f ≤ 14 GHz                                                                                                                                                                                                                                                | 40 MHz |
| Capture Oversampling      | 4, 8, 16                                                                                                                                                                                                                                                            |        |
| Capture Length            | Max. 4,096                                                                                                                                                                                                                                                          |        |
| Max. Sample Rate          | 51.15 MSa/s                                                                                                                                                                                                                                                         |        |
| Symbol Rate               | Related to Capture Oversampling                                                                                                                                                                                                                                     |        |
|                           | Sample Rate/Capture Oversampling, ≥1 kHz                                                                                                                                                                                                                            |        |
| Available I/Q Bandwidth   | Symbol Rate x Capture Oversampling/1.28                                                                                                                                                                                                                             |        |
| Trig Mode                 | Free run, external, IF power (time)                                                                                                                                                                                                                                 |        |
| Modulation Format         |                                                                                                                                                                                                                                                                     |        |
| FSK                       | 2FSK, 4FSK, 8FSK                                                                                                                                                                                                                                                    |        |
| MSK                       | Enables or disables the differential encoding for MSK                                                                                                                                                                                                               |        |
| PSK                       | BPSK, QPSK, OQPSK, DQPSK, pi/4-DQPSK, 8PSK, D8PSK, pi/8- D8PSK                                                                                                                                                                                                      |        |
| QAM                       | 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, 512QAM, 1024QAM                                                                                                                                                                                                                |        |
| ASK                       | 2ASK, 4ASK                                                                                                                                                                                                                                                          |        |
| APSK                      | 16APSK, 32APSK                                                                                                                                                                                                                                                      |        |
| Filter Type               |                                                                                                                                                                                                                                                                     |        |
| Measurement Filter Type   | No Filter, RRC, Gaussian, Rectangular, user-defined                                                                                                                                                                                                                 |        |
| Reference Filter Type     | Raised Cosine, RRC, Gaussian, Rectangular, Half Sine, user-defined                                                                                                                                                                                                  |        |
| Preset Standard           |                                                                                                                                                                                                                                                                     |        |
| Cellular                  | GSM, NADC, WCDMA, PDC, PHP(PHS)                                                                                                                                                                                                                                     |        |
| Wireless Networking       | Bluetooth, WLAN(802.11b) , ZIGBEE 868M, ZIGBEE 915M. ZIGBEE 2450M                                                                                                                                                                                                   |        |
| Others                    | TETRA, DECT, APCO-25                                                                                                                                                                                                                                                |        |
| Measurement Uncertainty   |                                                                                                                                                                                                                                                                     |        |
| Applicable Conditions     | Temperature at +20°C to +30°C<br>Signal level ≥ -25 dBm<br>Select the proper amplitude range<br>Deviation between the instrument's center frequency and the signal's center frequency less than 5% of symbol rate<br>Random data sequence<br>Capture oversampling 4 |        |

## Residual Error for QPSK

|             |                                                                                                                                                                                     |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Signal | The reference filter is RC, measurement filter RRC, with rolloff factor 0.35. The result lengths are 150 symbols. The center frequency is 1 GHz, and the capture oversampling is 4. |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Residual EVM RMS

|             |          |              |
|-------------|----------|--------------|
| Symbol Rate | 100 ksps | <0.8% (nom.) |
|             | 1 Msps   | <1.0% (nom.) |
|             | 10 Msps  | <1.2% (nom.) |

## Residual Error for FSK

|             |                                                                                                                                                                                                                                                  |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Signal | The reference filter is RC, measurement filter RRC, with rolloff factor 0.35. The FSK frequency deviation is a quarter of the symbol rate. The result lengths are 150 symbols. The center frequency is 1 GHz, and the capture oversampling is 4. |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## FSK Error

|             |         |               |
|-------------|---------|---------------|
| Symbol Rate | 10 Msps | < 1.5% (nom.) |
|-------------|---------|---------------|

## EMI Application

### EMI Resolution Bandwidth

|                              |                                      |
|------------------------------|--------------------------------------|
| Resolution Bandwidth (-3 dB) | 100 Hz to 10 MHz, in 1-3-10 sequence |
| Resolution Bandwidth (-6 dB) | 200 Hz, 9 kHz, 120 kHz, 1 MHz        |

### EMI Detector

|          |                                                                       |
|----------|-----------------------------------------------------------------------|
| Detector | Pos-peak, neg-peak, average, quasi-peak, EMI average, and RMS average |
|----------|-----------------------------------------------------------------------|

### EMI Key Features

|              |                                                                                                                                                                                                                                                                                                                                   |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Key Features | <ul style="list-style-type: none"> <li>CISPR 16-1-1 detectors</li> <li>CISPR 16-1-1 bandwidths</li> <li>log and linear display</li> <li>signal list</li> <li>scan table</li> <li>simultaneous detectors</li> <li>automatic limit testing</li> <li>measure at marker</li> <li>delta to limit</li> <li>report generation</li> </ul> |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## ADM Application

| ADM Resolution Bandwidth  |                                             |        |
|---------------------------|---------------------------------------------|--------|
| Analysis Bandwidth (Max.) | $5 \text{ kHz} \leq f \leq 100 \text{ MHz}$ | 20 MHz |
|                           | $100 \text{ MHz} < f \leq 14 \text{ GHz}$   | 40 MHz |

| General Specifications |                             |        |        |
|------------------------|-----------------------------|--------|--------|
|                        | RSA804                      | RSA808 | RSA814 |
| Carrier Power          | -30 dBm to 20 dBm           |        |        |
| Carrier Power Accuracy | $\pm 1.8 \text{ dB (nom.)}$ |        |        |

| Amplitude Modulation (AM) |                                      |                                     |
|---------------------------|--------------------------------------|-------------------------------------|
| Modulation Rate           | 20 Hz to 100 kHz                     |                                     |
| Modulation Rate Accuracy  | Modulation Rate < 1 kHz              | 1 Hz (nom.)                         |
|                           | Modulation Rate $\geq 1 \text{ kHz}$ | <0.1% of the Modulation Rate (nom.) |
| Modulation Depth          | 5% to 95%                            |                                     |
| Modulation Depth Accuracy | $\pm 4\%$ (nom.)                     |                                     |

| Frequency Modulation (FM)            |                                      |                                     |
|--------------------------------------|--------------------------------------|-------------------------------------|
| Modulation Rate <sup>[1]</sup>       | 20 Hz to 200 kHz                     |                                     |
| Modulation Rate Accuracy             | Modulation Rate < 1 kHz              | 1 Hz (nom.)                         |
|                                      | Modulation Rate $\geq 1 \text{ kHz}$ | <0.1% of the Modulation Rate (nom.) |
| Freq Deviation                       | 20 Hz to 400 kHz                     |                                     |
| FM Deviation Accuracy <sup>[1]</sup> | $\pm 4\%$ (nom.)                     |                                     |

| Phase Modulation (PM)    |                                      |                                     |
|--------------------------|--------------------------------------|-------------------------------------|
| Modulation Rate          | 50 Hz to 50 kHz                      |                                     |
| Modulation Rate Accuracy | Modulation Rate < 1 kHz              | 1 Hz (nom.)                         |
|                          | Modulation Rate $\geq 1 \text{ kHz}$ | <0.1% of the Modulation Rate (nom.) |
| PM Deviation             | 0.2 rad to 100 rad                   |                                     |
| PM Deviation Accuracy    | $\pm 4\%$ (nom.)                     |                                     |

**Note:**

[1]: Modulation Index = Modulation Frequency Deviation/Modulation Rate. The range of the modulation index is from 0.2 to 1,000.

# General Specifications

| Display    |                               |
|------------|-------------------------------|
| Type       | capacitive multi-touch screen |
| Resolution | 1024 × 600                    |
| Dimensions | 7 inch                        |
| Color      | 24-bit color                  |

| Mass Memory |                  |                                   |
|-------------|------------------|-----------------------------------|
| Mass Memory | Internal Storage | 32 GB                             |
|             | External Storage | USB storage device (not supplied) |

| Power             |             |
|-------------------|-------------|
| Power Interface   | Type-C      |
| Supply Voltage    | DC 20 V, 5A |
| Power Consumption | 50 W (typ.) |

| Environment |                             |                                                                                                        |
|-------------|-----------------------------|--------------------------------------------------------------------------------------------------------|
| Temperature | Operating Temperature Range | 0°C to 40°C                                                                                            |
|             | Storage Temperature Range   | -20°C to 60°C                                                                                          |
| Humidity    | Operating                   | 0 °C to 30 °C: ≤ 95% RH<br>30°C to 40°C: ≤ 75% RH                                                      |
|             | Non-operating               | <+40°C: 5% to 90%RH,<br>without condensation<br>≥+40°C to <+60°C: 5% to 80%RH,<br>without condensation |
| Altitude    | Operating Height            | Below 2,000 m (6561.68 feet)                                                                           |

| Electromagnetic Compatibility and Safety |                                                                           |                                                       |
|------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------|
| Electromagnetic Compatibility (EMC)      | Anti-interference conforms to specifications in EMC Directive 2014/30/EU; |                                                       |
|                                          | EMC RF and emission limits conforms to CISPR11/EN 55011, Group 1, Class A |                                                       |
|                                          | IEC61000-4-2:2008/EN61000-4-2                                             | ±4.0 kV (contact discharge), ±8.0 kV (air discharge)  |
|                                          | IEC61000-4-3:2002/EN61000-4-3                                             | 3 V/m (80 MHz to 1 GHz);<br>3 V/m (1.4 GHz to 2 GHz); |

| Electromagnetic Compatibility and Safety |                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                              |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
|                                          |                                                                                                                                                                                                                                                                                                                                                                                                           | 1 V/m (2.0 GHz to 2.7 GHz)                                                                                                                   |
|                                          | IEC61000-4-4:2004/EN61000-4-4                                                                                                                                                                                                                                                                                                                                                                             | 1 kV power line                                                                                                                              |
|                                          | IEC61000-4-5:2001/EN61000-4-5                                                                                                                                                                                                                                                                                                                                                                             | 0.5 kV (phase-to-neutral voltage);<br>1 kV (phase-to-earth voltage);<br>1 kV (neutral-to-earth voltage)                                      |
|                                          | IEC61000-4-6:2003/EN61000-4-6                                                                                                                                                                                                                                                                                                                                                                             | 3 V, 0.15 MHz-80 MHz                                                                                                                         |
|                                          | IEC61000-4-11:2004/EN 61000-4-11                                                                                                                                                                                                                                                                                                                                                                          | Voltage dip:<br>0% UT during half cycle<br>0% UT during 1 cycle<br>70% UT during 25 cycles<br>Short interruption:<br>0% UT during 250 cycles |
| Safety                                   | EN 61010-1, IEC 61010-1, UL 61010-1, CAN/CSA-C22.2 no. 61010-1                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                              |
| Environment                              | Samples of this product have been type tested in accordance with RIGOL's reliability test regulations and verified to be robust against the environmental stresses of storage, transportation, and end-use; those stresses include, but are not limited to, temperature, humidity, shock, and vibration. The test methods are compliant with standards specified in GB/T65872 and MIL-PRF-28800F Class 3. |                                                                                                                                              |

| Appearance and Dimensions |                                  |
|---------------------------|----------------------------------|
| Dimensions (W × H × D)    | 265.35 mm × 161.75 mm × 77.38 mm |
| Weight                    | 1.9 kg                           |

| Calibration Interval             |           |
|----------------------------------|-----------|
| Recommended Calibration Interval | 18 months |

# Input / Output

| Front Panel Connector     |           |                    |
|---------------------------|-----------|--------------------|
| RF Input                  | Impedance | 50 $\Omega$ (nom.) |
|                           | Connector | N-type female      |
| Tracking Generator Output | Impedance | 50 $\Omega$ (nom.) |
|                           | Connector | N-type female      |

| Internal/External Reference |              |                                  |
|-----------------------------|--------------|----------------------------------|
| Internal Reference          | Frequency    | 10 MHz                           |
|                             | Output Level | +3 dBm to +10 dBm, +7 dBm (typ.) |
|                             | Impedance    | 50 $\Omega$ (nom.)               |
|                             | Connector    | BNC female                       |
| External Reference          | Frequency    | 10 MHz $\pm$ 2 ppm               |
|                             | Input Level  | 0 dBm to +10 dBm                 |
|                             | Impedance    | 50 $\Omega$ (nom.)               |
|                             | Connector    | BNC female                       |

| External Trigger Input/Output |           |                            |
|-------------------------------|-----------|----------------------------|
| Trig Input                    | Impedance | $\geq$ 1 k $\Omega$ (nom.) |
|                               | Connector | BNC female                 |
|                               | Level     | 3.3 V TTL Level            |
| Trig Output                   | Impedance | 50 $\Omega$ (nom.)         |
|                               | Connector | BNC female                 |
|                               | Level     | 3.3 V TTL Level            |

| Communication Interface |           |                        |
|-------------------------|-----------|------------------------|
| USB Host                | Connector | USB Type-A (Standard)  |
|                         | Protocol  | Version 2.0            |
| USB Device              | Connector | USB Type-B (Standard)  |
|                         | Protocol  | Version 2.0            |
| LAN                     | Connector | 100/1000 Base-T, RJ-45 |
|                         | Protocol  | LXI Core 2011 Device   |
| HDMI                    | Connector | A plug                 |
|                         | Protocol  | HDMI 1.4               |

# Ordering Information and Warranty

## Ordering Information

|                      | Description                                                                                                                                                                      | Order No.                                   |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| Model                | Real-time spectrum analyzer, 5 kHz to 4.5 GHz                                                                                                                                    | RSA804                                      |
|                      | Real-time spectrum analyzer, 5 kHz to 8.5 GHz                                                                                                                                    | RSA808                                      |
|                      | Real-time spectrum analyzer, 5 kHz to 14 GHz                                                                                                                                     | RSA814                                      |
| Standard Accessory   | Power adapter compliant with local standards                                                                                                                                     | -                                           |
| Options              | Vector Signal Analysis Application Software                                                                                                                                      | RSA800-VSA                                  |
|                      | EMI Measurement Application Software                                                                                                                                             | RSA800-EMI                                  |
|                      | Analog Demodulation Application Software                                                                                                                                         | RSA800-ADM                                  |
|                      | Advanced Measurement Kit<br>(Including time-domain power, adjacent channel power, multichannel power, occupied bandwidth, C/N ratio, harmonic distortion, third-order intercept) | RSA800-AMK                                  |
|                      | Phase Noise Measurement Application Software                                                                                                                                     | RSA800-PNM                                  |
| Optional Accessories | DSA utility kit. Refer to Note[1] for details.                                                                                                                                   | DSA Utility Kit                             |
|                      | RF adaptor kit. Refer to Note[2] for details.                                                                                                                                    | RF Adaptor Kit                              |
|                      | Includes: 50 $\Omega$ to 75 $\Omega$ adaptor (2pcs)                                                                                                                              | RF CATV Kit                                 |
|                      | Includes: 6 dB attenuator (1pcs), 10 dB attenuator (2pcs)                                                                                                                        | RF Attenuator Kit                           |
|                      | 30 dB high-power attenuator, with the max. power of 100 W                                                                                                                        | ATT03301H                                   |
|                      | Near-field Probe                                                                                                                                                                 | NFP-3                                       |
|                      | USB Cable x1                                                                                                                                                                     | CB-USBA-USBB-FF-150                         |
|                      | RF Cable                                                                                                                                                                         | Refer to <a href="#">RF-Cable Datasheet</a> |

### Note:

For all the mainframes, accessories, and options, please contact the local office of RIGOL .

[1]: Includes N-SMA cable, BNC-BNC cable, N-BNC adaptor, N-SMA adaptor, 75  $\Omega$ -50  $\Omega$  adaptor, 900 MHz/1.8 GHz antenna (2pcs), 2.4 GHz antenna (2pcs)

[2]: Includes: N(F)-N(F) adaptor (1pcs), N(M)-N(M) adaptor (1pcs), N(M)-SMA(F) adaptor (2pcs), N(M)-BNC(F) adaptor (2pcs), SMA(F)-SMA(F) adaptor (1pcs), SMA(M)-SMA(M) adaptor (1pcs), BNC T type adaptor (1pcs), 50  $\Omega$  SMA load (1pcs), 50  $\Omega$  BNC impedance adaptor (1pcs)

## Warranty Period

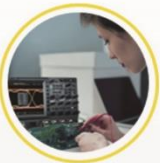
Three-year warranty on the main unit; accessories excluded

# Boost Smart World and Technology Innovation

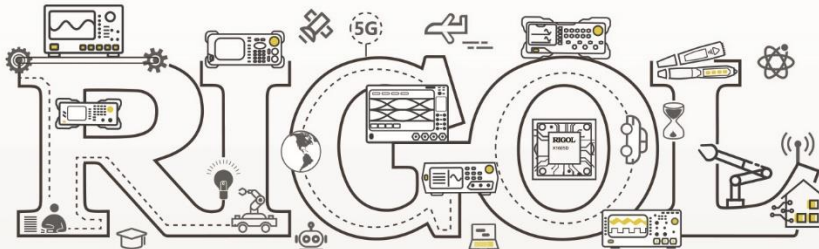
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