Real-time Spectrum Analyzers

RSA2200A Series • RSA3300A Series

Features & Benefits

Real-time Spectrum Analysis Provides Seamless Capture of Time-varying, Transient or Periodic RF Signals not Possible with Swept Spectrum Analyzers

Up to 256 MB of Internal Memory Provides for Complete Analysis of Signals Over Time Without Making Multiple Measurements

Time-correlated, Simultaneous Views of Time, Frequency, and Modulation Domains Provide Greater and Unique Understanding of Signal Behavior

Spectrogram Provides a Revealing Picture of RF Signal Frequency and Amplitude Behavior Over Time – Not Possible with a Swept Spectrum Analyzer

Frequency Mask Trigger – Available only from Tektronix – Makes it Easy to Capture Fast, Transient, or Intermittent Signals that Swept Spectrum Analyzers Would Miss

Spectrum Analyzer Mode for Very Wide Span Analyses

Built-in Demodulators Enhance Analysis of AM, ASK, FM, FSK and PM Signals

Digital Demodulator in RSA3300A Series Offers Affordable Vector Signal Analysis

Outstanding DC – 20 MHz Dynamic Range and Low Phase Noise Mean You Can Make High-Performance Weak Signal and Phase Noise Measurements

Applications

Analog and Digital Modulation Signal Quality Analysis

Understanding Frequency and Spectral Occupancy Behavior Over Time

Capture and Characterization of Undesired, Unknown or Interfering Signals

Device/System Design or Operational Diagnostic Measurement

Getting Answers to Elusive EMI Problems

VCO/Synthesizer Design, RFID Device Characterization, General Purpose Digital Modulation Vector Signal Analysis, Spectrum Monitoring, Radar Measurements

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Trigger, Capture, Analyze Your RF Signal

Quickly Solve Design, Production or Operational Problems with Comprehensive Characterization of Time-varying and Transient RF Signals

Define issues and solve problems faster by characterizing your device, system or signal more completely and rapidly than previously possible with swept spectrum analyzers. Tektronix RSA2200A and RSA3300A Series Real-time Spectrum Analyzers capture many signals not viewable on swept spectrum analyzers by seamlessly capturing and storing a span of RF frequencies all at one time.* Once a signal is captured it can be viewed simultaneously and analyzed in time-correlated frequency, time and modulation domains. RSA Series instruments include not only Real-time Spectrum Analyzer fast-signal capture, internal memory and modulation analysis but also functionality and operation of a swept spectrum analyzer for looking at very wide spans, all in an integrated, transportable package.

RSA Series Spectrogram uniquely shows time-varying signal behavior in frequency change/stability, spectrum occupancy, pulsed signal timing, power change and more! The sample on this page shows the frequency settling characteristic of a transmitting device.

Time-correlated multi-domain view provides a new level of insight about design or operational problems and possible solutions. The example on this page includes frequency, time and modulation domain view of AM-modulated pulsed signal with pulse-to-pulse phase variation measured in the modulation domain.

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*RSA2200A and RSA3300A Series Real-time Spectrum Analyzer Trigger-Capture-Analyze capability enables characterization of time-varying, transient or periodic RF signals not possible with swept spectrum analyzers.

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Real-time Spectrum Analyzers
- RSA2200A Series • RSA3300A Series

Trigger, Capture, Analyze

You Can Easily Catch an Elusive RF Signal and Analyze it at Your Convenience

Sensitive and fast, RSA Series Real-time Spectrum analyzer triggering easily captures unknown, periodic or intermittent signals. Using Tektronix exclusive Frequency Mask Trigger, you can configure a custom frequency domain mask including signal guard bands and levels then trigger on events isolated to a specific frequency or frequency range. As signals are captured, they are automatically saved to RSA internal memory, making it easy to perform in-depth time-correlated analysis across the frequency, time and modulation domains with no external computer required! Quick-to-set-up IF Level and Power (Span Bandwidth) triggers provide very convenient capture of signals in applications such as incident carrier-and-response interaction between two devices or burst signal carrier ramp up. Continuous Trigger Mode also eliminates the “dead time” between periodic signals or pulses that would otherwise be included in your acquired time record – capture only the signals you want and minimize analysis time.

Price/Performance Choice: RSA2200A and RSA3300A Series Real-time Spectrum Analyzers

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency Range</th>
<th>Memory Depth</th>
<th>Modulation Analysis</th>
<th>Real-time Capture Bandwidth</th>
<th>Triggering Modes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2203A</td>
<td>10 MHz – 3 GHz</td>
<td>2 MB</td>
<td>AM, FM (ASK, FSK), PM</td>
<td>10 MHz</td>
<td>IF Level</td>
</tr>
<tr>
<td></td>
<td>DC to 3 GHz (Opt. 05)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2208A</td>
<td>10 MHz – 8 GHz</td>
<td>2 MB</td>
<td>AM, FM (ASK, FSK), PM</td>
<td>10 MHz</td>
<td>IF Level</td>
</tr>
<tr>
<td></td>
<td>DC to 8 GHz (Opt. 05)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3303A</td>
<td>DC – 3 GHz</td>
<td>64 MB, 256 MB (Opt. 02)</td>
<td>AM, FM (ASK, FSK), PM, general purpose digital mod analysis (Opt. 21)</td>
<td>15 MHz</td>
<td>IF Level; Frequency Mask Trigger and Power (Span BW) (Opt. 02)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3308A</td>
<td>DC – 8 GHz</td>
<td>64 MB, 256 MB (Opt. 02)</td>
<td>AM, FM (ASK, FSK), PM, general purpose digital mod analysis (Opt. 21)</td>
<td>15 MHz</td>
<td>IF Level; Frequency Mask Trigger and Power (Span BW) (Opt. 02)</td>
</tr>
</tbody>
</table>

Characteristics

Frequency

Frequency Range

<table>
<thead>
<tr>
<th>RSA2203A</th>
<th>RSA2208A</th>
<th>RSA3303A</th>
<th>RSA3308A</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 MHz – 3 GHz</td>
<td>10 MHz – 8 GHz</td>
<td>DC – 3 GHz</td>
<td>DC – 8 GHz</td>
</tr>
<tr>
<td>Opt. 05: DC – 3 GHz</td>
<td>Opt. 05: DC – 8 GHz</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Frequency Aging

<table>
<thead>
<tr>
<th>RSA2203A</th>
<th>RSA2208A</th>
<th>RSA3303A</th>
<th>RSA3308A</th>
</tr>
</thead>
<tbody>
<tr>
<td>±2 x 10^-6/year</td>
<td>±2 x 10^-6/year</td>
<td>±1 x 10^-7/year</td>
<td>±1 x 10^-7/year</td>
</tr>
<tr>
<td>Opt. 10: ±1 x 10^-7/year</td>
<td>Opt. 10: ±1 x 10^-7/year</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Frequency Stability

<table>
<thead>
<tr>
<th>RSA2203A</th>
<th>RSA2208A</th>
<th>RSA3303A</th>
<th>RSA3308A</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x 10^-6 (10 ºC to 40 ºC)</td>
<td>2 x 10^-6 (10 ºC to 40 ºC)</td>
<td>1 x 10^-7 (10 ºC to 40 ºC)</td>
<td>1 x 10^-7 (10 ºC to 40 ºC)</td>
</tr>
<tr>
<td>Opt. 10: 1 x 10^-7 (10 ºC to 40 ºC)</td>
<td>Opt. 10: 1 x 10^-7 (10 ºC to 40 ºC)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Reference Frequency Error

<table>
<thead>
<tr>
<th>RSA2203A</th>
<th>RSA2208A</th>
<th>RSA3303A</th>
<th>RSA3308A</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 x 10^-6</td>
<td>4 x 10^-6</td>
<td>2 x 10^-7</td>
<td>2 x 10^-7</td>
</tr>
<tr>
<td>Opt. 10: 2 x 10^-7</td>
<td>Opt. 10: 2 x 10^-7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Marker Frequency Readout Accuracy –
\[ \pm 0.001 \times MF + 0.001 \times CF + RFM \] Hz.
MF = Reference Frequency Error.
CF = Carrier Frequency [Hz].
RFM = Residual FM [Hz].

Carrier Frequency Measurement Accuracy –
RSA2203A and RSA2208A –
At spans ±10 MHz, all frequency components of the signal must be contained in the analysis period and span.
Accuracy: RE x CF x RFM. Resolution Setting = 1 mHz to 1 MHz.
At 2 GHz ±0.01 Hz.
At 5 GHz ±0.1 Hz.
At 7 GHz ±1.0 Hz.
RSA2203A Opt. 10, RSA2208A Opt. 10, RSA3303A and RSA3308A –
At spans ±10 MHz for RSA2200A Opt. 10, and spans ±15 MHz for RSA3300A, all frequency components of the signal must be contained in the analysis period and span.
Accuracy: RE x CF x RFM. Resolution Setting = 1 mHz to 1 MHz.
At 2 GHz ±0.2 Hz.
At 5 GHz ±0.5 Hz.
At 7 GHz ±0.72 Hz.

Carrier Frequency Measurement Sensitivity –
Carrier Power, >–40 dbfs (typical) (dBfs = dB below full screen reference).

Accuracy: RE x CF x RFM. Resolution Setting = 1 mHz to 1 MHz.
At 2 GHz ±0.01 Hz.
At 5 GHz ±0.1 Hz.
At 7 GHz ±1.0 Hz.

Frequency Span
Range –
RSA2203A and RSA2208A
Spectrum Analyzer Mode:
50 Hz to 3 GHz, (Start Frequency ±20 MHz),
50 Hz to 20 MHz, (Stop Frequency <20 MHz, Opt. 0).
Real-time Spectrum Analyzer Mode:
100 Hz – 10 MHz, 1-2-5 sequence (RF);
20 MHz (Bassband).
Time Domain and Demodulation Modes:
Span = 0 Hz (Simultaneous with 50 Hz to
10 MHz: Span in second analysis window).
RSA3303A and RSA3308A
Spectrum Analyzer Mode:
50 Hz to 3 GHz, (Start Frequency ±20 MHz),
50 Hz to 20 MHz, (Stop Frequency <20 MHz).
Real-time Spectrum Analyzer Mode:
100 Hz – 10 MHz, 15 MHz (RF); 20 MHz
(Bassband).
Time Domain and Demodulation Modes:
Span = 0 Hz (Simultaneous with 50 Hz to
15 MHz: Span in second analysis window).
Resolution – <0.2% of Span (Span = 100 Hz to
10 MHz).
Accuracy – <0.1% of Span.

Resolution Bandwidth
Range – 1 Hz to 10 MHz, automatically selected or user defined.
Accuracy – <0.1% (Referenced to Noise BW);
6.0 ±0.1% (Referenced to 3 dB BW).
Shape Characteristic – Gaussian, <5:1 Shape Factor; Rectangular; Nyquist; Root Nyquist.

FFT Performance
Number of Samples Per Frame – 64 to 8192
(65536 samples/frame, extended resolution).

Stability

Noise Sidebands, dBc/Hz

<table>
<thead>
<tr>
<th>Offset</th>
<th>RSA2203A, RSA2208A</th>
<th>RSA3303A, RSA3308A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 kHz</td>
<td>s-99</td>
<td>s-102</td>
</tr>
<tr>
<td>10 kHz</td>
<td>s-105</td>
<td>s-108</td>
</tr>
<tr>
<td>20 kHz</td>
<td>s-105</td>
<td>s-108</td>
</tr>
<tr>
<td>30 kHz</td>
<td>s-105</td>
<td>s-108</td>
</tr>
<tr>
<td>100 kHz</td>
<td>s-112</td>
<td>s-115</td>
</tr>
<tr>
<td>1 MHz</td>
<td>s-130</td>
<td>s-133</td>
</tr>
<tr>
<td>5 MHz</td>
<td>s-132</td>
<td>s-135</td>
</tr>
<tr>
<td>7 MHz</td>
<td>s-133</td>
<td>s-136</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Offset</th>
<th>RSA2203A, RSA2208A</th>
<th>RSA3303A, RSA3308A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 kHz</td>
<td>s-95</td>
<td>s-98</td>
</tr>
<tr>
<td>10 kHz</td>
<td>s-104</td>
<td>s-107</td>
</tr>
<tr>
<td>20 kHz</td>
<td>s-105</td>
<td>s-108</td>
</tr>
<tr>
<td>30 kHz</td>
<td>s-105</td>
<td>s-108</td>
</tr>
<tr>
<td>100 kHz</td>
<td>s-112</td>
<td>s-115</td>
</tr>
<tr>
<td>1 MHz</td>
<td>s-130</td>
<td>s-133</td>
</tr>
<tr>
<td>5 MHz</td>
<td>s-132</td>
<td>s-135</td>
</tr>
<tr>
<td>7 MHz</td>
<td>s-132</td>
<td>s-135</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Offset</th>
<th>RSA2203A, RSA2208A</th>
<th>RSA3303A, RSA3308A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 kHz</td>
<td>s-87</td>
<td>s-90</td>
</tr>
<tr>
<td>10 kHz</td>
<td>s-103</td>
<td>s-106</td>
</tr>
<tr>
<td>20 kHz</td>
<td>s-105</td>
<td>s-108</td>
</tr>
<tr>
<td>30 kHz</td>
<td>s-105</td>
<td>s-108</td>
</tr>
<tr>
<td>100 kHz</td>
<td>s-111</td>
<td>s-114</td>
</tr>
<tr>
<td>1 MHz</td>
<td>s-128</td>
<td>s-131</td>
</tr>
<tr>
<td>5 MHz</td>
<td>s-129</td>
<td>s-132</td>
</tr>
<tr>
<td>7 MHz</td>
<td>s-130</td>
<td>s-133</td>
</tr>
</tbody>
</table>

Window Types – Rectangular, Parzen, Welch,
Sine-Lobe, Hanning, Sine-Cubed, Sine-To-The-4th,
Hannming, Blackman, Rosenfield, Blackman-Harris
3A, Blackman-Harris 3B, Blackman-Harris 4A,
Blackman-Harris 4B, FlatTop.
Real-time Spectrum Analyzers

RSA2200A Series • RSA3300A Series

**Time Domain**

Trace Point Range –
- Span > 0 Hz, 64 – 240001 (RBW mode), 16 – 240001 (FFT mode).
- Span = 0 Hz (Time and Demodulation Modes).
- RSA2200A and RSA2008A – IQ Data Pairs: 1024 to 512000; Power vs. Time: 1 to 512000.
- RSA3300A and RSA3308A – IQ Data Pairs: 1024 to 16384000, 1 to 65536000 (Option 02) Power vs. Time: 1 to 512000.

Triggers –
- RSA2200A and RSA2208A: Free run, single, external, F level (10 MHz BW).
- RSA3300A and RSA3308A: Free run, single, external, F level (15 MHz BW).
- Option 02: adds Power (Span BW, Span <15 MHz) and Frequency Mask.

Frequency Mask Trigger (Real-time SA Mode), RSA3300A and RSA3308A with Option 02

**Bandwidth** –
- Up to 15 MHz: Start Frequency ≥ 20 MHz.
- Up to 20 MHz: Start Frequency <20 MHz, and on IQ inputs.

Event Detection Bandwidth –
- 5 MHz (100% probability of intercept).
- 10 MHz (50% probability of intercept (typical)).

Frequency Mask Range –
- Span = 15 MHz: 0 to –6 divisions from Reference Level.
- Span ≤ 10 MHz: 0 to –7 divisions from Reference Level.

Mask Shape – User Defined.

Minimum Horizontal Mask Setting Resolution – <0.2% of Span.

Minimum Event Duration – 1 frame time.

Minimum Frequency Width – <0.2% of Span.

Uncertainty – ±2 frames.

**Amplitude Specifications**

Measurement Range – Displayed average noise level to MAX safe input.

Input Attenuator Range –
- RSA2200A, RSA2208A: 0 – 50 dB, 10 dB steps.
- RSA3300A: 0 – 50 dB, 2 dB steps, DC to 3.0 GHz.
- RSA3308A: 0 – 50 dB, 2 dB steps, DC to 3.5 GHz.
- 0 – 50 dB, 2 dB steps, DC to 3.5 GHz.
- 0 – 50 dB, 10 dB steps, 3.5 to 8.0 GHz.

Maximum Safe Input Level –
- Average Continuous: +30 dBm (RF ATT = 10 dB).
- Peak Pulse Power: +30 dBm (RF ATT = 10 dB).

1 dB Gain Compression –
- RSA2200A, RSA2208A: +0 dBm (RF ATT = 0 dB, 2 GHz).
- RSA3300A, RSA3308A: +2 dBm (RF ATT = 0 dB, 2 GHz).

**Displayed Average Noise Level (DANL)**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>RSA2200A Spec, dBB</th>
<th>RSA2208A Typical, dBB, with Preamp</th>
<th>RSA2200A Spec, dBB</th>
<th>RSA2208A Typical, dBB, with Preamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 kHz – 10 kHz</td>
<td>–144†</td>
<td>N/A</td>
<td>–144</td>
<td>N/A</td>
</tr>
<tr>
<td>10 kHz – 10 MHz</td>
<td>–150†</td>
<td>N/A</td>
<td>–151</td>
<td>N/A</td>
</tr>
<tr>
<td>10 MHz – 100 MHz</td>
<td>–148</td>
<td>N/A</td>
<td>–151</td>
<td>N/A</td>
</tr>
<tr>
<td>100 kHz – 1 GHz</td>
<td>–148</td>
<td>–164</td>
<td>–164</td>
<td>–164</td>
</tr>
<tr>
<td>1 GHz – 2 GHz</td>
<td>–148</td>
<td>–164</td>
<td>–150</td>
<td>–164</td>
</tr>
<tr>
<td>3 GHz – 5 GHz</td>
<td>–142¬</td>
<td>N/A</td>
<td>–142 ¬</td>
<td>N/A</td>
</tr>
<tr>
<td>5 GHz – 8 GHz</td>
<td>–142¬</td>
<td>N/A</td>
<td>–142 ¬</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Frequency Response**

<table>
<thead>
<tr>
<th>RSA2200A, RSA2208A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
</tr>
<tr>
<td>100 Hz – 20 MHz†</td>
</tr>
<tr>
<td>10 MHz – 3 GHz</td>
</tr>
<tr>
<td>3 GHz – 3.5 GHz×2</td>
</tr>
<tr>
<td>3.5 GHz – 6.5 GHz×2</td>
</tr>
<tr>
<td>5 GHz – 8 GHz×2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RSA3300A, RSA3308A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
</tr>
<tr>
<td>100 Hz – 25 MHz</td>
</tr>
<tr>
<td>15 MHz – 3 GHz</td>
</tr>
<tr>
<td>3 GHz – 3.5 GHz×3</td>
</tr>
<tr>
<td>3.5 GHz – 6.5 GHz×3</td>
</tr>
<tr>
<td>5 GHz – 8 GHz×3</td>
</tr>
</tbody>
</table>

**Input Attenuation Switching Uncertainty** –
- RSA2200A Opt. 05 only. 
- RSA2208A only.

**Marked Readout Resolution, Log – 0.01 dB.**

**Linear Display Scale – 10 divisions.**

**Linear Display Units – dBm, dBµV, V, Watts + Hz for FM Demod, Degrees for PM Demod.**

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Absolute Amplitude Uncertainty –
At Reference Setting: ±0.5 dB (RF) at 50 MHz CF, –20 dBm signal, 0 dB ATT, 20 ºC to 30 ºC; ±0.3 (baseband) (Opt. 05) at 10 MHz CF, –20 dBm signal, 0 dB ATT, 20 ºC to 30 ºC.
Overall Amplitude Accuracy: ±0.7 dB (RF) + Frequency Response.

**RF Input VSWR**

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>VSWR, at 10 dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 kHz – 10 MHz</td>
<td>&lt;1.4</td>
</tr>
<tr>
<td>10 MHz – 3 GHz</td>
<td>&lt;1.3</td>
</tr>
<tr>
<td>3 GHz – 8 GHz</td>
<td>&lt;1.4</td>
</tr>
</tbody>
</table>

Resolution Bandwidth Switching Uncertainty –
1 Hz to 10 MHz: ±0.05 dB.
Reference Level –
Range: –51 to +30 dBm.
Accuracy: ±0.2 dB (–10 dBm to –50 dBm) at 50 MHz.

Display Scale Fidelity –
Log Scale (max. cumulative), >0 dB – 50 dB: ±0.2 dB; <0 dB – 50 dB: ±0.12 dB, typical at 0 dBm reference level.
Linear Scale: ±0.2% of Reference Level.
Linear to Log Scale Switching Uncertainty: ±0.05%.

Spurious Responses –
Third-order Intermodulation Distortion
100 MHz – 3 GHz: RSA2203A, RSA2208A – <–73 dBc (Ref Level = +5 dBm, RF Att = 20 dB, total signal power = –7 dBm, signal separation 300 kHz).
RSA3303A, RSA3308A – <–74 dBc (Ref Level = +5 dBm, RF Att = 20 dB, total signal power = –7 dBm, signal separation 300 kHz).

Memory Depth (Time) – RSA2203A and RSA2208A

<table>
<thead>
<tr>
<th>Span</th>
<th>Sample Rate</th>
<th>Record Length</th>
<th>Spectrum Frame Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 MHz</td>
<td>12.8 Msps</td>
<td>0.04 s</td>
<td>80 µs</td>
</tr>
<tr>
<td>5 MHz</td>
<td>6.4 Msps</td>
<td>0.08 s</td>
<td>160 µs</td>
</tr>
<tr>
<td>2 MHz</td>
<td>3.2 Msps</td>
<td>0.16 s</td>
<td>320 µs</td>
</tr>
<tr>
<td>1 MHz</td>
<td>1.6 ksps</td>
<td>0.32 s</td>
<td>640 µs</td>
</tr>
<tr>
<td>500 kHz</td>
<td>800 sps</td>
<td>6.4 s</td>
<td>1.28 ms</td>
</tr>
<tr>
<td>200 kHz</td>
<td>320 sps</td>
<td>1.6 s</td>
<td>3.2 ms</td>
</tr>
<tr>
<td>100 kHz</td>
<td>160 sps</td>
<td>3.2 s</td>
<td>6.4 ms</td>
</tr>
<tr>
<td>5 kHz</td>
<td>8 ksps</td>
<td>64 s</td>
<td>128 ms</td>
</tr>
<tr>
<td>2 kHz</td>
<td>3.2 ksps</td>
<td>160 s</td>
<td>320 ms</td>
</tr>
<tr>
<td>1 kHz</td>
<td>1.6 ksps</td>
<td>320 s</td>
<td>640 ms</td>
</tr>
<tr>
<td>500 Hz</td>
<td>800 sps</td>
<td>640 s</td>
<td>1.28 s</td>
</tr>
<tr>
<td>200 Hz</td>
<td>320 sps</td>
<td>1600 s</td>
<td>6.4 s</td>
</tr>
<tr>
<td>100 Hz</td>
<td>160 sps</td>
<td>3200 s</td>
<td>6.4 s</td>
</tr>
</tbody>
</table>

Amplitude Reference Output: –20 dBm, 50 MHz, internally switched to input.

Seamless Capture and Processing
Memory Depth (samples) –
Real-time Spectrum Analyzers

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Memory Depth (Time) - RSA3303A and RSA3308A

<table>
<thead>
<tr>
<th>Span</th>
<th>Sample Rate</th>
<th>Record Length</th>
<th>Record Length Opt. 02</th>
<th>Spectrum Frame Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 MHz</td>
<td>25.6 Msps</td>
<td>0.64 s</td>
<td>2.56 s</td>
<td>40 µs</td>
</tr>
<tr>
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<td>10.24 s</td>
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</tr>
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<td>200 kHz</td>
<td>320 kspss</td>
<td>51.20 s</td>
<td>200.48 s</td>
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</tr>
<tr>
<td>100 kHz</td>
<td>160 kspss</td>
<td>102.40 s</td>
<td>409.60 s</td>
<td>6.4 ms</td>
</tr>
<tr>
<td>50 kHz</td>
<td>80 kspss</td>
<td>204.80 s</td>
<td>819.20 s</td>
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</tr>
<tr>
<td>20 kHz</td>
<td>32 kspss</td>
<td>512 s</td>
<td>2048 s</td>
<td>32 ms</td>
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<tr>
<td>10 kHz</td>
<td>16 kspss</td>
<td>1024 s</td>
<td>4096 s</td>
<td>64 ms</td>
</tr>
<tr>
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<td>8192 s</td>
<td>128 ms</td>
</tr>
<tr>
<td>2 kHz</td>
<td>3.2 kspss</td>
<td>5120 s</td>
<td>20480 s</td>
<td>320 ms</td>
</tr>
<tr>
<td>1 kHz</td>
<td>1.6 kspss</td>
<td>10240 s</td>
<td>40960 s</td>
<td>640 ms</td>
</tr>
<tr>
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<td>800 sps</td>
<td>20480 s</td>
<td>81920 s</td>
<td>1.28 s</td>
</tr>
<tr>
<td>200 Hz</td>
<td>320 sps</td>
<td>51200 s</td>
<td>204800 s</td>
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</tr>
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<td>102400 s</td>
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<td>5.12 s</td>
</tr>
</tbody>
</table>

Remote Measurement Rate and GPIB Transfer Rate - 7000 Samples/Sec at 2 MHz span Auto RBW Spectrum data.

Ethernet Transfer Rate - 2.6 Mbyte/Sec (256 Mbyte IQT file transfer).

RF Center Frequency Switching Time – <10 ms for 10 MHz frequency change; <500 ms for 3 GHz frequency change.

Traces, Displays, Detectors

Trace Types – Normal (RMS), Average, Max Hold, Min Hold.

Display Detection – Max, Min, Max/Min.

Memory Depth (Time)

<table>
<thead>
<tr>
<th>Span</th>
<th>Sample Rate</th>
<th>Record Length</th>
<th>Record Length Opt. 02</th>
<th>Spectrum Frame Time</th>
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<tbody>
<tr>
<td>15 MHz</td>
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<td>0.64 s</td>
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Real-time Capture Bandwidth (seamless data capture) –
RSA2200A and RSA2208A: 10 MHz (rf); 20 MHz, DC – 20 MHz (Baseband; Opt.05).
RSA3300A and RSA3308A: 15 MHz (rf); 20 MHz, DC – 20 MHz (Baseband); 10 MHz, 10 Inputs (Opt.03).

Data Samples per Frame (Real-Time S/A Mode) – 1024.

Block Size (number of frames) –
RSA2200A and RSA2208A: 1 to 500,
RSA3300A and RSA3308A: 1 to 16000; 1 to 64000 (Opt. 02).

Maximum A/D Sampling Rate and Resolution –
51.2 Msamples/sec, 14 bits.

Measurement Speed

Screen Update Rate –
386Sec, (SA Mode; 2 MHz span, 128 point FFT),
336Sec, (SA Mode; 2 MHz span, 1024 point FFT).

Remote Measurement Rate and GPIB Transfer Rate – 7000 Samples/Sec at 2 MHz span Auto RBW Spectrum data.

Ethernet Transfer Rate – 2.6 Mbyte/Sec (256 Mbyte IQT file transfer).

RF Center Frequency Switching Time – <10 ms for 10 MHz frequency change; <500 ms for 3 GHz frequency change.

Traces, Displays, Detectors

Trace Types – Normal (RMS), Average, Max Hold, Min Hold.

Display Detection – Max, Min, Max/Min.

Inputs and Outputs

Front Panel

Input – 50 Ω, type N.

Rear Panel

10 MHz REF OUT – 50 Ω, BNC, ±3 dBm.
20 MHz REF IN – 50 Ω, BNC, ±10 dBm – ±6 dBm.
-1, +1, -Q, +Q Inputs – RSA3303A with Opt. 03, and RSA3308A with Opt. 03.

EXT TRIG IN – Ext Trig, BNC, 5V TTL.

GPIB Interface – IEEE 488.

Side Panel

LAN Interface (Ethernet) – 10/100Base-T (std).

Serial Interface – USB 1.1, 2 ports.

VGA Output – VGA compatible, 15 pin D-sub.

Automated Measurements

Automated Measurements – Channel Power, ACPR, Carrier to Noise, Occupied BW, Carrier Frequency, Emission BW, Spurious Search, CCDF, dB/Hz Mkr, dBC/Hz Mkr.
Preamplifier (RSA2200A Series Opt. 2A, RSA3300A Series Opt. 1A, External)
Frequency Range – 100 MHz to 3 GHz.
Gain – 20 dB.
Noise Figure – 6.5 dB at 2 GHz.

Modulation Analysis

FM (may be used to evaluate FSK signals)
Optimum Input Level – –10 dBFS*2 (signal at center screen).
Range – 0.8 Hz to 12.8 MHz.
Accuracy – ±1% of span.

AM (may be used to evaluate ASK signals)
Accuracy – ±0.2 % (signal at center screen, –10 dBFS*2 10 % to 60 % modulation depth).
PM
Accuracy – ±3º (Signal at center screen, –10 dBFS*2).
PM Scale, Max, Min – ±180º.

Digital Modulation (RSA3303A with Opt. 21, RSA3308A with Opt. 21)
Modulation Format – BPSK, QPSK, π/4 DQPSK, 8PSK, 16QAM, 32QAM, 64QAM, GMSK, GFSK.
Analysis Period – Up to 7680 sample points.

Filter Types –
Measurement Filters: Square Root Raised Cosine, none.
Reference Filters: Raised Cosine, Gaussian, none.

Alpha/B*T Range – 0.0001 to 1, 0.0001 step.

General Specifications
Temperature Range – Operating: +10 ºC to +40 ºC.
Storage: –20 ºC to +60 ºC.
Warm-up Time – 20 min.
Safety and EMI Compatibility –
UL 61010B-1; CSA C22.2 No.1010.1.
Power Requirements – 100 VAC to 240 VAC, 47 Hz to 63 Hz.
Power Consumption – 350 VA max.
Data Storage – Internal HDD (20 GB) + USB port + Floppy Disk Drive.
Weight, without options – 19 kg.
Dimensions – 215 mm (H) x 425 mm (D) x 425 mm (W) without bumpers and feet.
238 mm (H) x 470 mm (D) x 445 mm (W) with bumpers and feet.
Calibration Interval – 1 year.
Warranty – 1 year.
Real-time Spectrum Analyzers

- RSA2200A Series
- RSA3300A Series

**Ordering Information**

**RSA2203A**
Real-Time Spectrum Analyzer, 10 MHz – 3 GHz.

**RSA2208A**
Real-Time Spectrum Analyzer, 10 MHz – 8 GHz.

**Standard Accessories**

**Options**
- Opt. 1R – Rackmount.
- Opt. 2A – Preamp, external, 20 dB gain to 3 GHz, + Power Supply, internal.
- Opt. 05 – DC – 20 MHz Baseband Frequency Extension.
- Opt. 10 – CXCO Hi-stability Reference Oscillator, 1x10⁻^7/day.
- Opt. 12 – USB Keyboard and Mouse.

**RSA3303A**
Real-Time Spectrum Analyzer, DC – 3 GHz.

**RSA3308A**
Real-Time Spectrum Analyzer, DC – 8 GHz.

**Standard Accessories**

**Options**
- Opt. 1R – Rackmount.
- Opt. 1A – External preamp, 20 dB gain to 3 GHz.
- Opt. 02 – 256 MB Data Memory with Frequency Mask Trigger.

**Opt. 03** – Differential IQ Inputs.

**Opt. 21** – General Purpose Digital Modulation Analysis.


**International Power Plugs**
- Opt. A0 – North America power.
- Opt. A3 – Australia power.
- Opt. A5 – Switzerland power.
- Opt. A99 – No power cord or AC adapter.

**Language Option**
- Option L0 – English User/Programmers Manual.

**Service Options**
- Opt. C5 – Calibration Service 5 Years.
- Opt. D3 – Calibration Data Report 3 Years (with Option C3).
- Opt. D5 – Calibration Data Report 5 Years (with Option C5).

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