

Real-Time Spectrum Analyzers

► RSA3300A Series



Trigger, Capture, Analyze Your RF Signal

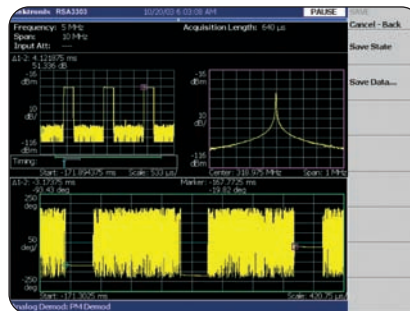
Quickly Solve Design, Production or Operational Problems with Comprehensive Characterization of Time-varying and Transient RF Signals

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 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.^{*1} 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.

^{*1} See Tektronix Real-Time Spectrum Analysis Technical Brief (Lit # 37W-17252) for an explanation of how RTSA works and its unique capabilities:
http://www.tek.com/M Measurement/App_Notes/37_17252/eng/



- 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 views of an AM-modulated pulsed signal with pulse-to-pulse phase variation measured in the modulation domain.

► 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 65.536 Ms (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 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

Real-Time Spectrum Analyzers

► 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 the 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 ensures a sequence of events are automatically captured into memory; you capture only the events and not time in between, maximizing memory efficiency and minimizing analysis time.

► Price/Performance choice: RSA3300A Series Real-Time Spectrum Analyzers

RSA Model	Frequency Range	Memory Depth	Modulation Analysis	Real-Time Capture Bandwidth	Triggering Modes
3303A	DC – 3 GHz	16.384 Msamples, 65.536 Msamples (Option 02)	AM, FM (ASK, FSK), PM; general-purpose digital mod analysis (Option 21)	15 MHz	IF Level; Frequency Mask Trigger and Power (Span BW) (Option 02)
3308A	DC – 8 GHz	16.384 Msamples, 65.536 Msamples (Option 02)	AM, FM (ASK, FSK), PM; general-purpose digital mod analysis (Option 21)	15 MHz	IF Level; Frequency Mask Trigger and Power (Span BW) (Option 02)

► Characteristics

► Frequency

	RSA3303A	RSA3308A
Frequency Range	DC – 3 GHz	DC – 8 GHz
Frequency Aging	$\pm 1 \times 10^{-7}$ /year	$\pm 1 \times 10^{-7}$ /year
Frequency Stability	1×10^{-7} (10 °C to 40 °C)	1×10^{-7} (10 °C to 40 °C)
	Opt. 10: 1×10^{-7} (10 °C to 40 °C)	Opt.10: 1×10^{-7} (10 °C to 40 °C)
Total Reference Frequency Error	2×10^{-7}	2×10^{-7}

Marker Frequency Readout Accuracy –

$\pm (RE \times MF + 0.001 \times \text{Span} + \text{RFM})$ Hz.

RE = Reference Frequency Error.

MF = Marker Frequency [Hz].

RFM = Residual FM [Hz].

Carrier Frequency Measurement Accuracy –

RSA3303A and RSA3308A

At spans of ≤ 15 MHz for RSA3300A, all frequency components of the signal must be contained in the analysis period and span.

Carrier Frequency Measurement Sensitivity –

Carrier Power, > -40 dbfs (typical) (dBfs = dB below full screen reference).

Accuracy – RE x CF + RFM. Resolution Setting =

1 mHz to 1 MHz.

At 2 GHz ± 202 Hz.

At 5 GHz ± 502 Hz.

At 7 GHz ± 702 Hz.

Frequency Span

Range –

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 to 10 MHz, 15 MHz (RF);

20 MHz (Baseband).

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, 15 MHz, RSA3303A and RSA3308A).

Accuracy – $\pm 0.1\%$ of Span.

Resolution Bandwidth

Range – 1 Hz to 10 MHz, automatically selected or user defined.

Accuracy – Within $6.0\% \pm 0.1\%$.

Shape Characteristic – Gaussian, $< 5:1$ Shape

Factor (3:60 dB); Rectangular, Nyquist, Root Nyquist shapes may also be selected.

Noise Bandwidth –

Range: 313.18 mHz to 400.87 kHz.

Accuracy: $\pm 0.1\%$.

FFT Performance

Number of Samples per Frame – 64 to 8192

(65536 samples/frame, extended resolution).

Window Types –

Rectangular, Parzen, Welch, Sine-Lobe, Hanning, Sine-Cubed, Sine-To-The-4th, Hamming, Blackman, Rosenfield, Blackman-Harris 3A, Blackman-Harris 3B, Blackman-Harris 4A, Blackman-Harris 4B, FlatTopn.

Stability

► **Noise Sidebands, dBc/Hz**

Offset	RSA3303A, RSA3308A				RSA3308A	
	At 1 GHz CF		At 2 GHz CF		At 6 GHz CF	
	Spec	Typical	Spec	Typical	Spec	Typical
1 kHz	≤ -100	≤ -103	≤ -96	≤ -99	≤ -87	≤ -90
10 kHz	≤ -105	≤ -108	≤ -104	≤ -107	≤ -104	≤ -107
20 kHz	≤ -105	≤ -108	≤ -105	≤ -108	≤ -105	≤ -108
30 kHz	≤ -105	≤ -108	≤ -105	≤ -108	≤ -105	≤ -108
100 kHz	≤ -112	≤ -115	≤ -112	≤ -115	≤ -112	≤ -115
1 MHz	≤ -132	≤ -135	≤ -132	≤ -135	≤ -128	≤ -131
5 MHz	≤ -135	≤ -138	≤ -135	≤ -138	≤ -130	≤ -133
7 MHz	≤ -135	≤ -138	≤ -135	≤ -138	≤ -130	≤ -133

Residual FM at 1 kHz RBW –

RSA3303A and RSA3308A: $2 \text{ Hz}_{\text{pk-pk}}$.

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Time Domain

Trace Point Range –

Span >50 Hz, 64 to 240001 (RBW mode),

18 to 240001 (FFT mode).

Span = 0 Hz (Time and Demodulation Modes).

RSA3303A and RSA3308A – IQ Data Pairs: 1024 to

16384000, 1 to 65536000 (Option 02) Power vs.

Time: 1 to 512000.

Triggers –

RSA3303A and RSA3308A: Free run, single,

external, IF level (15 MHz BW).

Option 02: Adds Power (Span BW, Span <15 MHz)

and Frequency Mask.

Frequency Mask Trigger (Real Time SA Mode), RSA3303A and RSA3308A with Opt. 02 Bandwidth –

Up to 15 MHz: Start Frequency \geq 20 MHz.

Up to 20 MHz: Start Frequency <20 MHz,

and on IQ inputs.

Event Detection Bandwidth –

\leq 5 MHz (100% probability of intercept, signal

occupying at least one complete \geq 160 μ s frame).

10 MHz (50% probability of intercept, signal occupying

at least one complete 80 μ s frame (typical)).

15/20 MHz (25% probability of intercept, signal

occupying at least one complete 40 μ s frame (typical)).

Frequency Mask Range –

0 to –6 divisions from Reference Level at 10 dB/div.

Mask Shape – User Defined.

Minimum Horizontal Mask Setting Resolution –

<0.2% of Span.

Minimum Frequency Width – < 0.2% of Span.

Uncertainty – \pm 2 frames.

Amplitude Specifications

Measurement Range – Displayed average noise

level to MAX safe input.

Input Attenuator Range –

RSA3303A –

0 to 50 dB, 2 dB steps, DC to 3.0 GHz.

RSA3308A –

0 to 50 dB, 2 dB steps, DC to 3.5 GHz.

0 to 50 dB, 10 dB steps, 3.5 to 8.0 GHz.

Maximum Safe Input Level –

Average Continuous – +30 dBm (RF ATT \geq 10 dB).

Peak Pulse Power – +30 dBm (RF ATT \geq 10 dB).

DC – RSA3303A, RSA3308A:

\pm 0.2 V (CF \geq 20 MHz); \pm 5 V DC – 20 MHz.

► Displayed Average Noise Level (DANL)

Frequency	RSA3303A, RSA3308A (Spec, dBm/Hz)	RSA3303A, RSA3308A (Typical, dBm/Hz, With Preamp)
1 kHz to 10 kHz	–144	N/A
10 kHz to 10 MHz	–151	N/A
10 MHz to 100 MHz	–151	N/A
100 MHz to 1 GHz	–151	–164
1 GHz to 2 GHz	–150	–164
2 GHz to 3 GHz	–150	–158
3 GHz to 5 GHz	–142 ^{*3}	N/A
5 GHz to 8 GHz	–142 ^{*3}	N/A

^{*3} RSA3308A only.

Log Display Range – 10 μ dB/div to 10 dB/div.

Linear Display Scale – 10 divisions.

Linear Display Units – dBm, dB μ V, V, Watts + Hz

for FM Demod, Degrees for PM Demod.

Marker Readout Resolution, Log – 0.01 dB.

Marker Readout Resolution, Linear – 0.001 μ V.

Frequency Response

► RSA3303A, RSA3308A

Frequency Range	Specification, dB	Typical, dB
100Hz – 20 MHz	\pm 0.5	\pm 0.3
15 MHz – 3 GHz	\pm 1.2	\pm 0.5
3.0 GHz – 3.5 GHz ^{*3}	\pm 1.7	\pm 0.5
3.5 GHz – 6.5 GHz ^{*3}	\pm 1.7	\pm 1.0
5 GHz – 8 GHz ^{*3}	\pm 1.7	\pm 1.0

^{*3} RSA3308A only.

Input Attenuation Switching Uncertainty (at 50 MHz) – <0.5 dB for all values of attenuation.

IQ Input Attenuator Range –

RSA3303A Opt. 03 and RSA3308A Opt. 03:

0 to 30 dB, 10 dB steps.

IQ Input Attenuator Switching Uncertainty –

RSA3303A Opt. 03 and RSA3308A Opt. 03:

<0.5 dB for all values of attenuation.

Absolute Amplitude Uncertainty –

At Reference Setting – \pm 0.5 dB (RF) at 50 MHz

CF, –20 dBm signal, 0 dB ATT, 20 °C to 30 °C;

\pm 0.3 (baseband) (Opt. 05) at 10 MHz CF, –20 dBm

signal, 0 dB ATT, 20 °C to 30 °C.

Overall Amplitude Accuracy –

\pm 0.7 dB (RF) + Frequency Response.

► RF Input VSWR

Frequency Range	VSWR, at 10dB RF Attenuation (Typical, dB)
300 kHz to 10 MHz ⁴	< 1.4
10 MHz to 3 GHz	< 1.3
3 GHz to 8 GHz ⁴	< 1.4

⁴ RSA3303A and RSA3308A.

Spurious Responses**Third Order Intermodulation Distortion –****100 MHz to 3 GHz:**

RSA3303A, RSA3308A: <-74 dBc (Ref Level = +5 dBm, RF Att. = 20 dB, total signal power = -7 dBm, signal separation 300 kHz).

3 GHz to 8 GHz:

RSA3308A: <-72 dBc (Ref Level = +5 dBm, RF Att. = 20 dB, total signal power = -7 dBm, signal separation 300 kHz).

Other-Input Related Spurious –

> 30 kHz offset – 70 dBc (Span = 2 MHz, Ref Level = 0 dBm, RBW = 50 kHz, Signal Level = -5 dBm, any center frequency).

Non-input Related Spurious –

(Ref = -30 dBm, RBW = 100 kHz, Span 3 GHz)

RSA3303A –

1 MHz to 20 MHz: -93 dBm.

20 MHz to 3 GHz: -90 dBm.

RSA3308A –

1 MHz to 20 MHz: -93 dBm.

20 MHz to 3.5 GHz: -90 dBm.

3.5 GHz to 8 GHz: -85 dBm.

1 dB Gain Compression**RSA3303A, RSA3308A –**

+2 dBm (RF ATT = 0 dB, 2 GHz).

Resolution Bandwidth Switching Uncertainty –

1 Hz to 10 MHz – ± 0.05 dB.

Reference Level –

Range – -51 to +30 dBm.

Resolution – 1 dB.

Accuracy – ±0.2 dB (-10 dBm to -50 dBm) at 50 MHz.

Display Scale Fidelity –

Log scale (max. cumulative), >0 dB to 50 dB – <±0.2 dB;

<±0.12 dB, typical at 0 dBm reference level.

Linear Scale – ±2% of Reference Level.

Linear to Log Scale Switching Uncertainty – 0.05%.

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

Seamless Capture and Processing**Memory Depth (samples) –**

RSA3303A and RSA3308A: 16.384 Msamples;

65.536 Msamples (Opt. 02).

Real-Time Capture Bandwidth (Seamless Data Capture) –

RSA3303A and RSA3308A: 15 MHz (rf); 20 MHz, DC – 20 MHz (Baseband); 20 MHz, IQ Inputs (Opt.03).

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

1024 .

Block Size (number of frames) –

RSA3303A and RSA3308A: 1 to 16000;

1 to 64000 (Opt. 02).

Maximum A/D Sampling Rate and Resolution –

51.2 Msamples/sec, 14 bits.

► Memory Depth (time) – RSA3303A and RSA3308A

Span	Sample Rate	Record Length	Record Length (Opt. 02)	Spectrum Frame Time
20 MHz (Baseband)	25.6 MS/s	0.64 s	2.56 s	40 µs
15 MHz	25.6 MS/s	0.64 s	2.56 s	40 µs
10 MHz	12.8 MS/s	1.28 s	5.12 s	80 µs
5 MHz	6.4 MS/s	2.56 s	10.24 s	160 µs
2 MHz	3.2 MS/s	5.12 s	20.48 s	320 µs
1 MHz	1.6 MS/s	10.24 s	40.96 s	640 µs
500 kHz	800 MS/s	20.48 s	81.92 s	1.280 ms
200 kHz	320 MS/s	51.20 s	200.48 s	3.2 ms
100 kHz	160 ksps	102.40 s	409.60 s	6.4 ms
50 kHz	80 ksps	204.80 s	819.20 s	12.8 ms
20 kHz	32 ksps	512 s	2048 s	32 ms
10 kHz	16 ksps	1024 s	4096 s	64 ms
5 kHz	8 ksps	2048 s	8192 s	128 ms
2 kHz	3.2 ksps	5120 s	20480 s	320 ms
1 kHz	1.6 ksps	10240 s	40960 s	640 ms
500 Hz	800 sps	20480 s	81920 s	1.28 s
200 Hz	320 sps	51200 s	204800 s	2.56 s
100 Hz	160 sps	102400 s	409600 s	5.12 s

Real-Time Spectrum Analyzers

► RSA3300A Series

Measurement Speed

Screen Update Rate –

38/Sec, (SA Mode, 2 MHz span, 128 point FFT).

35/Sec, (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 MB/Sec (256 MB .JQT file transfer).

RF Center Frequency Switching Time –

<10 ms for 10 MHz frequency change;

<500 ms for 3 GHz frequency change.

Traces, Displays, Detectors

Traces – Two traces, Spectrum Analyzer Mode.

Displays –

Up to three time-correlated, user-selected displays from the following: Spectrum, Spectrogram, Amplitude vs. Time, Frequency vs. Time, Phase vs. Time, IQ vs. time;

RSA3303A Opt. 21 and RSA3308A Opt. 21 add:

Constellation, EVM vs. time, Symbol Table, Eye Diagram.

Detector – RMS.

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.

Preamp Power –

Standard RSA3303A and RSA3308: LEMO 6 pin connector – Pin 1, NC; Pin 2, ID1; Pin 3, ID2; Pin 4, –12 V; Pin 5, GND; Pin 6, +12V.

Rear Panel –

10 MHz REF OUT – 50 Ω , BNC, >–3 dBm.

10 MHz REF IN – 50 Ω , BNC, –10 dBm to +6 dBm.

I, +I, Q, +Q Inputs –

RSA3303A with Opt. 03, and RSA3308A with Opt. 03.

EXT TRIG IN –

Ext Trig. BNC, High: 1.6 to 5.0 V, Low: 0 to 0.5 V .

GPIB Interface – IEEE 488.2.

TRIGGER OUT –

50 Ω , BNC, High >2.0 V, Low:

<0.4 V (output current 1 mA).

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

Channel Power, ACPR, Carrier to Noise, Occupied BW, Carrier Frequency, Emission BW, Spurious Search, CCDF, dB/Hz Mkr, dBc/Hz Mkr.

Preamplifier (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) –

Minimum Input Level – –40 dBfs,⁵ typical.

Range – 0.8 Hz to 12.8 MHz.

Accuracy – $\pm 1\%$ of span (Signal at center screen, input level –10 dBfs⁵).

AM (may be used to evaluate ASK signals)

Minimum Input Level – –40 dBfs,⁵ typical.

Accuracy – $\pm 2\%$ (Signal at center screen, input level –10 dBfs,⁵ 10 % to 60 % modulation depth).

PM

Minimum Input Level – –40 dBfs,⁵ typical.

Accuracy – $\pm 3^\circ$, (Signal at center screen, input level –10 dBfs⁵).

PM Scale, Max, Min – $\pm 180^\circ$.

⁵ dBfs = dB relative to full-screen reference.

Digital Demodulation Accuracy

The following tables are examples of typical digital demodulation accuracy:

▶ **EVM (%), Typical**

Symbol Rate, per second	100 k			1 M			4 M			10 M		
	QPSK	$\pi/4$ DQPSK	16 QAM	QPSK	$\pi/4$ DQPSK	16 QAM	QPSK	$\pi/4$ DQPSK	16 QAM	QPSK	$\pi/4$ DQPSK	16 QAM
CF = 1 GHz	0.5	0.6	0.9	0.5	0.6	0.5	1.2	1.2	1.2	2.7	2.7	2.2
CF = 2 GHz	0.5	0.6	0.9	0.5	0.6	0.5	1.2	1.2	1.2	2.7	2.7	2.2
CF = 3 GHz	0.7	0.7	0.9	0.7	0.7	0.5	1.5	1.5	1.2	2.9	2.9	2.5
CF = 5 GHz ³	0.7	0.7	0.9	0.7	0.7	0.5	1.5	1.5	1.2	3.0	3.0	2.5

³ RSA3308A only.

**Digital Modulation
 (RSA3303A with Opt. 21,
 RSA3308A with Opt. 21)**

Modulation Format – BPSK, QPSK, $\pi/4$ DQPSK, 8PSK, 16QAM, 32QAM, 64QAM, 256QAM, 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.

Maximum Symbol Rate – 12.8 Msymbols/sec.

Minimum Symbol Rate – 100 Symbols/sec (typical).

Vector Display Formats

Polar –

Constellation – Data displayed at symbol times.

Vector – X to Y Points displayed between symbols.

IQ Versus Time –

I, Q – Continuous versus time over analysis window.

Trellis – Adjustable, 1 to 16 symbols.

Eye Diagram – Adjustable, 1 to 16 symbols.

Error Measurements Versus Time –

EVM, Magnitude Error, Phase Error.

Error Measurements –

Waveform Quality (ρ), Frequency Error

Measurement, Origin Offset Measurement.

Symbol Table – Binary, Octal, Hexadecimal.

General Specifications

Temperature Range –

Operating – +10 °C to +40 °C.

Storage – –20 °C to +60 °C.

Warm-up Time – 20 min.

Safety and EMI Compatibility –

UL 61010B-1; CSA C22.2 No.1010.1.

EC Council Low Voltage Directive (LVD) 73/23/EEC, amended by 93/68/EEC.

EC Council EMC Directive 89/336/EEC, amended by 93/68/EEC.

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 –

Without bumpers and feet – 215 mm (H) x 425 mm (D) x 425 mm (W).

With bumpers and feet – 238 mm (H) x

470 mm (D) x 445 mm (W).

Calibration Interval – 1 year.

Warranty – 1 year.

Real-Time Spectrum Analyzers

► RSA3300A Series

► Ordering Information

RSA3303A

Real-Time Spectrum Analyzer, DC – 3 GHz.

RSA3308A

Real-Time Spectrum Analyzer, DC – 8 GHz.

Standard Accessories

User Manual, Programmer's manual, power cord, USB keyboard, USB mouse, BNC-N adapter.

Options

Opt. 1R – Rackmount.

Opt. 1A – External preamp, 20 dB gain to 3 GHz.

Opt. 02 – 256 MB Data Memory with Frequency Mask Trigger and Power (Span BW) Trigger.

Opt. 03 – Differential IQ Inputs.

Opt. 21 – General-purpose Digital Modulation Analysis.

Upgrades

RSA3UP 21 – General-purpose Digital Modulation Analysis Upgrade (customer installable).

RSA3UP IF – Installation for RSA3UP 21.

International Power Plugs

Opt. A0 – North America power.

Opt. A1 – Universal Euro power.

Opt. A2 – United Kingdom power.

Opt. A3 – Australia power.

Opt. A4 – 240 V, North America power.

Opt. A5 – Switzerland power.

Opt. A6 – Japan power.

Opt. A10 – China power.

Opt. A99 – No power cord or AC adapter.

Language Option

Option L0 – English User/Programmer's Manual.

Option L5 – Japanese User/Programmer's Manual.

Service Options

Opt. C3 – Calibration Service 3 years.

Opt. C5 – Calibration Service 5 years.

Opt. D1 – Calibration Data Report.

Opt. D3 – Calibration Data Report 3 years (with Opt. C3).

Opt. D5 – Calibration Data Report 5 years (with Opt. C5).

Opt. R3 – Repair Service 3 years.

Opt. R5 – Repair Service 5 years.

Contact Tektronix:

ASEAN / Australasia (65) 6356 3900

Austria +41 52 675 3777

Balkan, Israel, South Africa and other ISE Countries +41 52 675 3777

Belgium 07 81 60166

Brazil & South America (11) 40669400

Canada 1 (800) 661-5625

Central East Europe, Ukraine and the Baltics +41 52 675 3777

Central Europe & Greece +41 52 675 3777

Denmark +45 80 88 1401

Finland +41 52 675 3777

France +33 (0) 1 69 86 81 81

Germany +49 (221) 94 77 400

Hong Kong (852) 2585-6688

India (91) 80-22275577

Italy +39 (02) 25086 1

Japan 81 (3) 6714-3010

Luxembourg +44 (0) 1344 392400

Mexico, Central America & Caribbean 52 (55) 5424700

Middle East, Asia and North Africa +41 52 675 3777

The Netherlands 090 02 021797

Norway 800 16098

People's Republic of China 86 (10) 6235 1230

Poland +41 52 675 3777

Portugal 80 08 12370

Republic of Korea 82 (2) 528-5299

Russia & CIS +7 (495) 7484900

South Africa +27 11 254 8360

Spain (+34) 901 988 054

Sweden 020 08 80371

Switzerland +41 52 675 3777

Taiwan 886 (2) 2722-9622

United Kingdom & Eire +44 (0) 1344 392400

USA 1 (800) 426-2200

For other areas contact Tektronix, Inc. at: 1 (503) 627-7111

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