Real-Time Spectrum Analyzers

▶ **RSA3408A**

Trigger, Capture, Analyze WLAN, Radar, 3G or Other Time-Varying RF Signals

Get Fast Resolution to Complex Problems with Enhanced Triggering, More Capture Bandwidth and Great New Analysis Tools

See the frequency and amplitude of your RF signal change over time in a single view. With only a single acquisition, the RSA3408A Real-Time Spectrum Analyzer (RTSA) captures a continuous time record of changing RF events and enables time-correlated analysis in the Frequency, Time and Modulation domains. You get the functionality of a vector signal analyzer, a wide band spectrum analyzer, plus the unique trigger-capture-analyze capability of RTSA – in one, transportable package.

▶ Features & Benefits

Trigger
- Tektronix Exclusive Frequency Mask Trigger Makes Easy Event-based Capture of Transient RF Signals by Triggering on Any Change in the Frequency Domain

Capture
- All Input Signals Up To 36 MHz[*1] Spans Are Seamlessly Captured into Memory
- Long Record Length at 36 MHz Span Enables Complete Analysis Over Time Without Making Multiple Acquisitions
- Interfaces With TekConnect® Probes for RF and Baseband Probing

Analyze
- Gain a Unique Understanding of Time-varying RF Signals
- See Frequency and Amplitude Change Over Time
- Built-in 802.11a/b/g Measurement Suite
- Comprehensive Pulsed Analysis Suite
- General Purpose Digital Modulation Analysis
- Spectrum Analyzer View for Traditional Wideband Signal Analysis
- High 3G Measurement Versatility with W-CDMA, cdma2000, 1X EVDO, HSDPA, TD-SCDMA RF and Modulation Analysis
- Capture and Analyze on RFID Interrogator and Tag Response Signals
- Signal Source Analysis Simplifies Phase Noise, Jitter and Frequency Settling Measurements

▶ Applications

System Integration of WLAN, 3G and Other RF Systems

Radar and Pulsed RF Signal Characterization

RFID System Development and Troubleshooting

Characterization of Interfering or Unknown Signals in Spectrum Monitoring and Surveillance

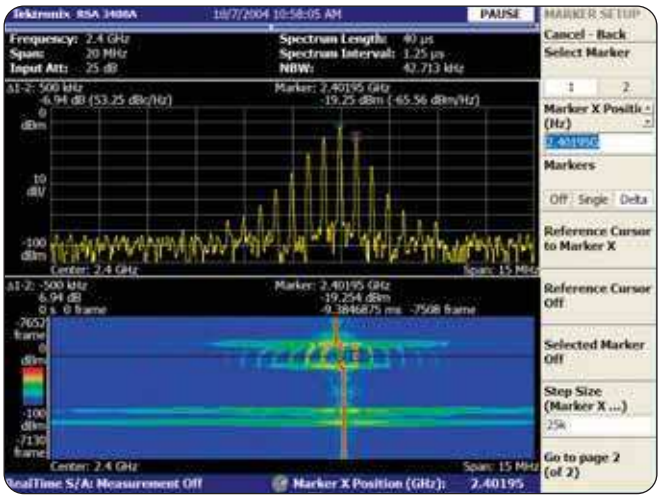
Troubleshooting RF Components, Modules or Systems

Getting Answers to Elusive EMI Diagnostic Problems

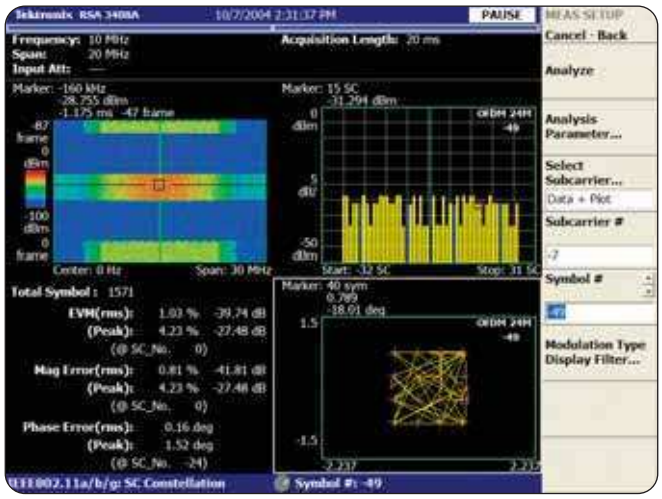
General Purpose Phase Noise and Jitter Signal Analysis

[*1] 40 MHz bandwidth at baseband.

Tektronix
Enabling Innovation



► High-resolution spectrogram reveals transient signal behavior that translates to rapid problem solving. Here, 500 kHz sidebands are revealed as part of the transient behavior of a hopping signal as it switches frequencies.



► Time-correlated, multi-domain view provides a new level of insight into design or operational problems not possible with conventional analysis solutions.

Trigger

Unparalleled 36 MHz bandwidth Frequency Mask Trigger (FMT) makes it easy to capture transient, low duty-cycle or other difficult-to-capture signals. An FMT mask is simply configured using a mouse and it can be set up for one or many frequency bands within an analysis span. FMT can monitor for signal appearance/disappearance or change in amplitude, frequency, bandwidth, spectral shape and more – all while the instrument user is working on another task. A Power Trigger, working in the time domain and at any Real-Time analysis span, can be armed to monitor for a user-set power threshold to be crossed during a moment in time. A power detector determines total power of all signals in a span which is compared to the user-set threshold.

Capture

Capture once – make multiple measurements as needed. All signals in a Real-Time analysis span – including transients, low duty-cycle and other difficult-to-measure events – are captured together into RSA3408A deep memory where signal data can be accessed at the user's convenience. Record lengths vary depending on span selected – up to 1.28 s at 36 MHz span, 51.2 s at 1 MHz span or 5120 s at 10 kHz span with Deep Memory Opt. 02. Real-Time capture of small signals is enhanced by –78 dBc third order IM and 66 dB 3GPP ACLR (TM1, 16 channel), plus very good phase noise performance and sensitivity. A solid performance front-end serves not only Real-Time and wide band Spectrum Analysis modes, but also on-board vector signal analysis functionality.

Analyze

Time-correlated multi-domain analysis provides engineers with unique insight to time-varying signal behavior resulting in fast analysis and problem solving. Time-correlated measurements can be made across the frequency, time or modulation domains. The analysis display called Spectrogram has the ability to overlap individual spectra as close as 20 ns, providing an intuitive view of signal changes over time, ideal for such things as frequency hopping, pulsed signals, modulation switching, settling time, bandwidth changes, relative timing of appearing and intermittent signals. The RSA3408A introduces analysis capabilities that advance productivity for engineers working on components or in RF system design, integration and performance verification or operations engineers working in networks, spectrum monitoring or surveillance.

▸ Example Applications Benefiting from Key RSA3408A Capabilities

Analysis Feature	RF Communications Systems	WLAN	Cell. Wireless + WLAN devices	Radar, Pulsed Signal Transmission	Surveillance, Spectrum Monitoring	RFID
Hi-res Spectrogram	X	X	X	X	X	X
Multi-domain Correlation	X	X	X	X	X	X
802.11a/b/g Analysis (Opt. 29)		X	X		X	
Cellular Standards Analysis (Multiple Options)			X		X	
Advanced Measurement Suite (Opt. 21)	X			X	X	X
AM, FM, PM Analysis	X			X	X	
Pulsed RF Signal Analysis	X			X	X	
Pulse Spectrum	X		X	X	X	
AM/AM, AM/PM and 1 dB compression (Opt. 21)	X	X	X	X		
Digital IQ Output (Opt. 05)	X			X	X	
Removable HDD (Opt. 06)	X			X	X	

TekConnect® Probe Adapter for Real-Time Spectrum Analyzers

The RTPA2A Real Time Probe Adapter extends the capabilities of the Real-Time Spectrum Analyzers (RTSA) by offering additional tools to make debugging today's high-performance electrical designs easier. Using the RTPA2A with Tektronix RTSA, design engineers can benefit from Tektronix' industry-leading active and differential probes to measure signals on SMD pins or other challenging circuit features.

► Characteristics

Trigger-related
Trigger Mode –
Free run (triggered by acquisition); Triggered (Triggered by event), Single or Continuous.
Trigger Event Source –
Power (span BW); Frequency Mask (Opt. 02); External.
Pre-/Post-Trigger Setting –
Trigger position settable within 0 to 100% of total acquisition length.
Trigger Marker Position Timing Uncertainty (Power and External Trigger) – ±2 sample points.

Power Trigger
Level Range – 0 dBfs[*1] to –40 dBfs.

Frequency Mask Trigger (Opt. 02)
Mask Resolution – 1-Bin.
Level Range –
0 dBfs to –60 dBfs[*1] at 10 dB/div vertical scale.
Bandwidth –
Up to 36 MHz: Start frequency ≥40 MHz.
Up to 40 MHz: Start frequency < 40 MHz.
Real-Time Event Detection Bandwidth (1024 point FFT) –
100% probability of event detection at all Real-Time spans.
Minimum Event Duration –
One frame time; events lasting less than one frame time will result in degraded Frequency Mask Trigger accuracy.
Mask Shape – User-defined.
Minimum Horizontal Mask Setting Resolution –
< 0.2% of span.
Uncertainty – ±2 frames.

[*1] dBfs: dB relative to full scale.

External Trigger
Threshold Voltage – –1.5 V to +1.5 V.
Threshold Voltage Setting Resolution – 0.1 V.
Input Impedance – > 2 kΩ.

Trigger Output
Voltage (Output Current < 1 mA) –
HIGH: > 2.0 V; LOW: < 0.4 V.

Capture-related
Real-Time Capture Bandwidth –
36 MHz, RF; 40 MHz, baseband; 40 MHz using Opt. 03 IQ inputs.
A/D Converter – 102.4 MS/s, 14-Bits.
Minimum Acquisition Length in RTSA/Time/Demod Modes – 1024 samples.
Maximum Acquisition Length in RTSA/Time/Demod Modes –
16,384,000 samples; 65,636,000 samples, Opt. 02.
Acquisition Length Setting Resolution in RTSA/Time/Demod Modes – 1024 samples.
Acquisition Memory Size –
16.4 Msamples; 65.6 Msamples, Opt. 02.
Block Size (number of frames) –
1 to 16,000; 1 to 64,000, Opt. 02.

▶ Memory Depth (time) and Maximum Time Resolution

Span	Sample Rate (For I and Q)	Record Length	Record Length (Opt. 02)	Spectrum Frame (Time)	Max Time (Resolution)
40 MHz (baseband)	51.2 MS/s	0.32 s	1.28 s	20 µs	20 ns
36 MHz	51.2 MS/s	0.32 s	1.28 s	20 µs	20 ns
20 MHz	25.6 MS/s	0.64 s	2.56 s	40 µs	40 ns
10 MHz	12.8 MS/s	1.28 s	5.12 s	80 µs	80 ns
5 MHz	6.4 MS/s	2.56 s	10.24 s	160 µs	160 ns
2 MHz	2.56 MS/s	6.4 s	25.6 s	400 µs	400 ns
1 MHz	1.28 MS/s	12.8 s	51.2 s	800 µs	800 ns
500 kHz	640 kS/s	25.6 s	102.4 s	1.6 ms	1.6 µs
200 kHz	256 kS/s	64 s	256 s	4.0 ms	4.0 µs
100 kHz	128 kS/s	128 s	512 s	8.0 ms	8.0 µs
50 kHz	64 kS/s	256 s	1024 s	16 ms	16 µs
20 kHz	25.6 kS/s	640 s	2560 s	40 ms	40 µs
10 kHz	12.8 kS/s	1280 s	5120 s	80 ms	80 µs
5 kHz	6.4 kS/s	2560 s	10240 s	160 ms	160 µs
2 kHz	2.56 kS/s	6400 s	25600 s	400 ms	400 µs
1 kHz	1.28 kS/s	12800 s	51200 s	800 ms	800 µs
500 Hz	640 S/s	25600 s	102400 s	1.6 s	1.6 ms
200 Hz	256 S/s	64000 s	256000 s	4.0 s	4 ms
100 Hz	128 S/s	128000 s	512000 s	8.0 s	8 ms

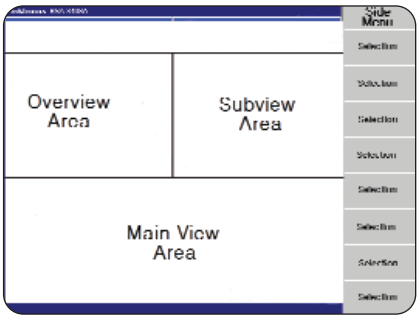
Analysis-related

▶ Measurement Functions by Mode

Mode	Measurements
SA	Channel Power, Adjacent Channel Power Ratio, Occupied Bandwidth, Emission Bandwidth, Carrier-to-Noise Ratio, Carrier Frequency, Spur search, db/Hz Marker, dBc/Hz Marker
RTSA	Channel Power, Adjacent Channel Power Ratio, Occupied Bandwidth, Emission Bandwidth, Carrier-to-Noise Ratio, Carrier Frequency, Spur search
Time	IQ vs. Time, Power vs. Time, Frequency vs. Time, CCDF, crest factor Pulse Measurements: Pulse Width, Pulse Peak Power, On/Off Ratio, Pulse Ripple, Pulse Repetition Interval, Duty Cycle, Pulse-Pulse Phase, Channel Power, OBW, EBW, Frequency Deviation (Min pulse length, 20 samples; Max pulse length, 16,384 samples), Channel Power, Frequency Deviation, and EBW (less than 16, 384 points)
Analog Demod	IQ vs. Time, AM Depth, FM Deviation, PM Deviation, Pulse Spectrum

▶ Views by Mode

Mode	Views
SA	Spectrum
SA/Spectrogram	Spectrum, Spectrogram
RTSA	Spectrum, Spectrogram
Time	Overview: Power vs. Time, Spectrogram Sub-view: Spectrum Main view: Measurement result
Analog Demod	Overview: Power vs. Time, Spectrogram Sub-view: Spectrum Main view: Measurement result
Digital Demod (Opt. 21)	Overview: Power vs. Time, Spectrogram Sub-view or Main View: Vector diagram Constellation diagram, data displayed at symbol times Error vector diagram Eye Diagram, adjustable, 1 to 16 symbols Trellis, adjustable, 1 to 16 symbols I/Q vs. Time, EVM vs. time Symbol Table, binary, octal or hexadecimal – Manchester, Miller and NRZ decoding available for 2ASK and 2FSK modulation AM-AM display AM-PM display CCDF display PDF display



▶ RSA3408A Screen layout, to identify analysis view locations as described in the table at left.

▶ QPSK EVM (%), Typical

Symbol Rate, per Second	100 k	1 M	4 M	10 M	20 M
CF = 1 GHz	0.5	0.5	0.6	0.9	1.6
CF = 2 GHz	0.5	0.5	0.6	0.9	1.8
CF = 3 GHz	0.5	0.5	0.6	0.9	1.8
CF = 5 GHz	0.7	0.7	0.9	1.6	2.4

▶ π/4 DQPSK EVM (%), Typical

Symbol Rate, per Second	100 k	1 M	4 M	10 M	20 M
CF = 1 GHz	0.6	0.6	0.6	0.9	1.8
CF = 2 GHz	0.6	0.6	0.6	0.9	1.8
CF = 3 GHz	0.6	0.6	0.6	0.9	1.8
CF = 5 GHz	0.7	0.7	0.9	1.6	2.4

Measurement Speed

Screen Update Rate –
2 MHz Span, AUTO RBW : 19.4/sec.
Remote Measurement Rate and GPIB Transfer Rate (2 MHz span, auto RBW, spectrum data) –
1.87 wfm/s or 6,000 S/s.
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.
Detector – RMS.
Trace Types –
Normal (RMS), Average, Max Hold, Min Hold.
Display Detection – Max, Min, Max/Min.

Modulation Analysis

Analog
AM
Minimum Input Level – –40 dBfs,[*1] typical.
PM
Minimum Input Level – –40 dBfs, typical.
PM Scale, Max, Min – ±180º.
FM
Minimum Input Level – –40 dBfs, typical.
Range – ± Span/2 from center frequency.

[*1] dBfs: dB relative to full scale

Digital (Opt. 21)
Modulation Formats –
BPSK, QPSK, π/4 DQPSK, OQPSK, 8PSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, GMSK, GFSK, 2ASK, 2FSK.
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.

Demodulation Accuracy

Analog
AM (–10 dBfs signal, input at CF, 10 to 60% modulation depth) – ±2%.
PM (–10 dBfs signal, input at CF) – ±3º.
FM (–10 dBfs signal, input at CF) – ±1% of span.
Digital (Opt. 21):
The following tables are examples of typical digital demodulation accuracy:

▶ 16/64 QAM EVM (%), typical

Symbol Rate, per second	100 k	1 M	4 M	10 M	20 M
CF = 1 GHz	0.5	0.5	0.5	0.7	1.2
CF = 2 GHz	0.5	0.5	0.5	0.7	1.2
CF = 3 GHz	0.5	0.5	0.5	0.7	1.2
CF = 5 GHz	0.9	0.5	0.7	1.3	2.0

Stability

▶ Noise Sidebands, dBc/Hz

Offset	At 1 GHz CF		At 2 GHz CF		At 6 GHz CF	
	Spec	Typical	Spec	Typical	Spec	Typical
1 kHz	–105	–107	–103	–105	–97	–99
10 kHz	–110	–112	–109	–111	–106	–108
20 kHz	–110	–112	–109	–111	–106	–108
30 kHz	–110	–112	–109	–111	–106	–108
100 kHz	–112	–115	–112	–115	–111	–113
1 MHz	–132	–135	–132	–135	–132	–134
5 MHz	–138	–140	–138	–140	–137	–139
7 MHz	–138	–140	–138	–140	–137	–139
10 MHz	–138	–140	–138	–140	–137	–139

RF Performance

Frequency
Frequency Range – DC to 8 GHz.
Center Frequency Setting Resolution – 0.1 Hz.
Frequency Marker Readout Accuracy, Baseband – ± (RE x MF + 0.001 x Span + 0.2) Hz.
Frequency Marker Readout Accuracy, RF – ± (RE x MF + 0.001 x Span + 2) Hz.
RE: Reference Frequency Error.
MF: Marker Frequency (Hz).
Span Accuracy – ±1 bin.
RBW Filter Bandwidth Accuracy – 0.1%.
Reference Frequency –
Aging per Day – 1 x 10^{-9} (after 30 days of operation).
Aging per Year – 1 x 10^{-7} (after 30 days of operation).
Temperature Drift – 1 x 10^{-7} (10 to 40 ºC).
Total Frequency Error – 2 x 10^{-7} (within one year after calibration).
Reference Output Level – >0 dBm.
External Reference Input – 10 MHz, –10 dBm to + 6 dBm.
Frequency Span –
Range, Spectrum Analyzer Mode – 50 Hz to 3 GHz, (Start Frequency ≥40 MHz). 0 Hz to 40 MHz, (Stop Frequency <40 MHz).
Range, Real-Time Spectrum Analyzer Mode – 100 Hz to 20 MHz, 36 MHz (RF). 0 Hz to 40 MHz, (Baseband).

IF Flatness – CF = 400 MHz.

Frequency	Bandwidth	Flatness
2 GHz	≤36.6 MHz	±0.3 dB
5 GHz	≤36.6 MHz	±0.3 dB

IF Phase Linearity –

Frequency	Bandwidth	Flatness
2 GHz	≤36.6 MHz	±2.5º
5 GHz	≤36.6 MHz	±2.5º

IF Filter Bandwidth –
Resolution Bandwidth Range – 1 Hz to 10 MHz, automatically selected or user-defined.
Accuracy – Within 6.0% ±0.1%.
Shape Characteristic – Gaussian, <5:1 shape factor (3:60 dB); Rectangular, Nyquist, Root Nyquist shapes may also be selected.

Minimum Settable RBW (Extended Resolution ON)

Frequency	RBW
Span > 2 GHz	100 kHz
1 GHz < Span ≤ 2 GHz	50 kHz
500 MHz < Span ≤ 1 GHz	20 kHz
20 MHz < Span ≤ 500 MHz	10 kHz
500 kHz < Span ≤ 20 MHz	1 kHz
200 kHz < Span ≤ 500 kHz	500 Hz
100 kHz < Span ≤ 200 kHz	200 Hz
50 kHz < Span ≤ 100 kHz	100 Hz
20 kHz < Span ≤ 50 kHz	50 Hz
10 kHz < Span ≤ 20 kHz	20 Hz
5 kHz < Span ≤ 10 kHz	10 Hz
2 kHz < Span ≤ 5 kHz	5 Hz
1 kHz < Span ≤ 2 kHz	2 Hz
100 Hz < Span ≤ 1 kHz	1 Hz

Noise Bandwidth Range, RTSA Mode – 250.545 mHz to 100.218 kHz.
FFT Performance –
Number of Samples per Frame – 64 to 8192 (65,536 samples per 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, FlatTop.

▶ Frequency Response, 20 ºC to 30 ºC, RF ATT ≥10 dB

Frequency	Spec	Typical
100 kHz to 40 MHz	±0.5 dB	±0.3 dB
40 MHz to 3.5 GHz	±1.2 dB	±0.5 dB
3.5 GHz to 6.5 GHz	±1.7 dB	±1.0 dB
5 GHz to 8 GHz	±1.7 dB	± 1.0 dB

Residual FM – 2 $Hz_{pk\text{-}pk}$, typical.

Amplitude

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

Input Attenuator Range –
RF/baseband input – 0 dB to 55 dB, 5 dB step.
IQ Input (Opt. 03) – 0 dB to 35 dB, 5 dB step.

Input Attenuator Setting Uncertainty (at 100 MHz, 10 dB ATT, 20 ºC to 30 ºC) – ±0.2 dB.

Maximum Safe Input Level –
Average Continuous (RF band, RF ATT ≥10 dB) – +30 dB.
MAX DC voltage – ±0.2 V, RF; ±5 V, Baseband; ±5 V, IQ input, Opt. 03.

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

Linear Display Scale – 10 divisions.

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

Marker Readout Resolution, Log – 0.01 dB.

Marker Readout Resolution, Linear – 0.001 µV.

Absolute Amplitude Accuracy at Calibration Point (baseband, at 25 MHz, –10 dBm Signal, 0 dB ATT, 20 ºC to 30 ºC) – ±0.3 dB.

Absolute Amplitude Accuracy at Calibration Point (RF, at 100 MHz, –20 dBm signal, 0 dB ATT, 20 ºC to 30 ºC) – ±0.5 dB.

Reference Level Setting Range –
1 dB step, RF, –50 dBm to +30 dBm;
5 dB step, baseband, –30 dBm to +20 dBm;
5 dB step, IQ, –10 dBm to +20 dBm.

Reference Level Accuracy (–10 dBm to –50 dBm at 100 MHz, 10 dB ATT, 20 ºC to 30 ºC) – ±0.2 dB.

Level Linearity in Display Range –
±0.2 dB, spec; ±0.12 dB, typical.

Spurious Response

1 dB Compression (RF ATT = 0 dB, 2 GHz CF) – +2 dBm.

3rd Order Inter-modulation Distortion (Ref Level = +5 dBm, RF ATT: adjusted for optimum, total signal power = –7 dBm, CF = 2 GHz) – –78 dBc.

2nd Harmonic Distortion (–30 dBm tone at input mixer, 10 MHz to 1750 MHz) – –65 dBc, typical.

Displayed Average Noise Level, Specified, dBm/Hz

Frequency	Spec
10 MHz	–151
2 GHz	–150
3 GHz	–150
7 GHz	–142

Displayed Average Noise Level, Typical, dBm/Hz

Frequency	Typical
1 kHz to 10 kHz	–144
10 kHz to 10 MHz	–151
10 MHz to 100 MHz	–151
100 MHz to 1 GHz	–150
1 GHz to 2 GHz	–150
2 GHz to 3 GHz	–150
3 GHz v 5 GHz	–142
5 GHz to 8 GHz	–142

▶ Residual Response

Frequency	Spec
1 to 40 MHz (Span=20 MHz, Ref Lvl = –30 dBm, RBW=100 kHz)	–93 dBm
0.5 to 3.5 GHz (Span=3 GHz, Ref Lvl=–30 dBm, RBW=100 kHz)	–90 dBm
3.5 to 6.5 GHz (Span=3 GHz, Ref Lvl=–30 dBm, RBW=100 kHz)	–85 dBm
3.5 to 8 GHz (Span=3 GHz, Ref Lvl=–30 dBm, RBW=100 kHz)	–85 dBm

▶ Spurious Response with Signal

Frequency	Spec
0 MHz (Span=10 MHz, Ref Lvl=0 dBm, RBW–50 kHz, Signal Frequency=25 MHz, Signal Level=–5 dBm)	–73 dBc
2 GHz (Span=10 MHz, Ref Lvl=0 dBm, RBW–50 kHz, Signal Frequency=2 GHz, Signal Level=–5 dBm)	–73 dBc
5 GHz (Span=10 MHz, Ref Lvl=0 dBm, RBW–50 kHz, Signal Frequency=5 GHz, Signal Level=–5 dBm)	–70 dBc
7 GHz (Span=10 MHz, Ref Lvl=0 dBm, RBW–50 kHz, Signal Frequency=7 GHz, Signal Level=–5 dBm)	–70 dBc

▶ VSWR, RF ATT >10 dB

Frequency	Spec	Typical
300 kHz to 10 MHz	—	<1.4:1
10 MHz to 3 GHz	—	<1.3:1
2.5 GHz	<1.4:1	—
7.5 GHz	<1.8:1	—

Inputs and Outputs

Front Panel

Input Connectors –
N type, RF/baseband; BNC type, IQ, Opt. 03.

Input Impedance – 50 Ω.

Preamp Power Connector –
Lemo 6-Pin connector – pin 1: NC; pin 2: ID1; pin 3: ID2; pin 4: –12 V; pin 5: GND, pin 6: +12 V.

External Preamp (Opt. 1A) –
100 MHz to 3 GHz, 20 dB gain, 6.5 dB Noise Figure at 2 GHz (Typical).

Rear Panel

Digital IQ Output (Opt. 05) –

Connector Type – MDR (3M) 50 pin x 2.

Data Output – I data: 16 bit LVDS; Q data: 16 bit LVDS.

Control Output – Clock: LVDS, MAX 51.2 MHz.

Control Input – IQ data output enabled, connecting GND enables output of IQ data.

Clock Rising Edge to Data Transition Time (hold time) – >5 ns.

Data Transition to Clock Rising Edge (setup time) – >5 ns.

Data from Opt. 05 requires application of correction factors to IQ data to achieve similar RF performance to RSA3408A.

10 MHz REF OUT – 50 Ω, BNC, > -3 dBm.

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

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 – 10/100 Base-T (Std.).

Serial Interface – USB 1.1, two ports.

VGA Output – VGA compatible, 15 D-sub.

General Characteristics

Temperature Range –
Operating: +10 ºC to +40 ºC.
Storage: –20 ºC to +60 ºC.

Warm-up Time – 20 min.

Operating Altitude –
Operating: up to 3000 m (10,000 ft.)
Non-operating: up to 12,000 m (40,000 ft.)

Safety and EMI Compatibility –
UL 61010-1; CSA C22.2 No. 61010-1-04; IEC61010, second edition (Self Declaration).
Low Voltage Directive 73/23/EEC, amended by 93/68/EEC; EN61010-1: 2001 Safety requirements for electrical equipment for Measurement control and laboratory use.
EC Council EMC Directive 89/336/EEC, amended by 93/68/EEC.
EN61326-1: 1997 Product Family Standard for Electrical Equipment for Measurement, Control and Laboratory Use-EMC Requirements.
Electromagnetic Compatibility Framework:1992 AS/NZS 2064.1/2(Industrial, Scientific and Medical Equipment).

Power Requirements –
100 VAC to 240 VAC, 47 Hz to 63 Hz.

Power Consumption – 400 VA max.

Data Storage – Internal HDD (40 GB), USB port, FDD.

Weight, without options – 20 kg, 44 lbs.

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 – One year.

Warranty – One year.

GPIB – SCPI-compatible.

▸ Ordering Information

RSA3408A

Real-Time Spectrum Analyzer DC – 8 GHz.

Includes: User manual, programmer's manual, power cord, BNC-N adapter, USB keyboard and mouse.

Options[*1]

Opt. 1A – External Preamp, 100 MHz – 3 GHz, 20 dB gain, 6.5 dB Noise Figure at 2 GHz (Typical).

Opt. 1R – Rackmount kit.

Opt. 02 – 65.5 MSample Deep Memory, Frequency Mask Trigger.

Opt. 03 – IQ, Differential IQ Inputs.

Opt. 05 – Digital IQ Output.

Opt. 06 – Removable HDD.

Opt. 21 – General Purpose Modulation Analysis.

Opt. 23 – W-CDMA Uplink Analysis.

Opt. 24 – GSM/EDGE Analysis.

Opt. 25 – CDMA 1X Forward/Reverse Link Analysis.

Opt. 26 – 1X EVDO Forward/Reverse Link Analysis.

Opt. 27 – 3GPP Release 5 Downlink (HSDPA) Analysis.

Opt. 28 – TD-SCDMA Analysis.

Opt. 29 – WLAN 802.11a/b/g Analysis.

Opt. SASW – USB Stand Alone Software Key

[*1] Specifications for Options 21 through 29 can be found in the Real-Time Spectrum Analyzer Software Options datasheet, on www.tektronix.com/RSA.

Upgrades

RSA34UP02 – 65.5 MSample Deep Memory, Frequency Mask Trigger.

RSA34UP03 – IQ, Differential IQ Inputs.

RSA34UP05 – Digital IQ Output.

RSA34UP06 – Removable HDD.

RSA34UP21 – Advanced Measurement Suite (customer-installable).

RSA34UP23 – W-CDMA Uplink Analysis (customer-installable).

RSA34UP24 – GSM/EDGE Analysis (customer-installable).

RSA34UP25 – cdma2000 1X Forward/Reverse Link Analysis (customer-installable).

RSA34UP26 – 1X EVDO Forward/Reverse Link Analysis (customer-installable).

RSA34UP27 – 3GPP Release 5 Downlink (HSDPA) Analysis (customer-installable).

RSA34UP28 – TD-SCDMA Analysis (customer-installable).

RSA34UP29 – WLAN 802.11a/b/g Analysis (customer-installable).

WCA2UP 1A – External Preamp, 100 MHz to 3 GHz, 20 dB gain, 6.5 dB Noise Figure at 2 GHz (Typical).

WCA2UP 1R – Rackmount kit upgrade for RSA3408A.

RSA34UPIF – Installation labor for RSA34UPxx (no calibration required).

RSA34UPIFC – Installation labor for RSA34UPxx (with calibration).

RSA3SASW – USB Stand Alone Software Key.

Accessories

RSA34RHD – Extra 40 GB Removable Hard Drive for use with Opt. 06.

RTPA2A – Probe adapter box for TekConnect® probes.

119-4146-00 – RF Near Field Passive Probe Kit.

International Power Plugs

Opt. A0 – North America power.

Opt. A1 – Universal Euro power.

Opt. A2 – United Kingdom power.

Opt. A3 – Australia power.

Opt. A4 – North America power, 240 V.

Opt. A5 – Switzerland power.

Opt. A6 – Japan power.

Opt. A10 – China power.

Opt. A99 – No power cord.

Service

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.

Languages

Opt. L0 – English User/Programmer's Manuals.

Opt. L5 – Japanese User/Programmer's Manuals.

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Our most up-to-date product information is available at:
www.tektronix.com

Product(s) are manufactured in ISO registered facilities.

Product(s) complies with IEEE Standard 488.2-1987 with SCPI conformance

3/06 HB/WOW 37W-18380-2

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