It’s Time To Get Real.

Your Guide to Selecting the Right Real-Time Spectrum Analyzer

Tektronix

Enabling Innovation

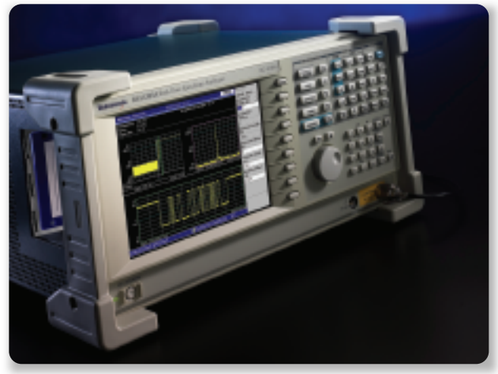
Complex RF Problems

Require a New Type of Analysis

Today's RF signals change over time, often unpredictably. To effectively characterize these signals, you need a tool that can discover and trigger on both known and unpredictable events, capture the signals seamlessly into memory, and analyze the behavior of frequency, amplitude, and modulation parameters over time. Using traditional tools like swept spectrum analyzers and vector signal analyzers might provide snapshots of the signal in the frequency and modulation domains, but this is often not enough information to confidently describe the dynamic RF signals produced by the device under test. By providing insight into how parameters change over continuous time, the Real-Time Spectrum Analyzer adds another crucial dimension to all of these measurements.

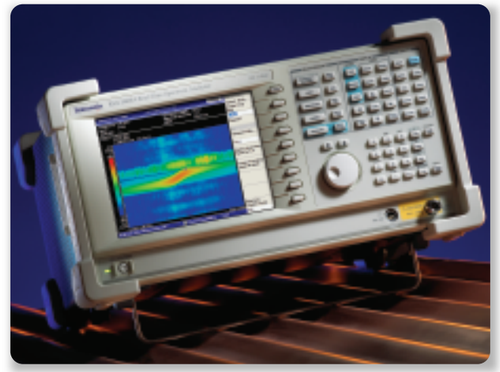
▶ Select Your Real-Time Spectrum Analyzer Performance

RTSA Model Series	Frequency Range	Memory Depth	Modulation Analysis	Real-Time Capture Bandwidth	Triggering Modes
RSA3303A	DC-3 GHz	64 MB, 256 MB optional	AM, FM (ASK, FSK), PM, Pulse Analysis; optional general purpose digital mod analysis	15 MHz	IF Level, Power and Opt. Frequency Mask Trigger
RSA3308A	DC-8 GHz	64 MB, 256 MB optional	AM, FM (ASK, FSK), PM, Pulse Analysis; optional general purpose digital mod analysis	15 MHz	IF Level, Power and Opt. Frequency Mask Trigger
RSA3408A	DC-8 GHz	64 MB, 256 MB optional	AM, FM (ASK, FSK), PM, Pulse Analysis; optional general purpose digital mod analysis	36 MHz	Power and Opt. Frequency Mask Trigger
RSA6106A	9 kHz - 6.2 GHz	256 MB, 1 GB optional	Amplitude, Frequency, Phase vs Time and Advance Signal (Pulse)Analysis optional general purpose digital mod analysis	40 MHz 110 MHz optional	Power and Opt. Frequency Mask Trigger
RSA6114A	9 kHz - 14 GHz	256 MB, 1 GB optional	Amplitude, Frequency, Phase vs Time and Advance Signal (Pulse)Analysis optional general purpose digital mod analysis	40 MHz 110 MHz optional	Power and Opt. Frequency Mask Trigger



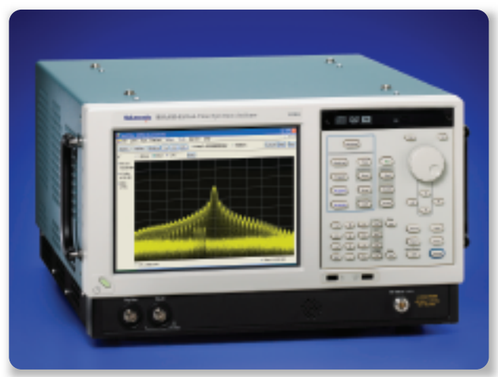
RSA3300A Series

With a single acquisition, the RSA3300A Series captures a continuous time record of changing RF events and enable time-correlated analysis in the frequency, time and modulation domains.



RSA3408A Series

Get fast resolution to complex problems with enhanced triggering, more capture bandwidth and great analysis tools with the RSA3408A.



RSA6100A Series

The RSA6100A Series offers the revolutionary DPX® spectrum display with an intuitive live color view of signal transients changing over time in the frequency domain, giving you immediate confidence in the stability of your design, or instantly displaying a fault when it occurs.

It's Time to Get Real.

Completely Characterize Time-varying RF Signals

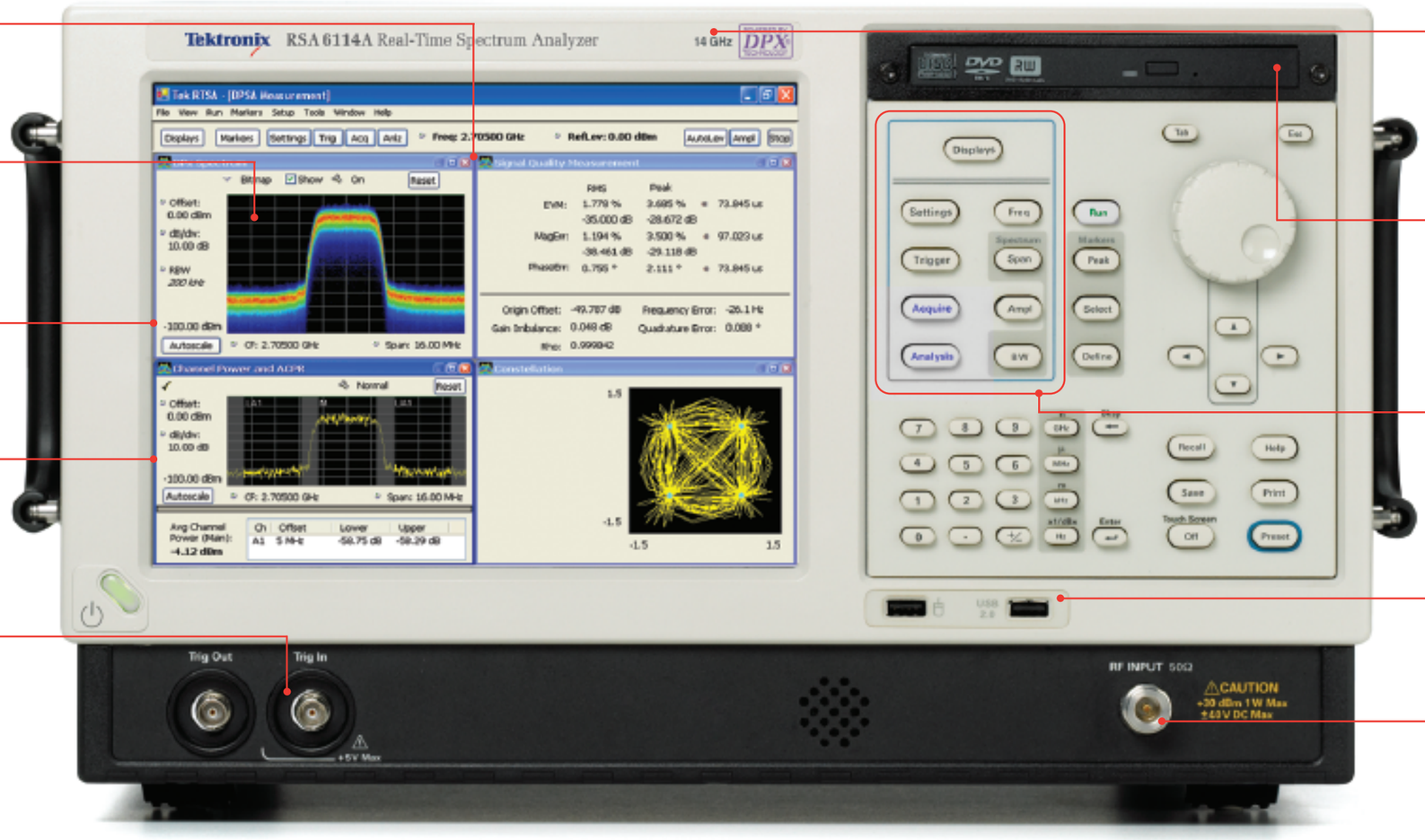
Multiple correlated views in all domains (Frequency, Time, Amplitude, Phase, Modulation) with intuitive user interface.

Revolutionary DPX® spectrum processing for unmatched troubleshooting and live transient analysis.

Touch screen, mouse and front panel controls directly adjust settings in the views.

Windows XP Operating System with Tek OpenChoice® for easy file operations, printing, Ethernet and GPIB control, remote connections and more.

Two external triggers to capture key event information (1 front, 1 rear).



Two frequency ranges: 9 kHz to 6.2 GHz (RSA6106A) or 9 kHz to 14 GHz (RSA6114A).

DVD ±RW (standard) for waveform storage. Removable HDD (optional) for data security.

Familiar spectrum analyzer controls plus fast access to all acquisition and measurement settings.

USB connections (2 front, 2 rear), for mouse, keyboard and memory.

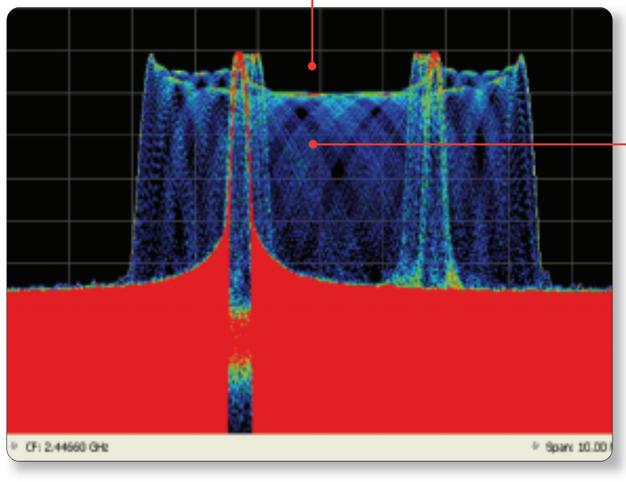
DC-Protected Input ±40 V DC, over entire frequency range, +30 dBm CW, 75W Pulse Maximum.

Easily Discover Problems Using the Revolutionary DPX® Spectrum Display

Detection is the first step in understanding and resolving any problem relating to time-variant signals. As new applications utilize wireless transmission, new channels crowd into available bandwidth, and RF systems become digital-based, engineers need better tools to help them find and interpret complex behaviors and interactions.

Tektronix' patented Digital Phosphor technology, standard in our RSA6100A Series Real-Time Spectrum Analyzers, reveals signal details that are completely missed by conventional spectrum analyzers and vector signal analyzers. The DPX® Spectrum's live RF display shows signals never seen before, giving users instant insight and greatly accelerating discovery and diagnosis.

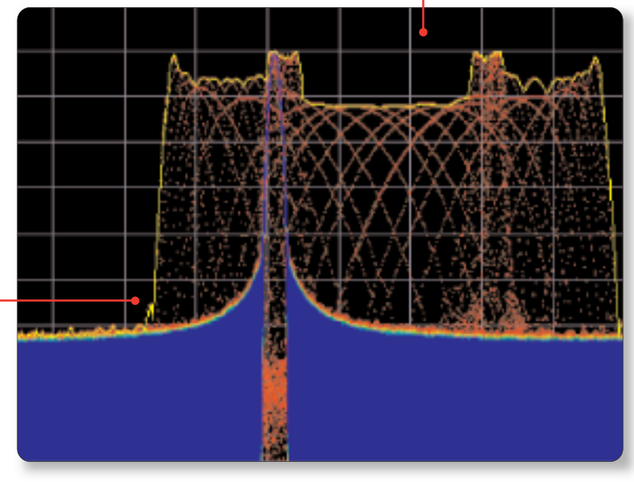
Revolutionary DPX spectrum display reveals transient signal behavior that helps you discover instability, glitches and interference.



Infrequently occurring transient is seen in detail. The frequency of occurrence is color-graded, indicating the infrequent transient event in blue and the noise background in red.

Performing >48,000 frequency transforms per second, transients as brief as 24 µs in length are displayed in the frequency domain. This is a 1000-fold improvement over swept analysis techniques. Events can be color coded by rate of occurrence onto a bitmapped display, providing unparalleled insight into transient signal behavior.

DPX Spectrum display after 5 seconds. Bitmap color mapping is "Spectral", to emphasize infrequent signals with hot colors. MaxHold trace is indicated in yellow.

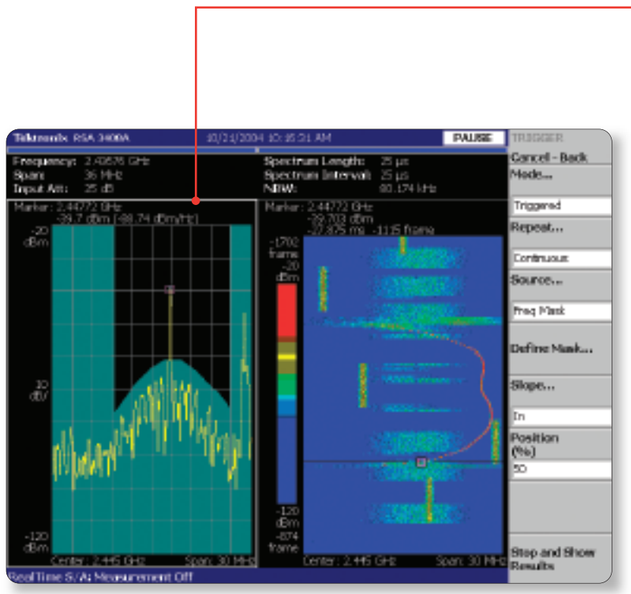


Trigger

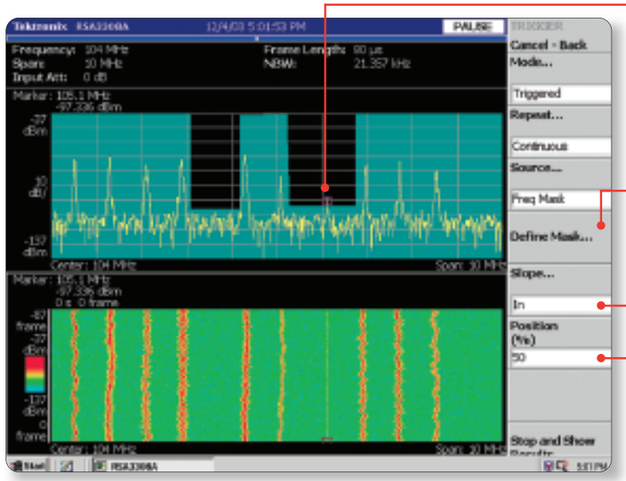
the Only Spectrum Analyzers with Frequency Domain Triggering

Real-Time Spectrum Analyzers overcome the challenges associated with today's complex RF signals with both frequency and time domain event triggers. These advanced triggers provide the ability to capture a seamless record of RF signals into memory and perform time-correlated, multi-domain analysis.

Unlike traditional swept spectrum analyzers, the Real-Time Spectrum Analyzer offers a Power Trigger with user-settable span, enabling spectrum capture whenever the power of any signal crosses a user-defined threshold. Tektronix' exclusive Frequency Mask Trigger enables the capture of the spectrum of interest when a discrete change in signal frequency, amplitude, or bandwidth occurs, or when a signal appears or disappears. Frequency Mask Triggering occurs even if spectral events are detected at a much lower level than adjacent signals. In addition, the flexibility of the Frequency Mask Trigger enables the creation of a customizable mask that can monitor multiple different frequency bands within the analysis span.



Using the Frequency Mask Trigger and Spectrogram to determine if interference with specific WLAN packets is coming from a Bluetooth transimitter or a microwave oven.



Frequency Mask Trigger can catch unknown, transient or low duty cycle signals in a multi-signal spectrum

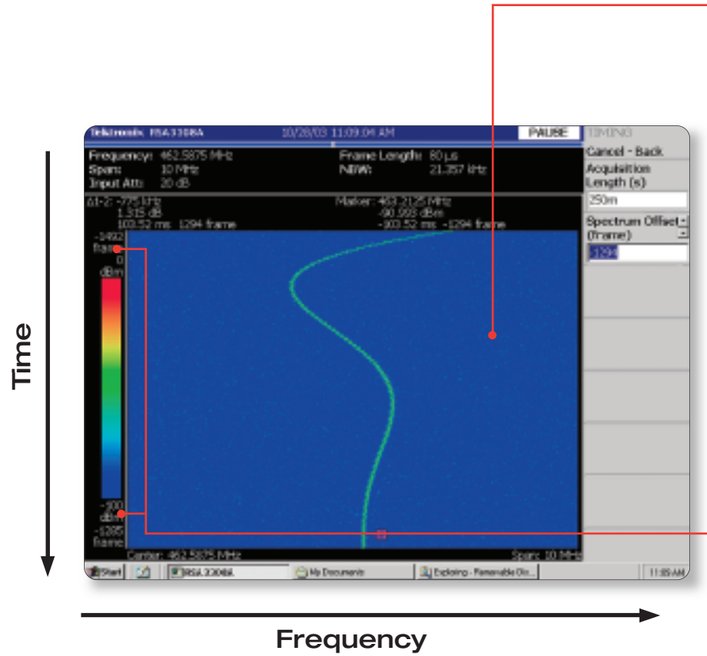
Point-click-and-drag editor makes mask set-up easy

Trigger can be used in an exceed threshold or "fall under" threshold mode

Trigger position can be set to designate what percentage of the captured time record will be pre-trigger and post-trigger

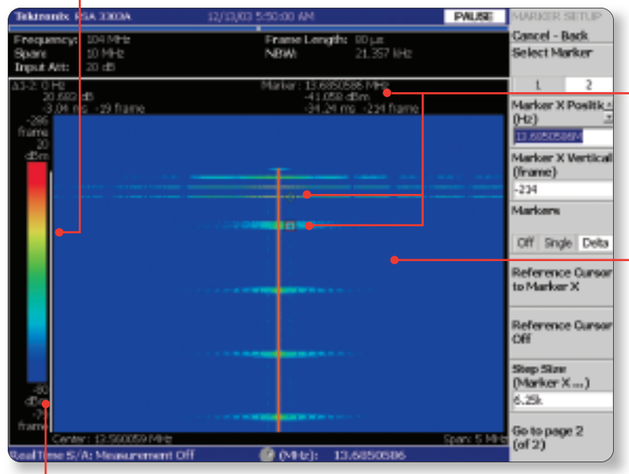
Continously Capture a Seamless Time Record of a Span of RF Frequencies

As the complexity of new RF components, devices and systems continues to increase, the ability to acquire and store a record of time-variant RF signal activity and thoroughly analyze its unique behavior – over time, in multiple domains – is becoming increasingly essential. Tektronix' Real-Time Spectrum Analyzers meet these requirements by seamlessly capturing and recording all the signals across a user-selected span – up to 110 MHz, depending upon model used. Transient, pulsed and other time-variant signals are all captured as a seamless time record into deep memory. Some models also include an option for streaming live IQ data to an output for external recording and analysis.



Spectrogram showing oscillator turn-on settling characteristic enables measurement frequency variance over time

Readouts show first and last spectra (frame) displayed, with color scaling that indicates amplitude



User adjustable color scaling shows signal amplitude transitions

Marker/delta markers provide signal amplitude, frequency, frame number and time

Spectrogram showing a pulsed AM signal... measure spectral occupancy and amplitude, timing between pulses. Also measure transient signals at carrier turn-on time

Trigger/pre-trigger time designation

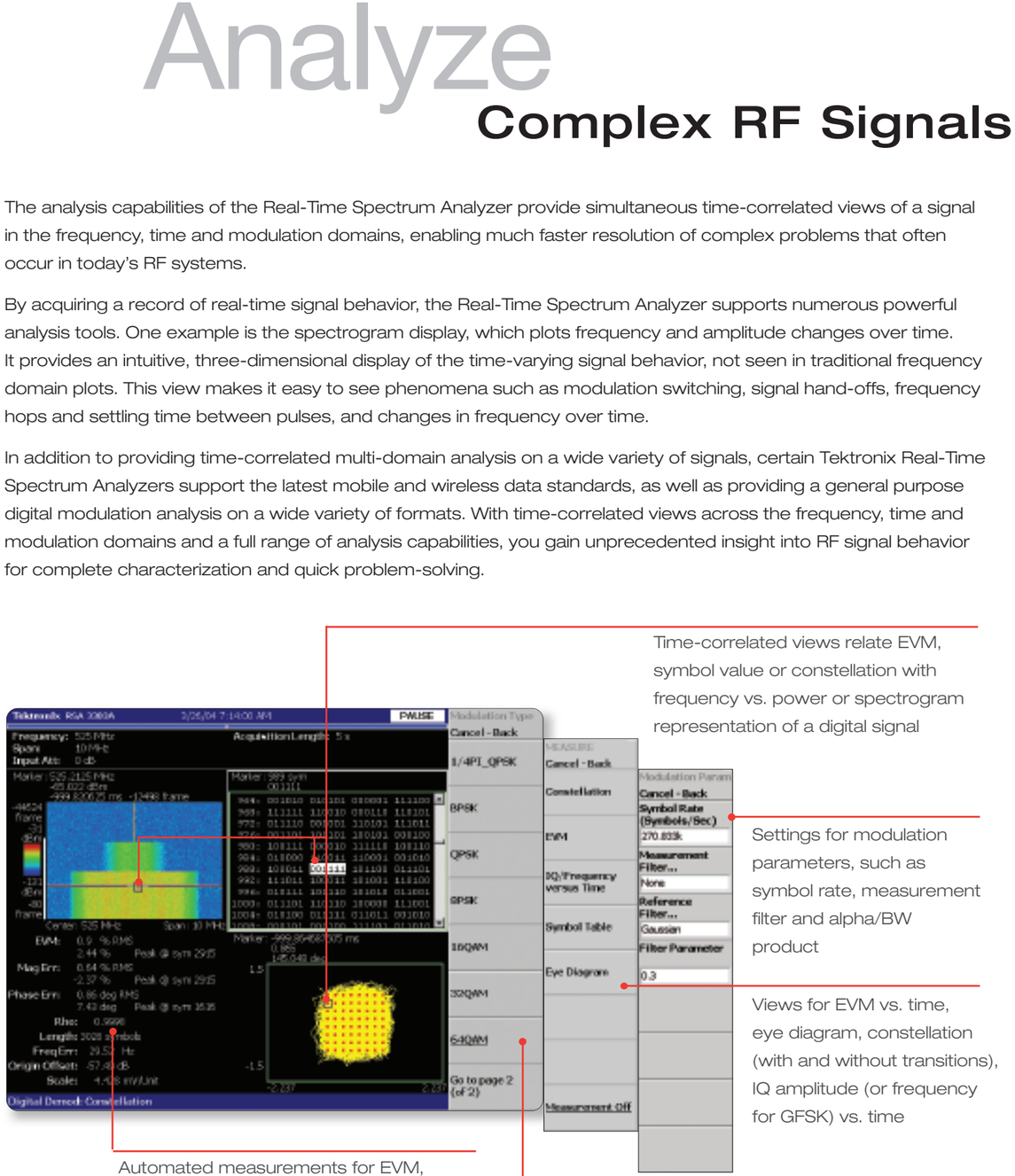
Analyze

Complex RF Signals Completely

The analysis capabilities of the Real-Time Spectrum Analyzer provide simultaneous time-correlated views of a signal in the frequency, time and modulation domains, enabling much faster resolution of complex problems that often occur in today's RF systems.

By acquiring a record of real-time signal behavior, the Real-Time Spectrum Analyzer supports numerous powerful analysis tools. One example is the spectrogram display, which plots frequency and amplitude changes over time. It provides an intuitive, three-dimensional display of the time-varying signal behavior, not seen in traditional frequency domain plots. This view makes it easy to see phenomena such as modulation switching, signal hand-offs, frequency hops and settling time between pulses, and changes in frequency over time.

In addition to providing time-correlated multi-domain analysis on a wide variety of signals, certain Tektronix Real-Time Spectrum Analyzers support the latest mobile and wireless data standards, as well as providing a general purpose digital modulation analysis on a wide variety of formats. With time-correlated views across the frequency, time and modulation domains and a full range of analysis capabilities, you gain unprecedented insight into RF signal behavior for complete characterization and quick problem-solving.



Time-correlated views relate EVM, symbol value or constellation with frequency vs. power or spectrogram representation of a digital signal

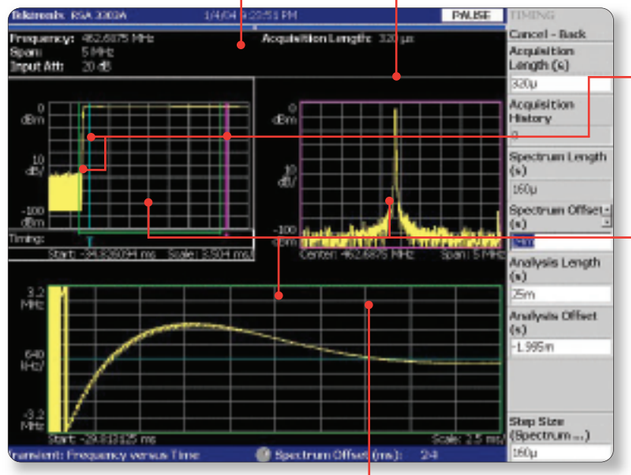
Settings for modulation parameters, such as symbol rate, measurement filter and alpha/BW product

Views for EVM vs. time, eye diagram, constellation (with and without transitions), IQ amplitude (or frequency for GFSK) vs. time

Automated measurements for EVM, Magnitude Error, Phase Error, plus symbol number where each measurement peaks

Modulation analysis for: BPSK; QPSK; 16, 32, 64, 256 QAM; 8PSK; π/4 DQPSK; GMSK; GFSK and more

View Multiple Domains At Your Convenience



Overview window: power vs. time

Sub-view window: choice of frequency vs. amplitude, constellation, EVM, many other displays

Color-keyed lines show timing of Main View analysis and Sub-View spectrum analysis and trigger time

Measurements are time-correlated

Main view window: time vs. amplitude, time vs. frequency, time vs. phase, many other views

Application

Solutions for Your Digital RF Challenges

▶ **Example Applications Benefiting from Key Standard Capabilities and Options**

Analysis Feature	Applications									Product Series		
	General Signal Analysis	RF Communication Systems	Spectrum Management	Radar & Pulsed Signals	SDR and Cognitive Radio	WiMAX	WLAN	RFID	Cellular	RSA6100A	RSA3408A	RSA3300A
DPX® Spectrum Processing	X	X	X	X	X	X	X	X	X	standard		
Multi-Domain Correlation	X	X	X	X	X	X	X	X	X	standard	standard	standard
Hi-res Spectrogram	X	X	X	X	X	X	X	X	X	standard	standard	standard
Internal Preamplifier			X		X			X		optional		
External Preamplifier			X		X			X			optional	optional
110 MHz Capture Bandwidth			X	X	X		X		X	optional		
40 MHz Capture Bandwidth	X	X	X			X			X	standard		
36 MHz Capture Bandwidth	X	X	X	X	X	X	X		X		standard	
15 MHz Capture Bandwidth	X	X		X	X	X		X	X			standard
Power Trigger	X	X	X	X	X	X	X		X	standard	optional	optional
Frequency Mask Trigger	X	X	X	X	X	X	X	X	X	optional	optional	optional
General Purpose Modulation Analysis		X	X		X			X		optional	optional	optional
Removable HDD			X	X						optional	optional	
Digital IQ Output	X		X		X	X				optional	optional	
Analog IF Output			X	X	X		X			optional	standard	
Differential Analog IQ Input			X		X	X	X	X			optional	optional
Pulsed RF Analysis	X	X	X	X							optional	optional
Advanced Analysis Pulsed Signal Suite	X		X	X						optional		
AM/AM, AM/PM, 1 dB Compression	X	X		X	X				X		optional	optional
Cellular Standards Analysis		X	X		X				X	optional	optional	optional
802.11a/b/g/n Analysis			X		X		X				optional	
RFID Analysis								X			optional	optional
WiMAX Analysis						X				optional	optional	optional

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Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit **www.tektronix.com**

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