

ThinkRF WSA1000U Enables Versatile and Powerful Real-Time Triggering

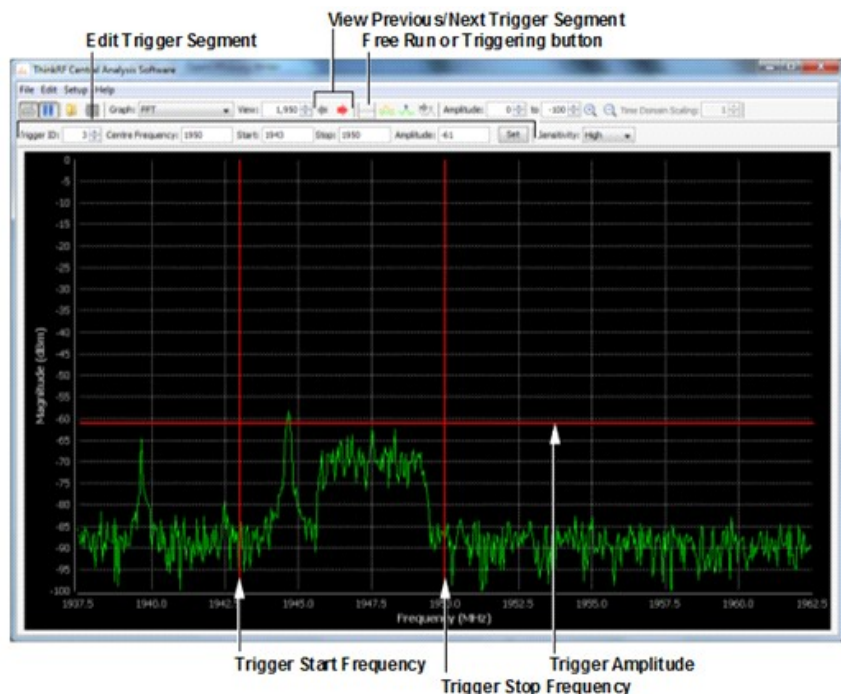
ThinkRF's WSA1000U functions as a field-deployable system for real-time analysis of signals in the 400 MHz to 4 GHz frequency range. The WSA1000U interfaces with the CAS9000 visualization software running on a laptop or PC. In addition to standard spectrum analysis utilities such as max hold, peak find and center frequency settings, the product supports advanced real-time signal triggering and data-streaming capabilities. This application note overviews the various triggering mechanisms available to the user.

WSA1000U Key Features

- Integrated RF/digital acquisition system
- Up to 85 MHz instantaneous RF bandwidth
- Scan rate greater than 10 GHz/sec
- 400 MHz to 4 GHz frequency coverage
- Large dynamic range
- High speed connectivity via USB 2.0
- Streaming modes supporting 32 MB/s
- Signal recording
- Low power consumption
- Very cost-effective

Frequency-threshold triggering

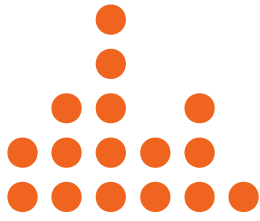
The user can set a number of frequency trigger conditions defined by a frequency range and amplitude threshold. The detection of any signal activity within this range that exceeds the threshold results in a triggered spectral event. Data is subsequently recorded to memory. A 1024-point Fast Fourier Transform and triggering operations are performed in hardware and at real-time. This reduces the likelihood of a missed spectral event and results in very reliable signal detection. This reliability is critical in applications such as enterprise wireless policy management and SIGINT.



Trigger and Amplitude Settings for Signal Detection

Triggering enables the user to capture wideband signal activity while concurrently transferring previously captured data to the PC via the USB. This triggered burst mode operation is useful for signal detection applications where the user does not require demodulation of the data. In this application and many other signal processing scenarios useful information can be derived from relatively short bursts of acquired data.





Triggering on the ThinkRF WSA1000U

Streaming

Demodulation operations in general require data to be streamed to the PC where it is processed continuously. For such applications, the WSA1000U supports up to 32 MB/s data throughput across the USB interface. This enables continuous processing of up to 8 MHz bandwidth waveforms.

Time and external triggering

For data acquisition applications, an internal counter may be used to capture data at regular intervals in time. The WSA1000U also has provision for an external pulse signal that can be applied to commence data collection and storage to memory. Time-triggered measurements are used extensively in channel sounding or radio channel occupancy measurement applications.

Free-run

The WSA can also operate in free-run or un-triggered mode where it captures wideband data asynchronously. This mode of operation is similar to the manner in which a basic spectrum analyzer operates and is useful for quick scans across the WSA1000U's operating frequency range. The figure below shows a spectrogram of data recorded in the free-run mode of operation.

Software Capability

Graph selection

- FFT
- FFT spectrogram/waterfall
- I-Q time domain

Triggering control

- create custom sweeps
- up to 1024 user-defined 85 MHz trigger segments
- control of center frequency, start-stop frequency, amplitude, dwell time, gain/sensitivity and moving average

Waveform viewing

- simple cursoring across trigger segments
- zoom in/out on amplitude and frequency axis
- max hold option
- peak find option

Signal recording

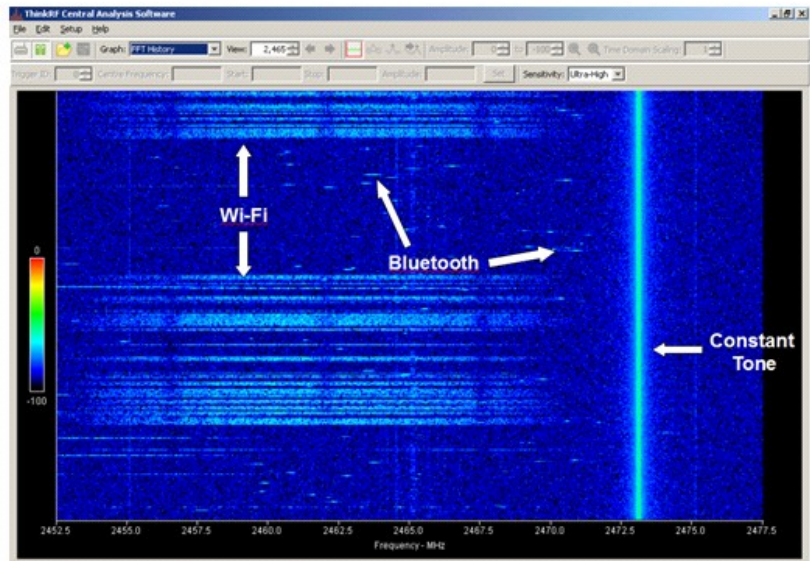
- I-Q data storage in CSV file format
- post-process with MATLAB or Excel

Save and restore setting

- create different measurement scenarios

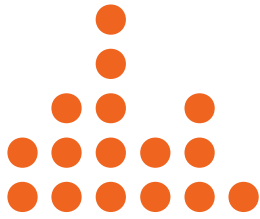
Operating system compatibility

- Windows 7, Vista, XP SP2, Linux



Waterfall or Spectrogram recorded in free-run mode.

The flexibility offered by the WSA1000U's triggering schemes in combination with its wide bandwidths and operating frequency ranges is useful in a number of applications including SIGINT and wireless system design.



Triggering on the ThinkRF WSA1000U

Software Configurability

The WSA1000U ships with a standard firmware build for real-time spectral analysis and data visualization. The user can change the hardware's personality at any time with the use of a ThinkRF software configuration tool, to support a different application. Additionally the WSA1000U contain non-volatile memory to support multiple instrument personalities and rapid re-configurability.

An example scenario of where this would be useful is when performing RF measurements in the field. Prior to making any measurements, the WSA1000U can be used in spectrum analysis mode to verify the presence of a signal. Subsequently the WSA1000U can be reconfigured to support external-pulse triggered data acquisition of the signal under observation.

WSA1000U Specifications

Instantaneous Bandwidth

- Up to 85 MHz

Frequency Range

- 400-4000 MHz

Spur-free Dynamic Range

- 73 dB

Total Operating Amplitude Range

- 120 dB

Max. Input Power

- +20 dBm

Input damage level

- +25 dBm

Phase Noise @ 2.45 GHz with internal VCO

- -89 dBc/Hz typ. @ 10 kHz offset
- -114 dBc/Hz typ. @ 100 kHz offset
- -134 dBc/Hz typ. @ 1 MHz offset
- -148 dBc/Hz typ. @ 5 MHz offset

Displayed Average Noise Level

- < -100 dBm

Input Supply Voltage

- 6V +/- 5%

Input Current

- 1.5A max.

Operating temperature

- 0 to 50C

Dimensions (L x W x H)

- 9" x 6.5" x 2.1"
- 22.9 cm x 16.5 cm x 5.2 cm

Weight

- 4 lbs / 2 kg

Contact Us

For more information on ThinkRF's products, applications or services, please contact us our sales team by phone +1.613.369.5104 ext 1 or by email sales@thinkrf.com or visit our website at www.thinkRF.com

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