Communications Research Centre Canada
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Spectrum Explorer®

Experts monitoring today's complex wireless signal environment require state-of-the-art communications measurement equipment. The CRC-developed Spectrum Explorer (SE) is a flexible software solution which provides a family of sophisticated applications that perform spectrum surveillance and analysis. Installed on a Windows-based PC, SE works with a broad range of commercial RF receiving and digitizing hardware. SE supports the digital signal processing and user-friendly GUI control needed by specialists to assess the usage and quality of the radio spectrum.

SE core applications:

- Wideband Scanner (WBS)
- Spectrum Analyzer (SA)

SE optional applications:

- Communication Signal Analyzer (CSA)
- Direction Finder (DF)
- Personal Communication System Analyzer (PCSA)
- Time Frequency Analyzer (TFA)
- Transmission Monitor (TM)

Major Features

- Monitors and captures all types of signals
  - Transients, low level, adjacent
- Uses commercially available hardware and Windows OS
  - Non-proprietary tuners and ADCs
  - Small size, low power, portable systems
  - Automatic OS updates, Plug & Play
- Modular design
  - Update/add subsystem components independently
- Intuitive GUI operation
- Complementary interworking between applications
- Sharing mode minimizes hardware
  - Multiple applications run simultaneously using a single tuner/ACD

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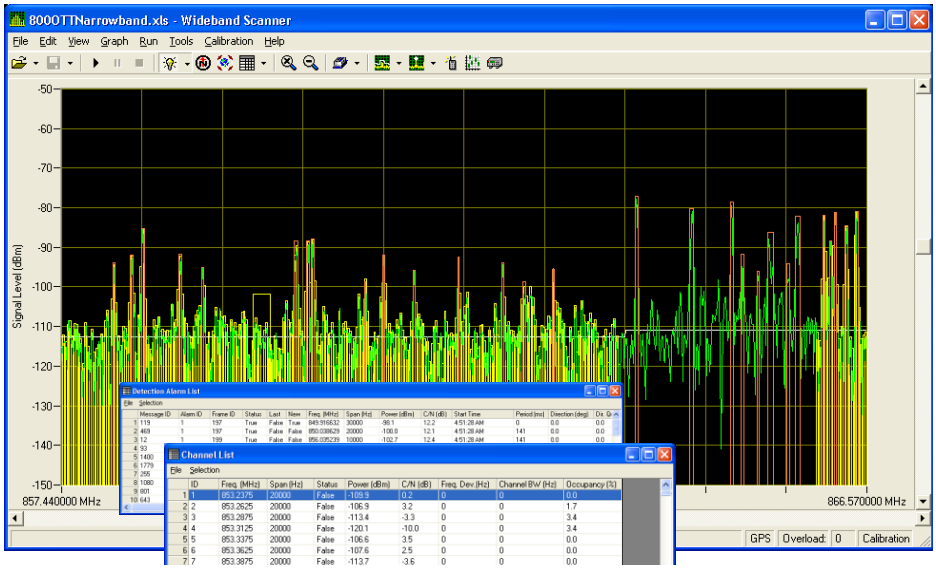
Spectrum Explorer®

Wideband Scanner

WBS provides detailed real-time spectrum monitoring measurements by directing a tuner to sweep frequencies typically from 2 MHz to 6 GHz and displaying spans typically from 20 MHz -250 MHz. The wideband IF composite signal is digitized by the ADC and passed to the PC where digital signal processing converts it to frequency domain points. These points may be displayed as energy spectrum, as channels, and/or as detections. The span, the number of channels and the resolution bandwidth are set via a GUI interface and can be stored in scan tables for reuse. Gain and attenuation can be adjusted to suit the signal strength of the monitoring environment. Active scan parameters can be captured in a log file for detailed analysis.



Major features

- Ultra fast scanning and scheduled logging
  - Statistical analysis of logged data
- Dynamic tables of measurements
- RF energy and channel detection
- Adjustable gain and attenuation
- Signal and channel filtering
  - Peak, RMS, Exponential
- Channel occupancy determination
- Noise floor level determination
- Signal detection using:
  - Constant probability of false alarm
  - Signal–to-noise ratio (SNR)
- Alarms for many signal parameters
- Zooming capability for scrutiny of signals of interest
- Complementary interworking with other SE applications
  - SA, DF, PCSA, TFA

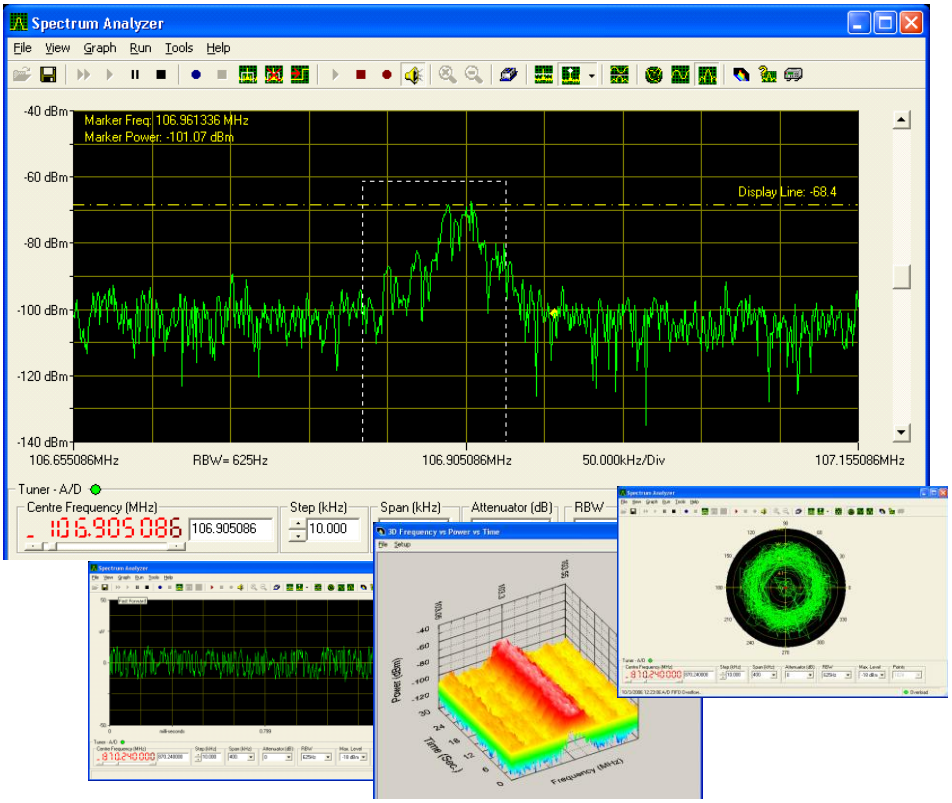
Spectrum Explorer®

Spectrum Analyzer

The Spectrum Analyzer (SA) provides narrow band spectrum scanning and a dynamic display of power spectral density versus frequency. The display span and resolution can be adjusted over a wide range of values. The SA can be operated in conjunction with the Spectrum Explorer's Wideband Scanner to provide an integrated system that offers narrowband scrutiny in a wideband context. Continuous signal data, block signal data and triggered events can be captured to file for future playback and analysis.

The SA includes a demodulation capability and provides control and input for commercial drop-down receivers.

The SA allows access to the optional Communications Signal Analyzer (CSA) that determines modulation type and gives signal parameter measurements.



Major features

- Display line and Markers
- Transient detection and capture
- Data logging and playback
- Signal demodulation and recording
- Continuous or block mode operation
- Displays
  - Frequency
  - Time linear (I and Q data)
  - Time polar
  - Power vs frequency vs time
- Complementary interworking with other SE applications
  - WBS
  - CSA

Specifications

Spectrum Explorer's modular design supports numerous configurations of tuner/ADC subsystems and can run on several generations of Windows-based PCs. Your system's performance will depend on your chosen hardware and number of concurrently running applications.

WBS – general specifications

Frequency Range	9 kHz to 40 GHz
Frequency Sweep rate	0.5 to 6 GHz with 5 kHz resolution and <100Hz tuner settling
Channel Sweep rate	> 20000 channels/s with 30 kHz channels, 10 kHz resolution and <100Hz tuner settling

Typical configurations

Freq Range	Tuner/ADC	Max Scanning Speed
20-3000 MHz	AG64000 / AG1437	0.2 to.4 GHz/s
20-2700 MHz	WJ8621 / AG1438-9	0.5 to 2.4 GHz/s
20-2700 MHz	AG2730 / AG1439B	0.5 to 6 GHz/s
20-2700 MHz	WJ8621 or AG2730 / ICS-554	1 to 2.4 GHz/s
20-3000 MHz	SI-9136B / AG1438-9	0.5 to 6 GHz/s
20-3000 MHz	SI-9144 / SI-9475	0.5 GHz/s
10kHz-2700 MHz	R&S EM010 & WJ8621 / AG1438-9	0.5 GHz/s
20-6000 MHz	AG 2731/ AG1439B	0.5 to 6 GHz/s
10 kHz – 3000 to 40000 MHz	R&S FSP 3 - FSP 40	0.2 GHz/s

SA – general specifications

Tuning Range	2 MHz to 10 GHz
Frequency Span	500 Hz to 5 MHz
Resolution Bandwidth	.5 Hz to 160 kHz
Dynamic range	70 db to 95 dB

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