



# Communications Signal Analyzer

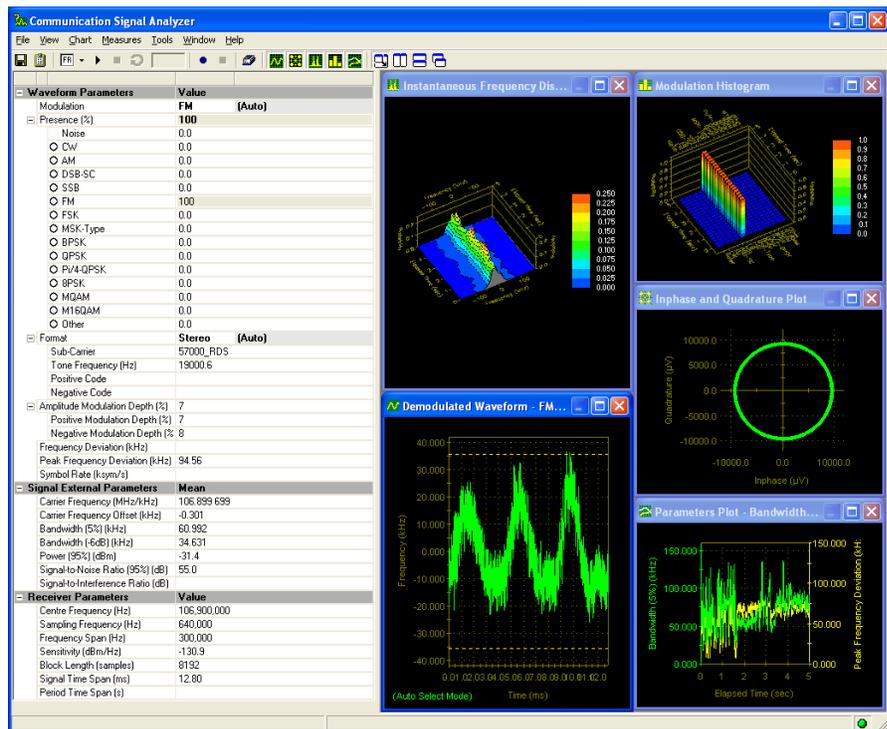
The CRC-developed Spectrum Explorer (SE) is a flexible software solution which provides a family of sophisticated applications that perform spectrum surveillance and analysis.

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)

The **Communications Signal Analyzer (CSA)** is an optional SE application which complements the SA's capabilities by providing real-time automatic analysis of intercepted signals. Powerful digital signal processing is used for modulation and communication system recognition. A number of graphical displays provide different views of the analyzed data.



## Major Features

- Real-time modulation type identification:
  - CW, AM, DSB-SC, SSB, FM, FSK, MSK-type, BPSK, QPSK,  $\pi/4$ -QPSK, 8PSK, M-QAM, M-16-QAM, OTHER, NOISE
- Communication systems identification:
  - AMPS, US Digital Cellular, GSM, iDEN, Sub-audio FM, Broadcast FM stereo
- Technical Parameter Estimation:
  - Signal-to-Noise Ratio, Signal Bandwidth, Carrier Frequency, Symbol Rate
- Multiple Displays, including:
  - Frequency, phase and amplitude content
  - Modulation and instantaneous frequency histogram
- Compliant with the ITU-R SM series of recommendations
- Complementary interworking with other SE applications
  - SA

## 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.

### CSA – general specifications

Input Segment Duration (samples):	≥ 512. The more samples, the more accurate the estimator
Sampling Frequencies (kHz):	Any sampling frequency >2X the signal bandwidth
Accuracy (typical):	> 90% at SNR = 5 dB in analysis bandwidth > 95% at SNR = 10 dB in analysis bandwidth
Speed (typical):	40 decisions/s (1024 FFT points at 40 kHz sampling rate)
Channel type:	AWGN, tolerates adjacent channel interference and multipath

### Technical Parameters

- Carrier frequency
- Symbol rate for digital modulation
- Frequency deviation for FM and FSK
- Bandwidth: x dB ( $0 < x < -60$ ) and y % ( $1 < y < 99.9$ )
- Signal-to-noise ratio in estimated signal bandwidth
- Power in y % bandwidth ( $1 < y < 99.9$ )

### Results Displayed

- Input signal power spectrum
- Filtered input signal vectors, on I/Q channels
- Filtered input signal polar representation, on I/Q channels
- Modulation histogram
- 3-D display of modulation histogram versus time
- Instantaneous frequency histogram
- 3-D display of frequency histogram versus time
- Frequency demodulated filtered input signal
- Amplitude demodulated filtered input signal
- Phase demodulated filtered input signal

### Operational Interface

- Controlled through Spectrum Explorer spectrum analyzer
- Log results to ASCII file
- Continuous or timed measurement periods
- Compliant with ITU-R SM.328, .377, .378, .443, .1269, .1600
- Read log files with statistical analysis software or your own software
- Operate off-line from sampled data file formats
  - ✓ Matlab™ \*.mat file
  - ✓ ASCII \*.txt file
  - ✓ Spectrum Explorer \*.das binary file

## Operations

The Communication Signal Analyzer provides real-time information, vital for radio spectrum regulation and defence signal intelligence, about intercepted signals. Due to the algorithm's precision and computational efficiency, off-the-air signals of interest can be automatically recognised at speeds greater than 40 decisions/s.

Efficient carrier frequency and bandwidth estimators are included, allowing large carrier frequency errors to be corrected. The modulation recognition algorithm is insensitive to carrier phase errors and is robust to interference from adjacent signals in the sampling bandwidth. Software block demodulators for some of the modulation types are available enabling on-line generation of audio files.



3538 Ashby, Montreal (St-Laurent), Quebec, Canada H4R 2C1  
Phone: +1-514-336-9426 Email: info@asiweb.com  
Fax: +1-514-336-4383 Web: www.asiiweb.com