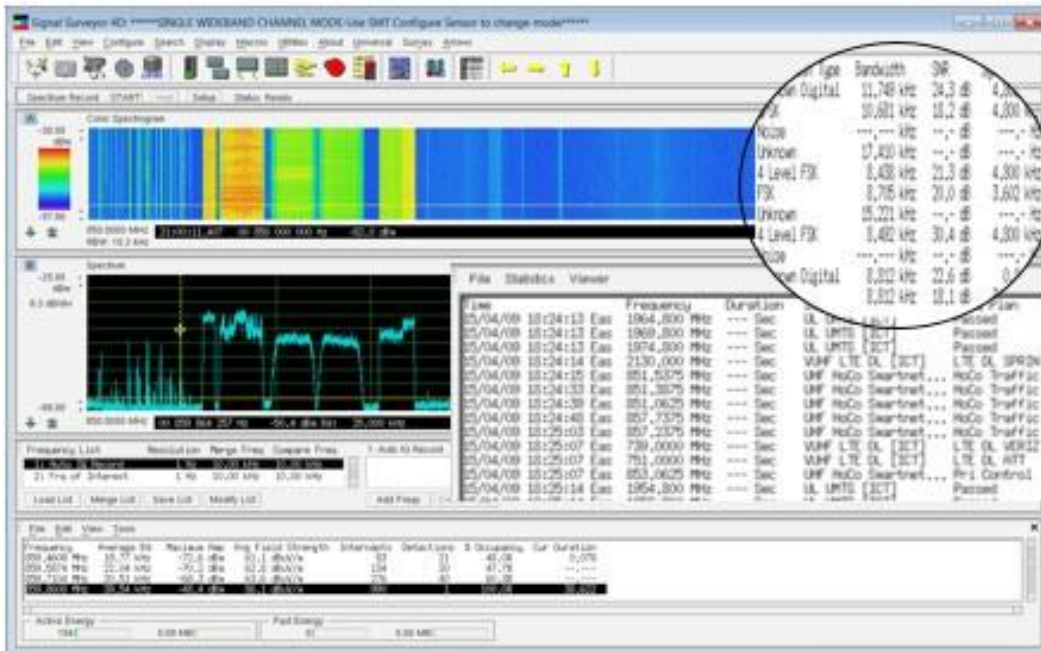


TECHNICAL
OVERVIEW

N6820ES Signal Surveyor 4D Software

Introduction

The Keysight Technologies N6820ES Surveyor 4D software is a spectrum monitoring tool, capable of automating signal search and survey functions. It tasks internal or external processes to capture and analyze spectrum events or conduct comprehensive surveys of the RF environment. Its powerful triggering and alarm functions are unrivalled in the commercial spectrum monitoring industry. It can also be used manually as a high-speed spectrum display with the ability to task handoff receivers, modulation recognition, recording, direction-finding and emitter location measurements.



For more information:
 Contact your NSCA & Tra-Cal Small Business Partner: Email info@nscainc.com
 or call your local sales rep today at 301-527-9200.



Applications

- Spectrum monitoring and logging
- Spectrum management
- Interference detection and location
- Band clearing
- Signal development
- RF Survey
- Special signal intercept and collection
- Satellite downlink monitoring

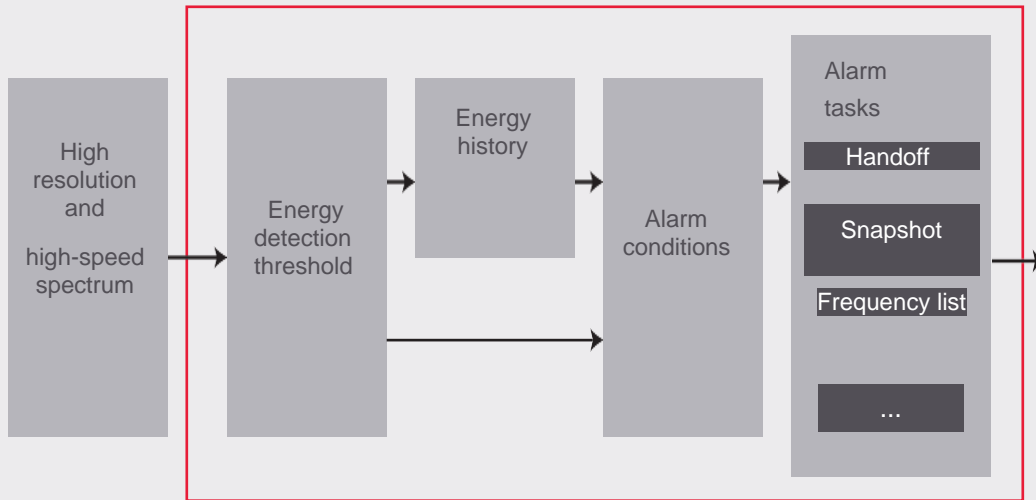
Customers

- Military and intelligence agencies
- Telecommunications regulatory authorities
- Mobile service providers
- Government range frequency managers
- Corporate spectrum/frequency managers
- RF test managers
- Satellite system operators

Key Features

- High-speed, high-resolution spectrum search
- Automated signal survey and classification tools
- Powerful triggering and masking functions
- Scheduled alarm functions and flexible tasking
- SQL database for long-term logging and analysis
- Built-in spectrum recorder
- Flexible multi-band search modes
- Geolocation – Automatic tasking of RF signal location sub-systems
- ITU-RSM.1600 Technical identification compliance
- IQ capture and recording of RF signals

As shown in the diagram below, Surveyor 4D works by first receiving high-resolution, high-speed spectral data from the hardware. RF signals are separated from the noise by using configurable energy detection and thresholds. Next, the parametric data of the RF signals are measured and stored in the energy history database. Specific parametric information can be used to trigger alarms, and actions can be taken through defined alarm tasks.



Hardware

Surveyor 4D software operates with the N6841A RF Sensor, the M9391A or M9393A PXI vector signal analyzer (VSA) modules, and the FieldFox handheld RF analyzers providing highly effective and affordable tools for RF professionals.

For signal surveying applications requiring a small, rugged time-enabled receiver, select the N6841A RF sensor which operates standalone or synchronously with other RF sensors in fixed, temporary, and mobile deployments capable of making TDOA emitter location measurements.

For applications requiring wider bandwidths, higher search speed, or 50 GHz frequency coverage, select the M9391A (or M9393A) PXI module.

For applications requiring portability and extended frequency range, select from the FieldFox handheld RF analyzers.

All receivers can function in either tuner locked or swept mode, providing high-speed search, energy detection, and parameter extraction from the RF spectrum.

Surveyor 4D software, combined with the right choice of hardware, provides a world-class spectrum monitoring solution. Choose the hardware configuration that best meets the application need.

N6841A RF Sensor

N6841A RF Sensor is an IP67-rated RF Sensor designed for outdoor operation and provides a frequency range of 20 MHz to 6 GHz, analysis bandwidth of 20 MHz, and integrated GPS receiver. Refer to www.keysight.com/find/N6841A for more details.



PXI Hardware

M9391A PXIe Vector Signal Analyzer

M9391A PXIe vector signal analyzer has a configurable frequency range of 1 MHz to 3 GHz or 6 GHz, with analysis bandwidths of 40 MHz (standard), 100 MHz, or 160 MHz. Refer to www.keysight.com/find/M9391A for more details.



M9393A PXIe Performance Vector Signal Analyzer

M9393A PXIe performance vector signal analyzer has a configurable frequency range of 9 kHz to 8.4, 14, 18, 27, or 50 GHz, and analysis bandwidths of 40 MHz (standard), 100 MHz, 160 MHz, and optionally, 1 GHz (with option WB1). Refer to www.keysight.com/find/M9393A for more details.

FieldFox Handheld RF Analyzer

(N9913A - N9918A, N9935A - N9938A, N9950A - N9952A, N9960A - N9962A) have a choice of frequency ranges between 5 kHz and 50 GHz, with analysis bandwidths up to 10 MHz. Requires options for spectrum analyzer (Option 233), Preamplifier (Option 235). The GPS Receiver Option (307) is recommended. The N9912A is not supported by S4D. Refer to www.keysight.com/find/FieldFox for more details.



Antennas

N6850A Broadband Omnidirectional Antenna

N6850A broadband omnidirectional antenna is a passive monitoring antenna with high sensitivity and a remarkably flat response from 250 MHz to 6 GHz. It is easily mounted to a tripod, pole, rail, or magnetic mount using the mounting bracket (included). The assembly is 42 cm high and 15.5 cm wide. Refer to www.keysight.com/find/N6850A for more details.



N9910x-822 Handheld Directional Antenna

N9910x-822 is a handheld log-period antenna designed for signal intelligence (SIGINT) and intelligence, surveillance and reconnaissance (ISR), and is ideal for direction finding applications from 600 MHz to 9 GHz.



Select hardware that will best meet the application requirements

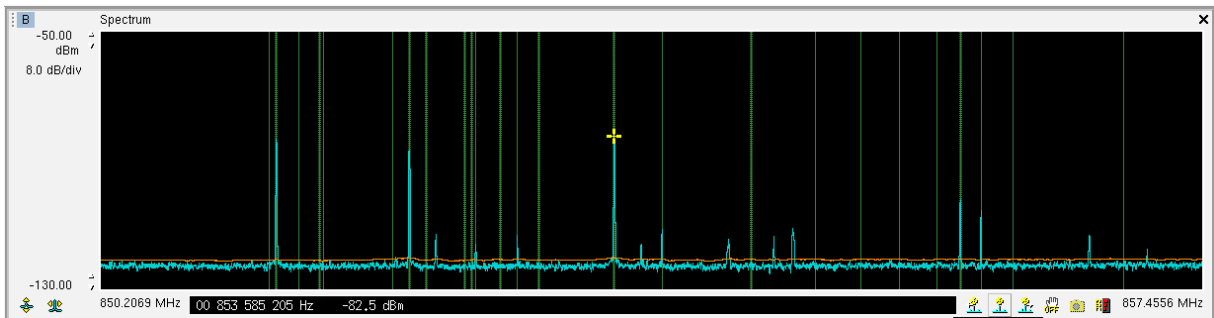
Specification/Feature	N6841A	M9391A/M9393A	FieldFox
Frequency range	20 MHz to 6 GHz	M9391A: 1 MHz to 3 GHz (F03) 1 MHz to 6 GHz (F06) M9393A: 9 kHz to 8.4 GHz (F08) 9 kHz to 14 GHz (F14) 9 kHz to 18 GHz (F18) 9 kHz to 27 GHz (F27) 3.6 to 43.5 GHz (FRZ) 3.6 to 50 GHz (FRX)	30 kHz to 50 GHz depending on model selected
Analysis bandwidth	20 MHz	40 MHz (B04) 100 MHz (B10) 160 MHz (B16) M9393A only: 1 GHz (M9393AWB1)	10 MHz
Pre-select filters	Yes (7-Bands)	M9391A: Yes (5-Bands) M9393A: None	Yes
Memory (Snapshot)	1 GB	4 GB	32 MB
Snapshot length (sec) at max bandwidth	5 sec at 20 MHz	2.5 sec at 160 MHz <i>Option B16 and M10 required for M9391A and M9393A</i>	0.32 sec at 10 MHz
Sweep speed	4 GHz/sec	M9391A: 30 GHz/sec M9393A: 40 GHz/sec	300 MHz/sec
Noise figure - (Pre-Amp ON)	13 to 26 dB	12 to 21 dB	8 to 48 dB
Phase noise (1 GHz CW signal with 100 kHz offset)	< -98 dBc/Hz	M9391A: < -121 dBc/Hz M9393A: < -107 dBc/Hz	-99 to -123 dBc/Hz
DANL - (Pre-Amp On)	-138 to -150 dBm/Hz	M9391A: -141 to -157 dBm/Hz M9393A: -120 to -154 dBm/Hz	-91 to -154 dBm/Hz
Multi-channel	4	1	1
Digital Downconverter Channels (DDC)	8	1	1
Hardware assisted FFT and averaging	Yes	No	No
Trace Averaging (RMS or Peak)	Yes, in sensor Enabling data reduction to host	Yes, in host PC	Yes, in host PC
Data transfer modes	I/Q and FFT (simultaneous) Streaming or Block Mode	Block mode IQ data No FFT No streaming	Block mode IQ data No FFT No streaming
Streaming bandwidth (Gapless)	FFT = 20 MHz I/Q = 1.56 MHz	No streaming Snapshot only	No streaming Snapshot only
Precision time stamping GPS/Network IEEE 1588 (PTP)	Yes (GPS and IEEE-1588)	No	No
Geolocation	Yes	No	No
Supported Software Options			
User Programming (ASD)	Yes	Yes	Yes
Modulation Recognition (MR1)	Yes	Yes	Yes
Narrow Band Recorder (NBR)	Yes	No	No
Multi-Sensor Synchronization (SSY)	Yes	No	No
Universal Signal Detection (USD)	Yes	Wideband only	Wideband only

Surveyor 4D Software Description

Energy Detection

Surveyor 4D conducts high-speed, high-resolution RF searches across single or multiple radio bands processing energy that meets detection criteria. It is a serious monitoring tool for serious RF professionals who can't just say, "No, we can't do that with our software."

Detecting energy is a core feature of the Surveyor 4D software. Energy detection requires a spectral threshold line and Surveyor 4D offers many different types including Level, Auto, Environmental, Point Average, Segment Average, and File. The choice of energy thresholds is extremely valuable for addressing different situations encountered in real-world spectral events.

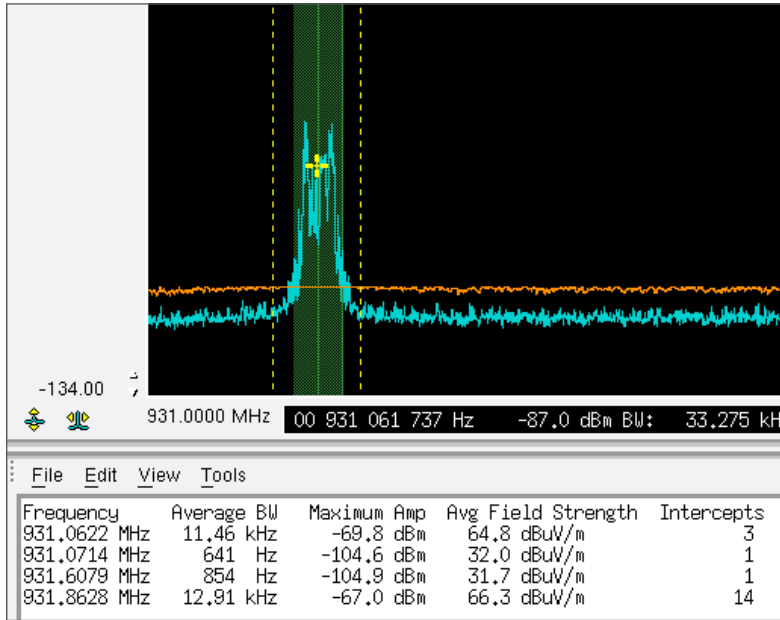


When the energy threshold is exceeded, an entry is made into the Energy History Database (EHD). Each entry contains over 20 precisely measured parameters based on signal externals associated with the detected energy.

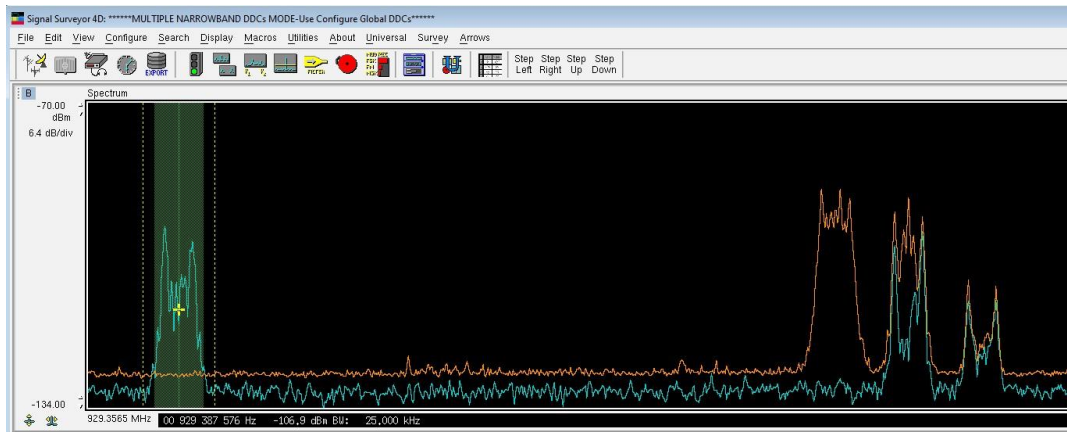
Parameters include, but are not limited to: frequency, bandwidth, amplitude, power, field strength, duration, and occupancy.



The EHD is used as an interim repository where intercept data is further processed and refined through filtering and alarms.



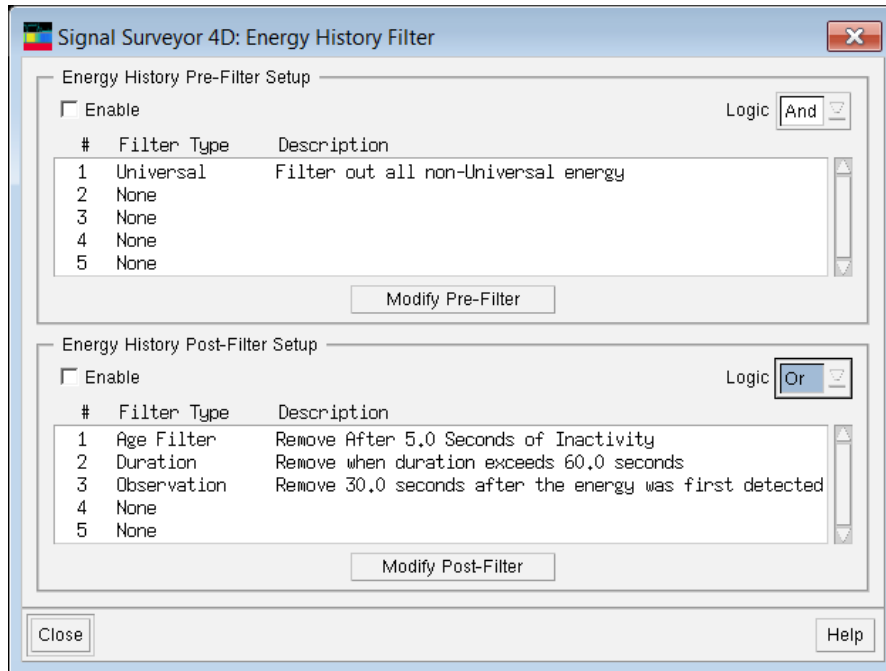
One type of threshold is the high-resolution environment threshold.



Energy History Filters

Surveyor 4D can apply Energy History Pre- and Post-Filters designed to restrict or open the flow of detected energy data into, or out of, the Energy History Database.

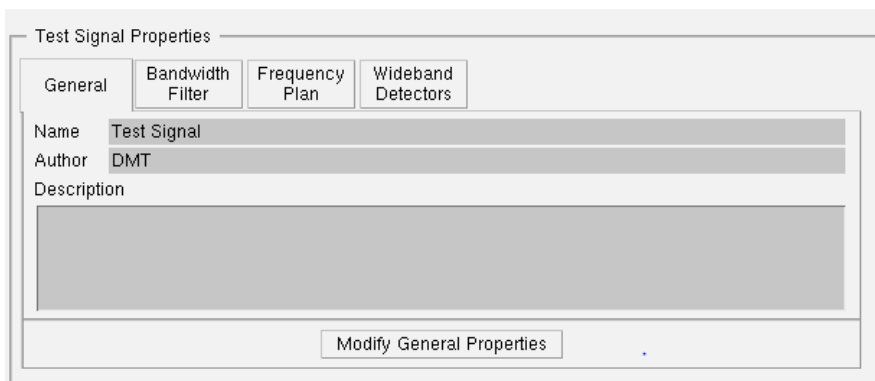
For example, the Post-Filter “Age” removes entries after the energy drops below the threshold for a user-defined number of seconds.



The most commonly used Pre-Filter is the Universal Signal Detector (USD) which has three key signal characteristics that can be used independently or together to perform signal isolation and classification. The three wideband characteristics are:

- Frequency plan
- Bandwidth filter
- Wideband spectral shape detector

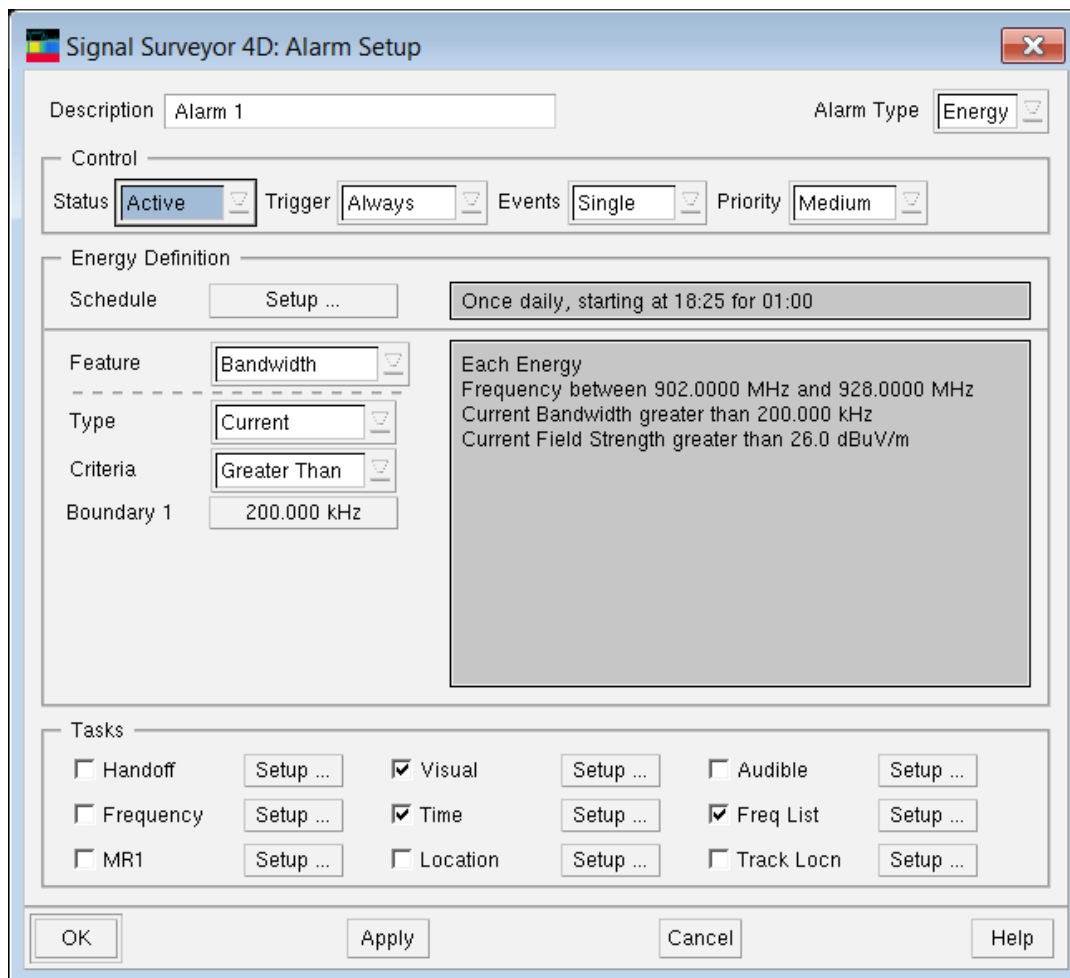
When Surveyor 4D is used in tuner locked mode, modulation format and symbol rate can also be measured. Extracting both internal and external signal parameters greatly increases the ability to properly classify a signal or device.



Energy Alarms

An Energy Alarm is a system-level trigger. The alarm criteria is based on one or more of the parametric data elements collected and stored in the EHD. These parameters can be used independently or together by an Alarm to isolate a spectral event of interest.

For example, an Energy Alarm can be created to take an action on energy seen occasionally between 902 MHz and 928 MHz, between 6:25 p.m. and 7:25 p.m., with a bandwidth greater than 200 kHz and field strength greater than 26 dBuV/m. This Energy Alarm is shown below:



When the Alarm triggers, one or more actions (referred to as “Tasks”) are executed. These tasks can include:

- Handoff the frequency to an external receiver which could demodulate the signal and play or record the audio.
- Take a frequency Snapshot of a user-defined portion of the spectrum.
- Send an IQ time-series record of the energy to the Modulation Recognition algorithm (MR1).
- Give the operator a visual indication on the computer screen that the alarm was tripped.
- Take an IQ time-series recording on the frequency that tripped the alarm with a user specified bandwidth and length.
- Task a network of N6841A RF sensors to locate the emitter that tripped the alarm.
- Give the operator an audible indication that the alarm tripped.
- Add/Remove the frequency that tripped the alarm to/from one of ten configurable frequency lists.
- Custom, user-defined alarms can be created by Keysight, or trained partners for special cases. For example, send an email or call a pager.



Signal Database And Reporting

Some Alarm tasks will generate an entry in the signal Database (SDB). The SDB contains information from signal processing tasks such as Universal Signal Detection (USD), Modulation Recognition (MR1), Direction-Finding (DF), emitter Location (GEO), Time or Frequency recording.

Time	Frequency	Duration	Signal	Freq Plan	Wideband	Narrowband	Modulation	Sym Rate	Freq Spacing	Bandwidth	SNR
18/03/23 11:10:35	Eas 2452.000 MHz	--- Sec	WiFi [Keysight]	WiFi CH 9	-	-	-	-	-	13,672 kHz	-
18/03/23 11:10:35	Eas 2457.000 MHz	--- Sec	WiFi [Keysight]	WiFi CH 10	-	-	-	-	-	41,016 kHz	-
18/03/23 11:10:39	Eas 2436.250 MHz	--- Sec	UHF BlueTooth [Ke...	Passed	-	-	-	-	-	1,000000 MHz	-
18/03/23 11:10:39	Eas 2436.250 MHz	--- Sec	WiFi [Keysight]	WiFi CH 6	-	-	-	-	-	1,000000 MHz	-
18/03/23 11:10:46	Eas 2411.250 MHz	--- Sec	UHF BlueTooth [Ke...	Passed	-	-	-	-	-	1,000000 MHz	-
18/03/23 11:10:46	Eas 2411.250 MHz	--- Sec	WiFi [Keysight]	WiFi CH 1	-	-	-	-	-	1,000000 MHz	-
18/03/23 11:10:56	Eas 2412.000 MHz	--- Sec	WiFi [Keysight]	WiFi CH 1	-	-	-	-	-	287,109 kHz	-
18/03/23 11:10:56	Eas 2439.250 MHz	--- Sec	UHF BlueTooth [Ke...	Passed	-	-	-	-	-	1,000000 MHz	-
18/03/23 11:10:56	Eas 2451.431 MHz	--- Sec	UHF BlueTooth [Ke...	Passed	-	-	-	-	-	637,207 kHz	-
18/03/23 11:11:10	Eas 2412.750 MHz	--- Sec	UHF BlueTooth [Ke...	Passed	-	-	-	-	-	1,000000 MHz	-
18/03/23 11:11:10	Eas 2412.750 MHz	--- Sec	WiFi [Keysight]	WiFi CH 1	-	-	-	-	-	1,000000 MHz	-
18/03/23 11:11:10	Eas 2413.605 MHz	--- Sec	UHF BlueTooth [Ke...	Passed	-	-	-	-	-	709,473 kHz	-
18/03/23 11:11:22	Eas 2115.000 MHz	--- Sec	VUHF AMS1 BAND [ict]	ATT Wireless	-	-	-	-	-	9,255859 MHz	-
18/03/23 11:11:22	Eas 2130.000 MHz	--- Sec	VUHF AMS1 BAND [ict]	VerizonWirel	-	-	-	-	-	18,265624 MHz	-
18/03/23 11:11:23	Eas 2147.500 MHz	--- Sec	VUHF AMS1 BAND [ict]	T Mobilile	-	-	-	-	-	13,740234 MHz	-
18/03/23 11:11:44	Eas 2434.250 MHz	--- Sec	UHF BlueTooth [Ke...	Passed	-	-	-	-	-	1,000000 MHz	-
18/03/23 11:11:48	Eas 2452.000 MHz	--- Sec	WiFi [Keysight]	WiFi CH 9	-	-	-	-	-	225,586 kHz	-

Signal Alarms

Signal Alarms operate on data found in the Signal Database. For example, a signal alarm can be triggered when a specific modulation format or symbol rate is detected, as shown below.

Signal Surveyor 4D: Signal Database Alarm Setup

Mod Rec Alarm #2

Modulation Type

Unknown Unknown Digital Noise MSK FSK
 3 Level FSK 4 Level FSK 8 Level FSK BPSK 8 Level PSK
 16 Level PSK QPSK PI/4 QPSK 16 QAM 32 QAM
 64 QAM 256 QAM AM AM DSBSC LSB
 USB Analog FM Manual Morse Machine Morse OOK
 4PAM Pure Carrier 128 QAM V.29

Symbol Rate

Between and

Deviation

Greater Than

Signal To Noise

Greater Than

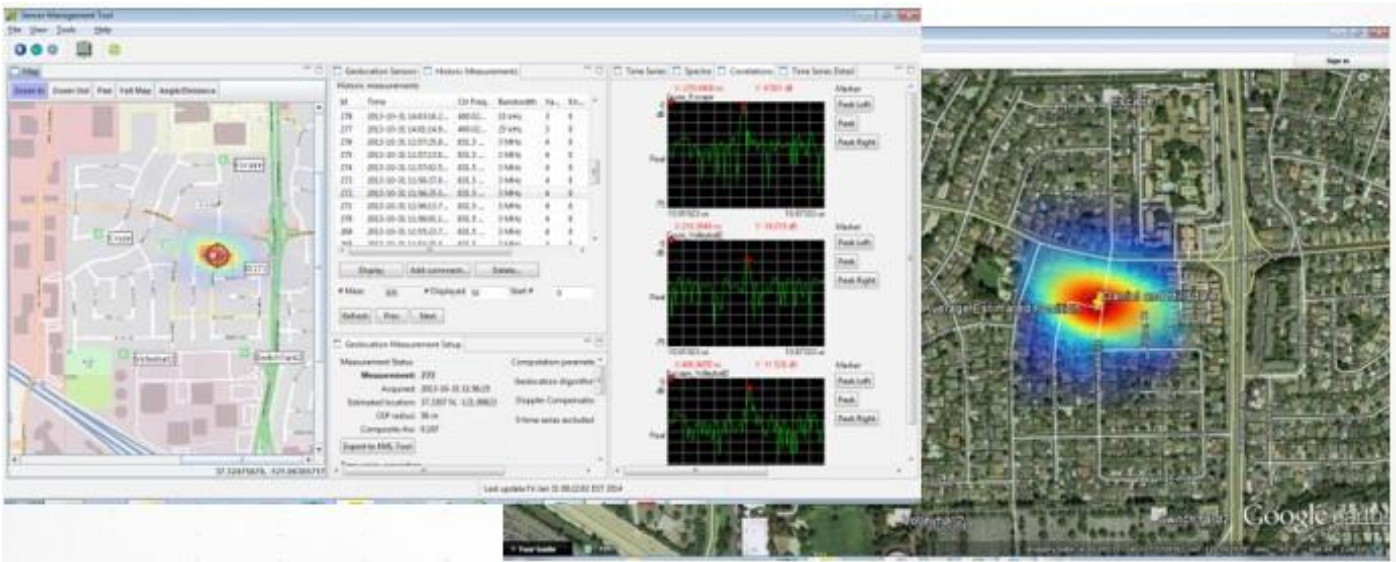
Confidence

Greater Than

OK Cancel

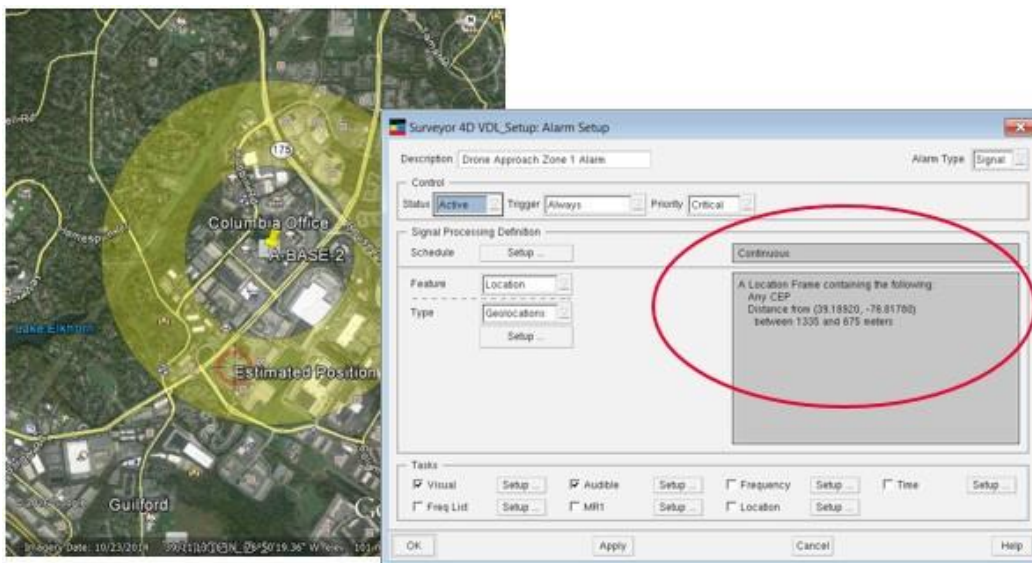
Surveyor 4D And The N6854A Geo Server Software

The N6854A Geo server software, which is part of the RF Sensor Management Tool software (SMT), is tightly integrated with Surveyor 4D. It synchronizes a group of RF sensors to locate RF emitters using Time Difference of Arrival (TDOA), Received Signal Strength (RSS), or a Keysight hybrid algorithm. The software uses time and power-based geolocation algorithms and is ideal for determining the location of modern signals. Time-based or RF power triggering can be used for high or low duty cycle signals.



Location Signal Alarm

Use Surveyor 4D's location signal alarm to create "No Fly Zone" or "Radio Restricted Area" alerts.



First, define the area, using one of the following methods:

- Establish a point on earth plus radius (in meters)
- Establish a point on earth plus two radiuses
- Box off a zone using upper left, lower right LAT, LONG pair

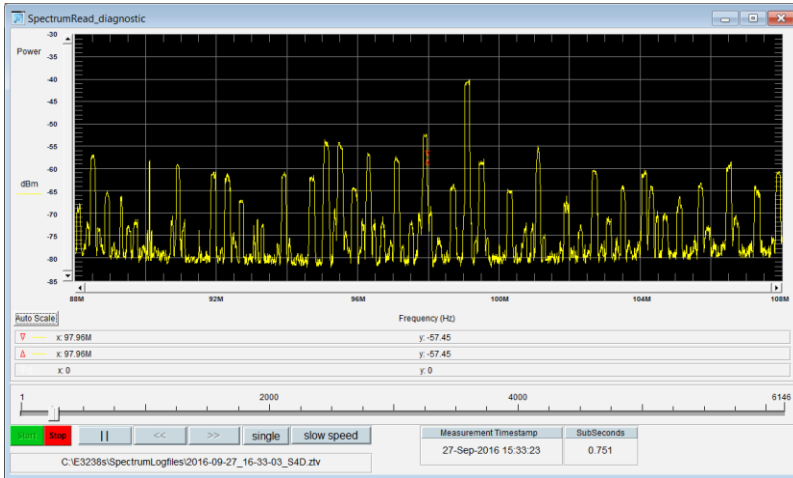
The location alarm will trigger when any emitter is located inside (or outside) one of the designated areas or zones. The alarm function can be used to enable security operations and alert resources to address the problem or take other actions.



Surveyor 4D Tools

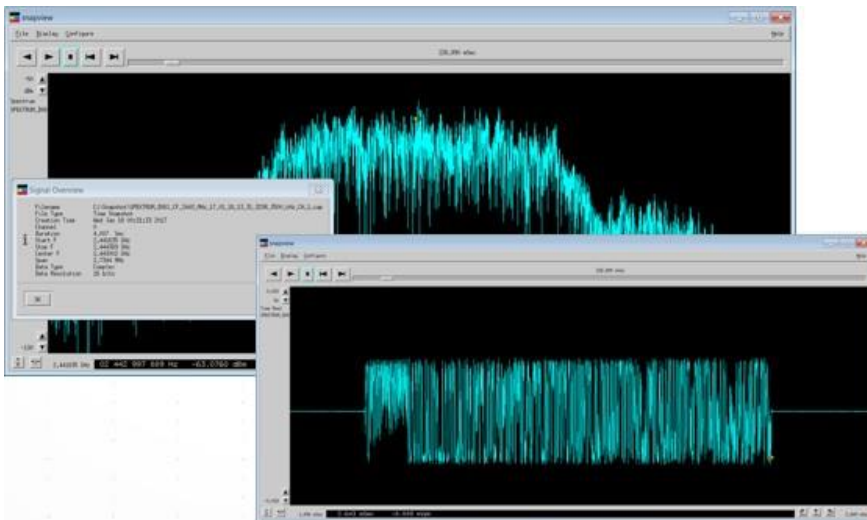
Surveyor 4D Spectrum Record and Playback Tool

The spectrum record and playback tool can be loaded as part of the N6820ES extensions and requires no option or license. It provides a record and playback feature for Surveyor 4D's high-speed spectrum trace data. Recorded files include sequential, time-stamped spectrum traces acquired in either swept or tuner locked modes. The record and playback feature is ideal for interference and survey applications involving short duration transmissions. Alarm tasks can be used to start or stop the spectrum recording.



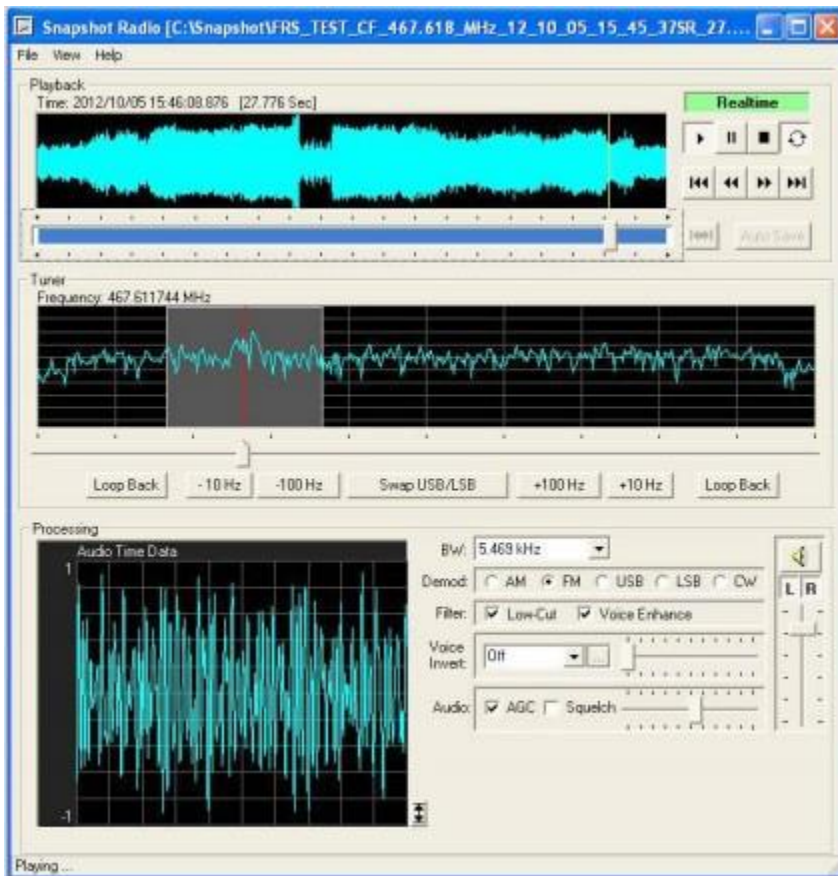
SnapView Software

The SnapView software loads with Surveyor 4D software and enables playback of IQ and Frequency snapshot recordings. SnapView provides a quick and easy way to evaluate time varying characteristics of a signal, with spectrum, or real/imaginary time series views.



N6829BS Snapshot Radio Player

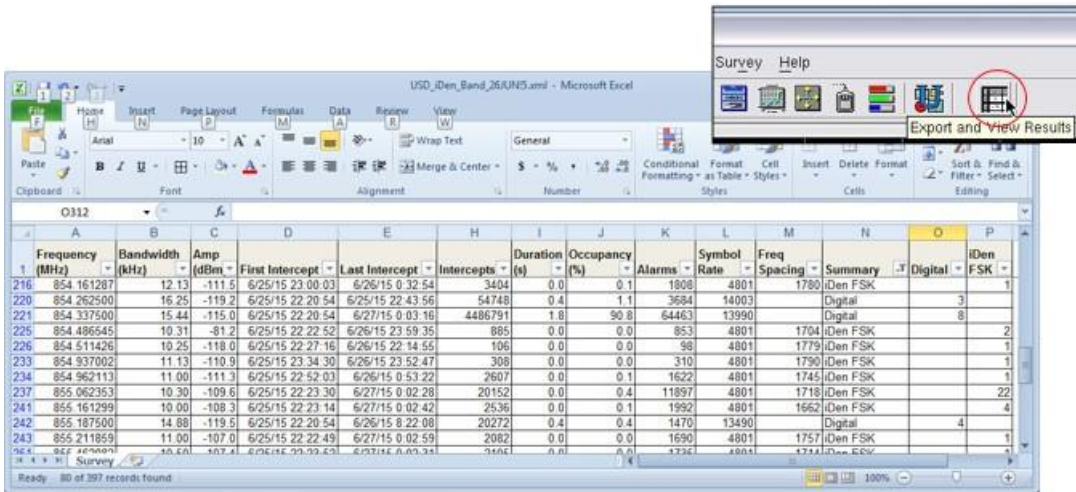
The snapshot radio player is sold and licensed separately from Surveyor 4D and is a great companion product. Users can play back IQ recordings with AM, FM, USB, LSB or CW demodulation schemes. The software also provides audio filtering and a flexible voice inversion mode. Snapshot radio player is ideal for processing large numbers of IQ or audio files for production. It comes with a file manager and socket connection back to the Surveyor 4D software, for tight integration. Refer to www.keysight.com/find/N6829BS for more details.



Spectrum Survey Tool

The Survey function collects and exports all the system results including Energy History and Signal Databases to a format readable by Microsoft Excel© where report data can be prioritized, sorted, and filtered.

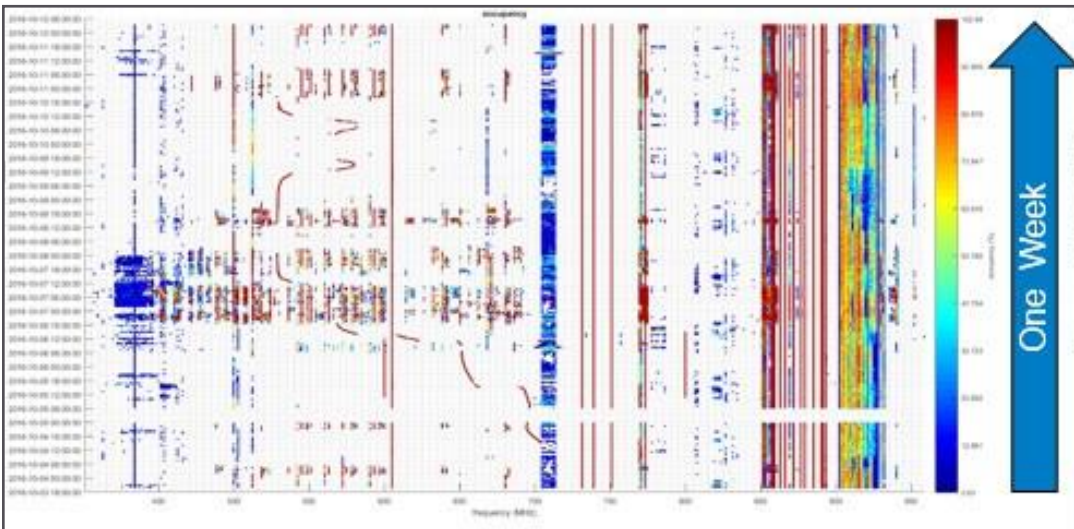
Use Surveyor 4D's Spectrum survey tool to easily create a comprehensive survey report in Microsoft Excel© with one click.



PostgreSQL Database and SQL Visualizer Tool

Surveyor 4D's integrated PostgreSQL database enables users to understand trends and changes in spectrum use.

The SQL visualizer tool enables creation of plots, charts, graphs, and tables using the spectrum data over long periods of time.



89601B VSA Software

Surveyor 4D Time Capture files (*.cap) can be loaded directly into the 89601B VSA software to provide in-depth analog and digital analysis of individual signals. It provides the tools for in-depth analysis including time-domain, frequency-domain, modulation analysis, and signal recording and playback. The VSA software supports the N6841A RF sensor, M9391A, M9393A PXI VSA hardware and the FieldFox handheld portable analyzer.

Surveyor 4D Options

User Programming (Option ASD)

Option ASD provides documentation and libraries to customize the Surveyor 4D graphical user interface, such as custom controls, menus, and user panes. Custom energy features, filters, and alarm tasks can also be created. The ASD option requires training and consulting services to implement successfully.

Enable Direction Finding (Option EDF)

Requires separately purchased 3rd-party direction-finding hardware. Option EDF provides an interface between the direction-finding hardware and Surveyor 4D software. The direction-finding hardware returns the line-of-bearing (LOB) to the Surveyor 4D software.

Modulation Recognition (Option MR1)

Option MR1 provides analysis of signal internals to identify modulation formats, frequency deviation, and symbol rates. It can be used in an automated mode, operating as an Alarm task, or in a manual mode, operating on live signal energy or previously recorded IQ data. MR1 ships with a library of analog and digital modulation recognizers as shown below.

The image shows a screenshot of the Surveyor 4D software interface. On the left, there is a 'Spectrum' plot showing signal energy in dBm (ranging from -60.00 to -150.00) versus frequency in MHz (ranging from 391.1127 to 391.1554). The plot shows a complex signal structure. To the right of the plot, there are several parameters displayed in a list:

- Modulation Type: PI/4 QPSK
- Frequency: 391,137,484 Hz
- Bandwidth: 23.285 kHz
- SNR: 54.2 dB
- Symbol Rate: 17.998 kHz
- Deviation: ---

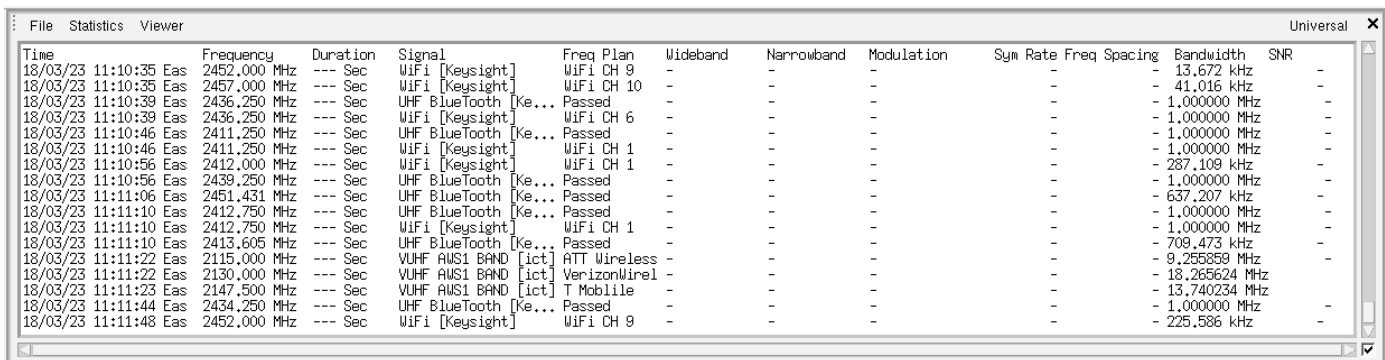
On the right side of the screenshot, there is a dialog box titled 'Signal Surveyor 4D: Signal Database Alarm Setup'. This dialog box is used to configure alarm conditions for a specific modulation type. The 'Mod Rec Alarm #2' section is active, and the 'Modulation Type' is set to 'PI/4 QPSK'. The 'Symbol Rate' is configured to be 'Between' 17998 and 18002. The 'Deviation' is set to 'Greater Than' 100. The 'Signal To Noise' is set to 'Greater Than' 6. The 'Confidence' is set to 'Greater Than' 90. The dialog box has 'OK' and 'Cancel' buttons at the bottom.

Sensor Sweep Synchronization (Option SSY)

Option SSY provides a utility to allow programming of synchronous sweeps of multiple instances of Surveyor 4D software and N6841A RF sensor hardware. Consulting services are required to implement successfully.

Universal Signal Detection (Option USD)

Option USD provides a tool to create custom signal detectors. It breaks down each energy in the RF spectrum into basic external parameters (bandwidth, frequency, and shape). It uses these parameters to isolate and classify signals of interest. No programming is required. An easy-to-use graphical user interface is provided to create these custom signal detectors. Additionally, a USD narrowband confirmer can further classify a signal based on internal parameters (modulation recognition, frequency deviation, and symbol rate). Narrowband confirmation is only available with the N6841A RF Sensor, with the Multiple Narrowband Digital Down Converter (DDC), option N6841A-MFP.



Time	Frequency	Duration	Signal	Freq Plan	Wideband	Narrowband	Modulation	Sym Rate	Freq Spacing	Bandwidth	SNR
18/03/23 11:10:35	Eas 2452,000 MHz	--- Sec	WiFi [Keysight]	WiFi CH 9	-	-	-	-	-	13,672 kHz	-
18/03/23 11:10:35	Eas 2457,000 MHz	--- Sec	WiFi [Keysight]	WiFi CH 10	-	-	-	-	-	41,016 kHz	-
18/03/23 11:10:39	Eas 2436,250 MHz	--- Sec	UHF Bluetooth [Ke...		-	-	Passed	-	-	1,000000 MHz	-
18/03/23 11:10:39	Eas 2436,250 MHz	--- Sec	WiFi [Keysight]	WiFi CH 6	-	-	-	-	-	1,000000 MHz	-
18/03/23 11:10:46	Eas 2411,250 MHz	--- Sec	UHF Bluetooth [Ke...		-	-	Passed	-	-	1,000000 MHz	-
18/03/23 11:10:46	Eas 2411,250 MHz	--- Sec	WiFi [Keysight]	WiFi CH 1	-	-	-	-	-	1,000000 MHz	-
18/03/23 11:10:56	Eas 2412,000 MHz	--- Sec	WiFi [Keysight]	WiFi CH 1	-	-	-	-	-	287,109 kHz	-
18/03/23 11:10:56	Eas 2439,250 MHz	--- Sec	UHF Bluetooth [Ke...		-	-	Passed	-	-	1,000000 MHz	-
18/03/23 11:11:06	Eas 2451,431 MHz	--- Sec	UHF Bluetooth [Ke...		-	-	Passed	-	-	637,207 kHz	-
18/03/23 11:11:10	Eas 2412,750 MHz	--- Sec	UHF Bluetooth [Ke...		-	-	Passed	-	-	1,000000 MHz	-
18/03/23 11:11:10	Eas 2412,750 MHz	--- Sec	WiFi [Keysight]	WiFi CH 1	-	-	-	-	-	1,000000 MHz	-
18/03/23 11:11:10	Eas 2413,605 MHz	--- Sec	UHF Bluetooth [Ke...		-	-	Passed	-	-	709,473 kHz	-
18/03/23 11:11:22	Eas 2115,000 MHz	--- Sec	VUHF AWS1 BAND [ict]	ATT Wireless	-	-	-	-	-	9,255859 MHz	-
18/03/23 11:11:22	Eas 2130,000 MHz	--- Sec	VUHF AWS1 BAND [ict]	VerizonWirel	-	-	-	-	-	18,265624 MHz	-
18/03/23 11:11:23	Eas 2147,500 MHz	--- Sec	VUHF AWS1 BAND [ict]	T Mobile	-	-	-	-	-	13,740234 MHz	-
18/03/23 11:11:44	Eas 2434,250 MHz	--- Sec	UHF Bluetooth [Ke...		-	-	Passed	-	-	1,000000 MHz	-
18/03/23 11:11:48	Eas 2452,000 MHz	--- Sec	WiFi [Keysight]	WiFi CH 9	-	-	-	-	-	225,586 kHz	-

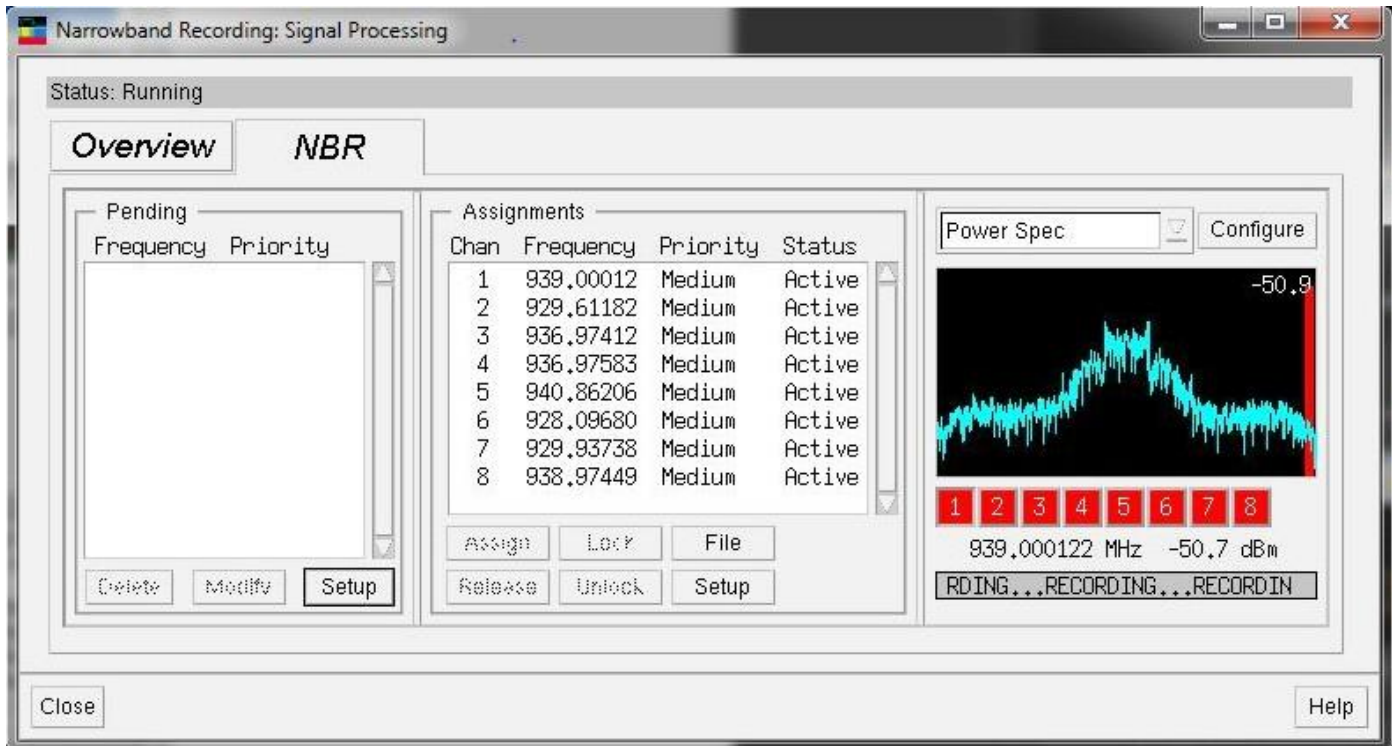
Interface to Modular Hardware (Option MTP)

This option is required to connect Surveyor 4D software to the M9391A and M9393A PXI VSA hardware.

Narrowband Recorder (NBR)

NBR is a standard part of the Surveyor 4D software and requires no special license.

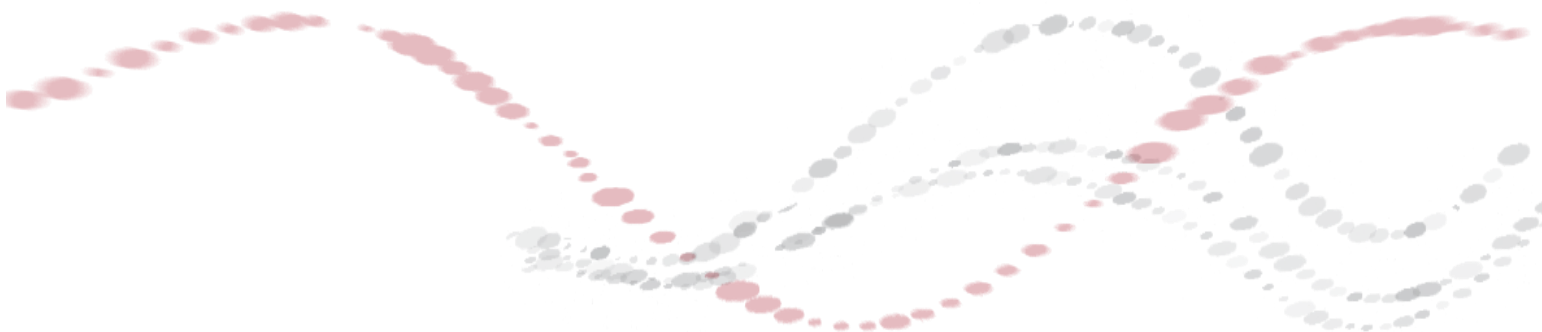
NBR enables recording of up to eight narrowband RF channels simultaneously. In single channel mode, up to 1.5 MHz bandwidth can be recorded. In multi-channel mode, up to eight 156 kHz bandwidth channels can be recorded. Multi-channel recording requires purchase of N6841A-MFP (Multiple Narrowband Channels). NBR is only available with the N6841A RF Sensor.



UHF/VHF Voice Activity Detection - UVAD (Option UTP)

Option UTP includes signal processing to recognize FM modulated human voice, in the UHF/VHF spectrum.

Once enabled, this option searches the spectrum for FM signals containing human speech, filtering out all other signals. This option requires a U.S. Export Licenses.



Technical Specifications

System Controller Requirements

CPU	Minimum	Recommended
Processor	1.5 GHz Pentium P4 (Surveyor 4D libraries are optimized for Intel Processors)	Dual 3 GHz Pentium
Memory	2 GB (performance suffers with less)	16 GB or more (more is always better)
Operating system	Windows®7 or Windows®10	Windows®7 or Windows®10
Hard drive	20 GB (750 MB required for Surveyor 4D installation)	120 GB (750 MB required for application software and Snapshot files)
DVD drive	Optional DVD drive (used to install Surveyor 4D software and license file)	16x DVD+ RW (used to install and backup software)
Display	17" display required to view spectral data points	Dual 24" or larger LCD display required to view spectral data points
Graphics card	True 1024x1280 (on-screen resolution) 16-bit True Color, 8 Mbyte on-board video memory required for Surveyor 4D high speed color displays	True 1600x1600 on-screen resolution, 32-bit True color video card with 2 Gbyte memory required for Surveyor 4D high-speed color displays

Training

Software	Description
PS-S20-100	Field application engineer training services, daily
R2004A-007	Factory consulting services, hourly (24 hours recommended)
R2004A-707	Travel expense for factory consulting

Ordering Information

Software	Description
N6820ES	Signal Surveyor 4D Software
N6820ES-114	Core Surveyor 4D software for Windows®
N6820ES-ASD	User programming libraries and documentation
N6820ES-EDF	Enable direction finding
N6820ES-MR1	Basic modulation recognition application
N6820ES-SSY	RF sensor measurement synchronization
N6820ES-USD	Universal signal detection
N6820ES-MTP	Interface to modular hardware
N6820ES-B02	Bundle includes options 114, ASD, EDF, MR1, NBR, SSY, USD, and 1RU
N6820ES-B03	Bundle includes option 114, ASD, EDF, MR1, MTP, NBR, SSY, USD, and 1RU
N6820ES-UTP	Automated FM Voice Activity Detector (UVAD) requires export license
N6829BS	Snapshot Radio Software
N6829BS-103	Standard software on Windows®
89601B	Vector Signal Analysis Software
89601B-200	Basic vector signal analysis and hardware connectivity
89601B-AYA	Vector modulation analysis
89601B-SSA	Spectrum analysis (only for use with M9391A or M9393A)
N6854A	RF Geolocation Server Software (License Required) <i>N6841-GEO option is required for each RF sensor used in the geolocation measurement</i>

Ordering Information (continued)

Related Hardware	
N6841A	RF Sensor
N6841A -EFP	Embedded applications
N6841A -GEO	Enables use with RF geolocation server software (N6854A)
N6841A -GPS	Adds GPS capability including cable and active antenna
N6841A -MFP	Multiple DDCs
N6841A -SP1	Power supply for indoor use
N6841A - CFP	Downconverter
N6850A	Broadband Omni-Directional Antenna
N6851A	Handheld Directional Antenna
M9391A	PXIe Vector Signal Analyzer
M9391A-FO3	1 MHz to 3 GHz
M9391A-FO6	1 MHz to 6 GHz
M9391A-B04	Analysis bandwidth 40 MHz
M9391A-B10	Analysis bandwidth 100 MHz
M9391A-B16	Analysis bandwidth 160 MHz
M9391A-M01	Memory 128 MSa
M9391A-M05	Memory 512 MSa
M9391A-M10	Memory 1024 MSa
M9393A	PXIe Performance Vector Signal Analyzer
M9393A-F14	Frequency 14 GHz
M9393A-F18	Frequency 18 GHz
M9393A-F27	Frequency 27 GHz
M9393A-FRX	Frequency 50 GHz
M9393A-B10	Analysis bandwidth 100 MHz
M9393A-B16	Analysis bandwidth 160 MHz
M9393A-M05	Memory 512 MSa
M9393A-M10	Memory 1024 MSa
M9393A-UNZ	Fast tuning

Ordering Information (continued)

Related Hardware (continued)	
FieldFox	Handheld RF Analyzer
N9913A	Frequency 100 kHz to 4 GHz
N9914A	Frequency 100 kHz to 6.5 GHz
N9915A, N9935A	Frequency 100 kHz to 9 GHz
N9916A, N9936A	Frequency 100 kHz to 14 GHz
N9917A, N9937A	Frequency 100 kHz to 18 GHz
N9918A, N9938A	Frequency 100 kHz to 26.5 GHz
N9950A, N9960A	Frequency 9 kHz to 32 GHz
N9951A, N9961A	Frequency 9 kHz to 44 GHz
N9952A, N9962A	Frequency 9 kHz to 50 GHz
Required options:	Spectrum Analyzer 233, Preamp/ifier 235 (GPS Receiver 307 recommended)

Support

Options	Description
N6820ES-1RU	Signal Surveyor 4D software subscription service, 1 year
N6820ES-2RU	Signal Surveyor 4D software subscription service, 2 years
N6820ES-3RU	Signal Surveyor 4D software subscription service, 3 years
N6820ES-4RU	Signal Surveyor 4D software subscription service, 4 years
N6820ES-5RU	Signal Surveyor 4D software subscription service, 5 years
N6820ES-1RU	Signal Surveyor 4D software subscription service, 1 year

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