Agilent E3238 Signal Intercept and Collection Solutions
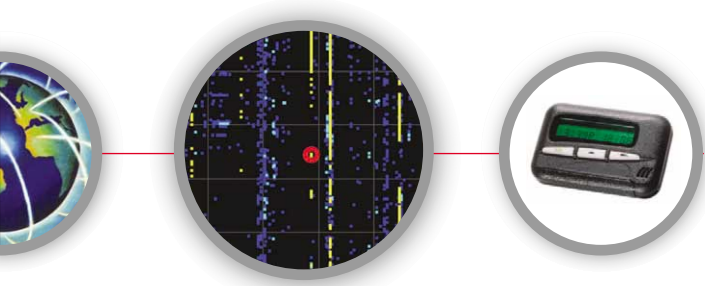
Family Overview
International Edition
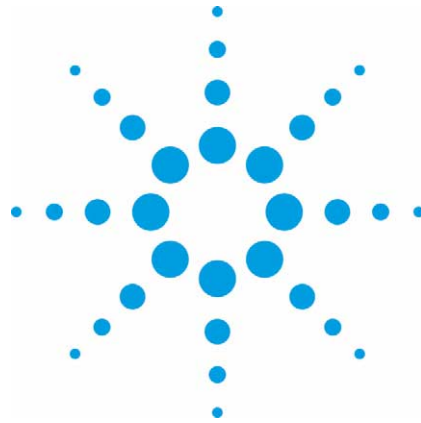
Deploy Quicker, Produce Faster
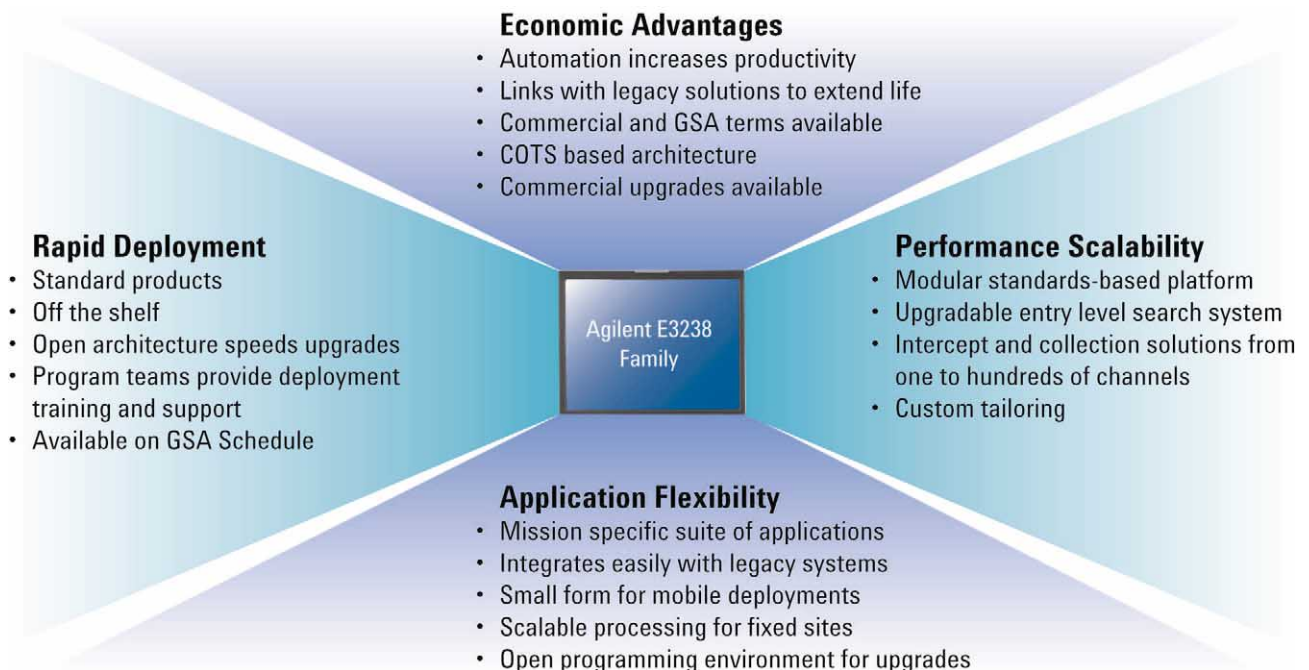
Agilent Technologies

Agilent E3238 Family of Signal Intercept and Collection Solutions

Explosive growth in the number and variety of wireless and satellite communications technologies pose an ever-increasing challenge within the global intelligence and homeland security community.

Signal surveillance and technical security mission managers are tasked to intercept and collect the precise information content required for decision makers. This task can no longer be accomplished with technology designed for legacy narrowband transmissions schemes. A new wideband architecture and automated interception and collection tools are required to increase the probability of intercept and mission success.

Agilent's diverse technology base provides a decisive edge in creating technologies for next-generation surveillance solutions. Agilent's intimate involvement and experience in wireless communication systems design and test yields early insight into the kinds of signals that our customers need to deal with today - and early insight into threats that will challenge them tomorrow.

Economic Advantages
- Automation increases productivity
- Links with legacy solutions to extend life
- Commercial and GSA terms available
- COTS based architecture
- Commercial upgrades available

Rapid Deployment
- Standard products
- Off the shelf
- Open architecture speeds upgrades
- Program teams provide deployment training and support
- Available on GSA Schedule

Agilent E3238 Family

Performance Scalability
- Modular standards-based platform
- Upgradable entry level search system
- Intercept and collection solutions from one to hundreds of channels
- Custom tailoring

Application Flexibility
- Mission specific suite of applications
- Integrates easily with legacy systems
- Small form for mobile deployments
- Scalable processing for fixed sites
- Open programming environment for upgrades

Whether your needs are to quickly find and log signal activity, or to find, recognize, demodulate and process signals to create meaningful intelligence, the family of E3238 systems includes a solution for you. The E3238's wideband architecture provides fast sweep rates and high dynamic range to significantly increase the probability of intercept. With the E3238 family, searches produce more hits quicker than manually operated narrowband systems.

Automation

The E3238 family automates common tasks so an operator can focus on the mission at hand and quickly accomplish mission goals. It allows highly skilled operators to set automated mission states for other less skilled operators. The system can even run in remote locations or unattended.

Applications

Agilent continuously adds applications to the E3238 family. This application flexibility increases life span and re-use of E3238-based solutions, lowering life cycle costs compared to purpose-built or "stovepipe" systems.

Adaptability & Connection to Legacy Systems

Optional user-programming software adapts the E3238 platform to your situation. Displays can be customized to increase productivity and set up mission-specific profiles. The family also integrates with legacy resources including hand-off receivers and direction finding systems. Network connectivity via sockets provides fast inter-system communication.

Support

The family is based upon commercial products and is easy to buy, maintain, and support. The E3238 arrives with everything pre-installed and ready to run. Because the E3238 family is standards-based, your investment is protected. As technology ramps, so can your system. If your mission requires you to survey the frequency spectrum to determine the nature of unknown emitters, the 35688E option 113 Signal Surveyor is the value leader in our family of solutions.

Agilent E3238 Family Benefits
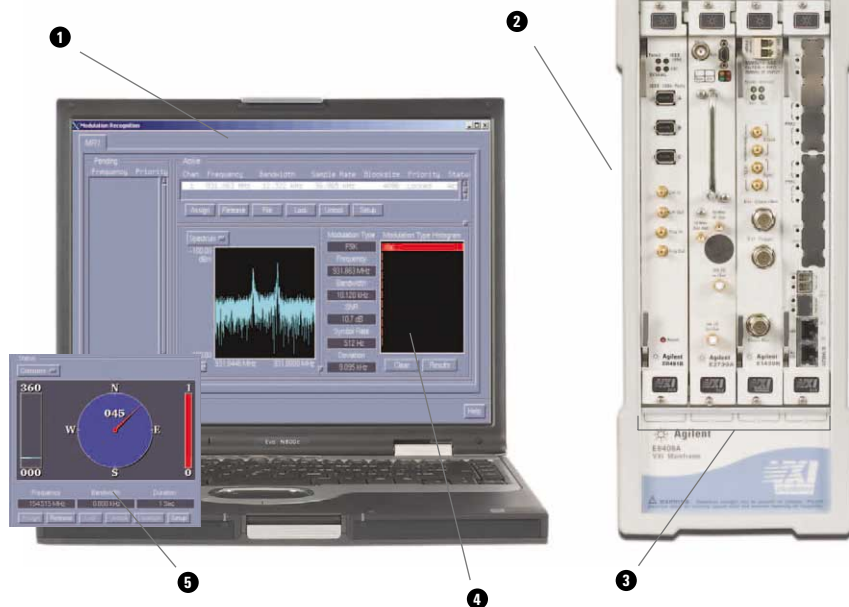
Typical intercept and collection solution consists of:

1 **Windows based PC with Standard Application Software**

2 **Choice of industry standard VXI mainframe (4, 5, 6 and 13 slots available)**

3 **A set of modular, VXI based signal acquisition and processing hardware**

4 **A specific suite of software tools for your mission (modulation recognition shown)**

5 **Tailoring to add links to customer legacy systems (direction finding shown)**

Agilent E3238 Family Benefits
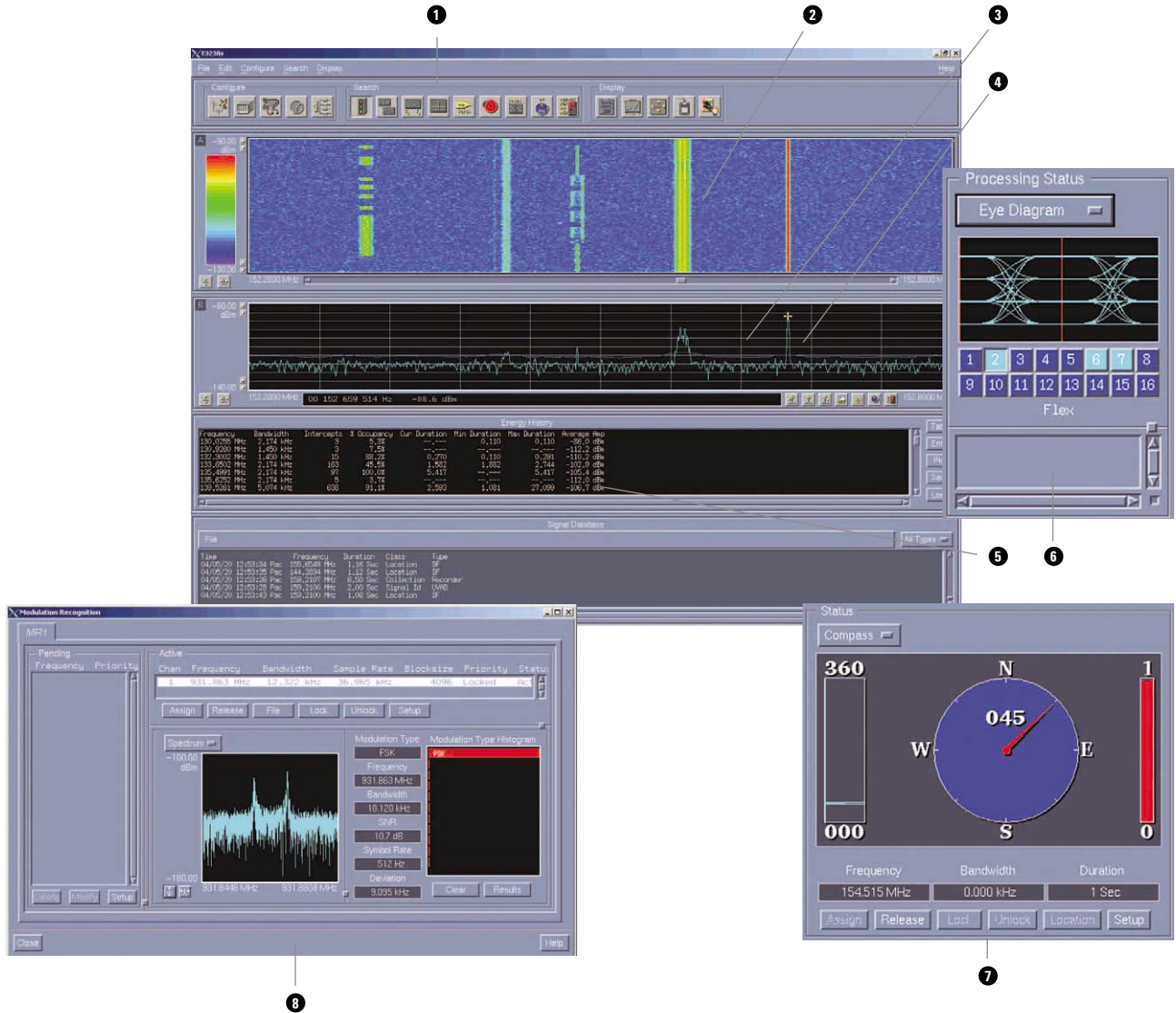
Designed to speed Intercept and Collection tasks and increase probability of intercept (POI):

1   Cockpit control of all systems assets from antennas to digital receivers via the system icon bar

2   A variety of signal visualization tools speed analysis.

3   Operators eyes never leave the signal of interest while they interact directly with trace data to control assets like drop receivers, Modulation Recognition, and Direction Finding systems

4   Automated alarms, thresholding and alerts automate the task of keeping track of incoming signals

5   Signals Database automatically logs all signals of interest for historical use

6   Per-channel view into signal processing activity and asset usage

7   Integration with legacy systems completes the solution, shown here with Direction Finding results

8   Quickly identify unknown emitters with the Modulation Recognition option

Signal Intercept and Collection Solutions Family

SIGNAL SURVEYOR | HF ALE | UHF/VHF VAD | PAGER | TAILORED SOLUTIONS
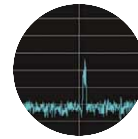
E3238 SOLUTION PLATFORM

EXPANDABILITY

The Agilent E3238 Family is designed around an industry-standard platform that continuously expands to meet emerging mission requirements.


Signal Surveyor The entry-level signal search and detection solution

- Extremely fast, high resolution spectral search
- Multiple search modes – F1-F2, Directed Search, Stare
- Advanced energy thresholding – Level, Noise Riding, Environmental

- New-energy database simplifies cataloging spectrum survey results
- Available in both HF and V/UHF solution
- Up to 6 GHz frequency range with 36MHz bandwidth

HF ALE Automatic Link Establishment intercept solution

- Adds a significant set of HF ALE specific detection algorithms and analysis tools to the E3238 platform

- Reliably detect and decode MIL-STD-188-141 HF-ALE communications

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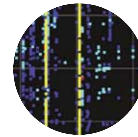
VHF/UHF VADS Voice Activity Detection System for the V/UHF Spectrum

- Intercept and collect push-to-talk voice communications
- Integrated suite of automated tools to detect and demodulate multiple voice signals in the band of interest
- Improves voice detection speed

- Can be integrated tightly with common direction finding solutions to create a complete detection and geolocation solution
- Multi-linguist support to access and play back recorded messages

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PAGER

- Automates the tedious task of searching for and intercepting pager signals
- Pager signals are automatically intercepted, demodulated, decoded, and recorded into a database

- Reports summarize the results of the *find operation* in a concise chronological report
- Automatic report generation
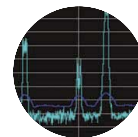
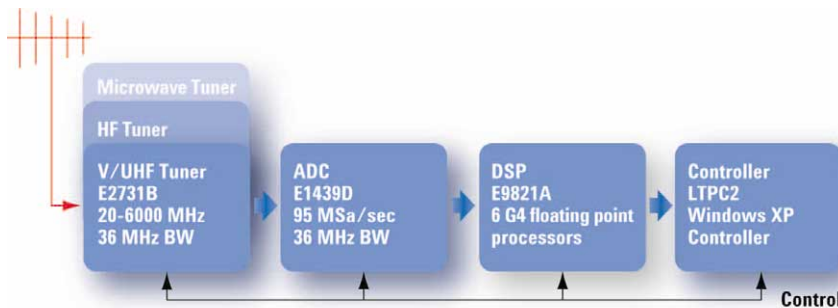## Signal Surveyor
(Agilent 35688E-113)
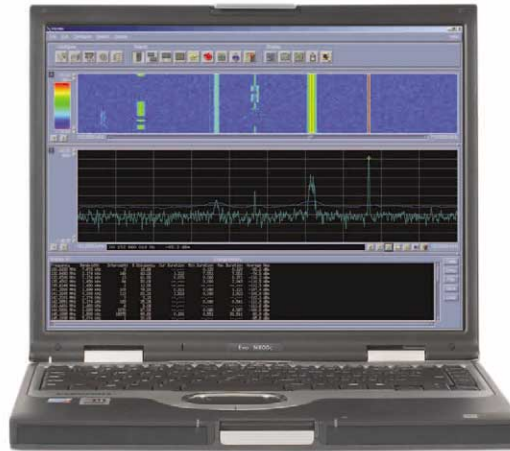
If your mission requires you to survey the frequency spectrum to determine the nature of unknown emitters, the 35688E option 113 Signal Surveyor is the value leader in our family of solutions.

Currently many users tasked with signal survey are buying many individual pieces of test equipment, including spectrum analyzers and other devices. Often, customers end up writing custom software and struggling to create databases for their collected signals. Signal Surveyor is a transportable solution for unknown wireless emitter identification. The Signal Surveyor provides an extremely powerful, high speed portable V/UHF Signal survey and database collection and creation tool.

The Signal Surveyor Solution speeds results by supplying all the necessary measurement acquisition hardware and automated signal processing tools in one complete portable solution.

Features such as signal thresholding and triggering along with complete energy history databases and sophisticated signal visualization capabilities speed the task of surveying and understanding the RF spectrum. The 35688E-113 Signal Surveyor software provides an entry level signal search solution for slightly more than the cost of a traditional swept spectrum analyzer and its associated laptop and software tools. The Signal Surveyor solution also has an upgrade path to the full intercept and collection capabilities of the other solutions in the E3238 family.

The basic search system controls the system tuner, Analog to Digital Convertor (ADC) and G4 based DSP hardware to provide industry leading performance and high probability of intercept of unknown/unwanted emitters.

Signal Surveyor Feature Summary

- Frequency coverage - three tuners available, HF, V/UHF or Microwave
- Up to 36MHz instantaneous bandwidth
- Fast, high resolution spectral search
- Multiple search modes – F1-F2, Directed, Stare
- Advanced energy thresholding – Level, Noise Riding, Environmental
- New-energy database simplifies cataloging spectrum survey results
- Automated energy alarms based upon database parameters
- Control of external handoff receivers, 18 different models available
- Optional Modulation Recognition Tool
- Data compatible with 89600 Vector Signal Analyzer
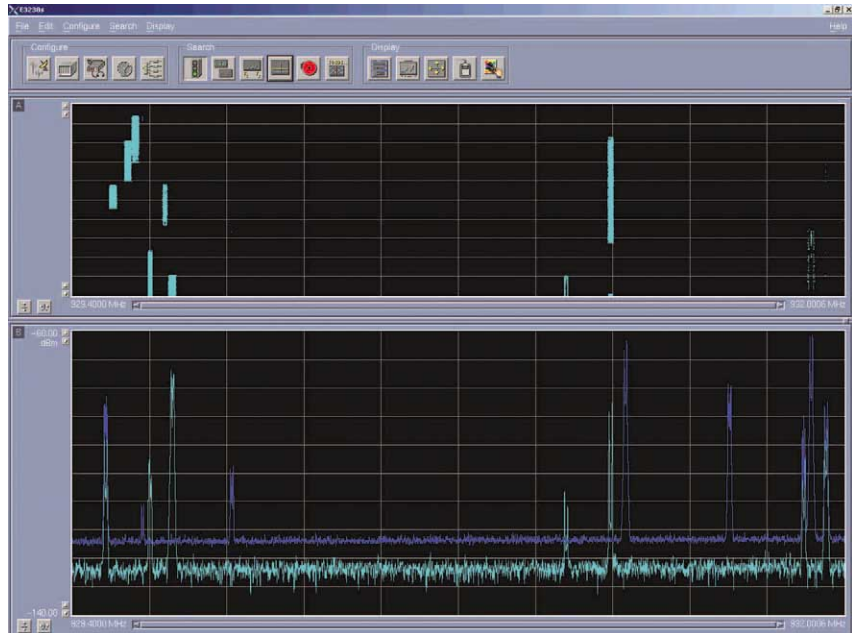
The environment threshold subtracts ambient signals and noise from the Agilent E3238 display and simplifies the task of finding new signals.

Scheduling and New Energy Classification Tools

Select the scheduling that fits the application and configure alarms to activate automatically. Multiple signal events can be combined into a single alarm. The alarms function can automatically identify energy of interest in the energy history database and take action on it. The alarm criteria can be set based on the external characteristics or features of the signal such as:
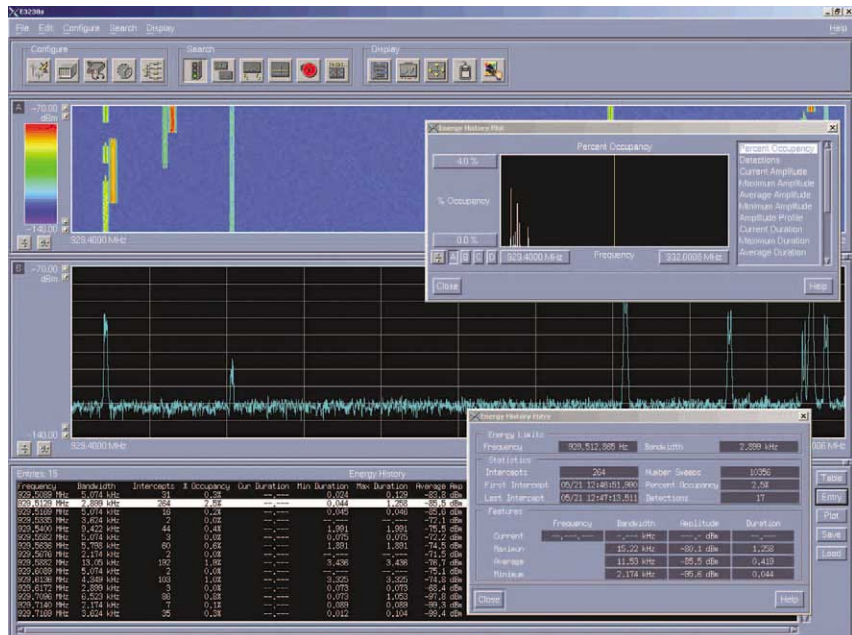
Signal parameters

- Frequency
- Amplitude
- Bandwidth

Signal state

- New signal
- Any signal
- Signal no longer there

Signal activity

- Duration
- Intercept time
- Occupancy

The energy history database automatically stores the parameters of all energy above the threshold. Summary tables and standard plots are built into this function.

VHF/UHF Voice Activity Detection System
(35688E-VA2)

For customers who need to specifically intercept and collect push-to-talk voice communications in the VHF/UHF frequency bands, the Agilent VHF/UHF Voice Activity Detection System provides an integrated suite of automated tools to reliably detect and demodulate multiple voice signals in the band of interest. Agilent Technologies' patent-pending technology dramatically reduces false positive identifications common with other systems that only use single-pass frequency-domain techniques

In addition, this system can be integrated tightly with popular common direction finding solutions to create a complete detection and geolocation solution.
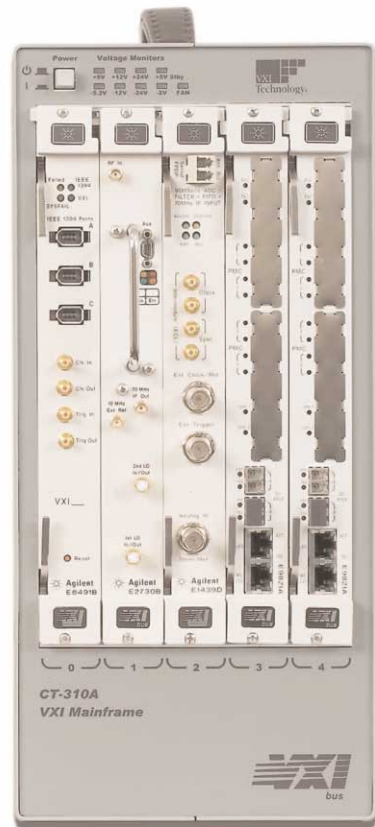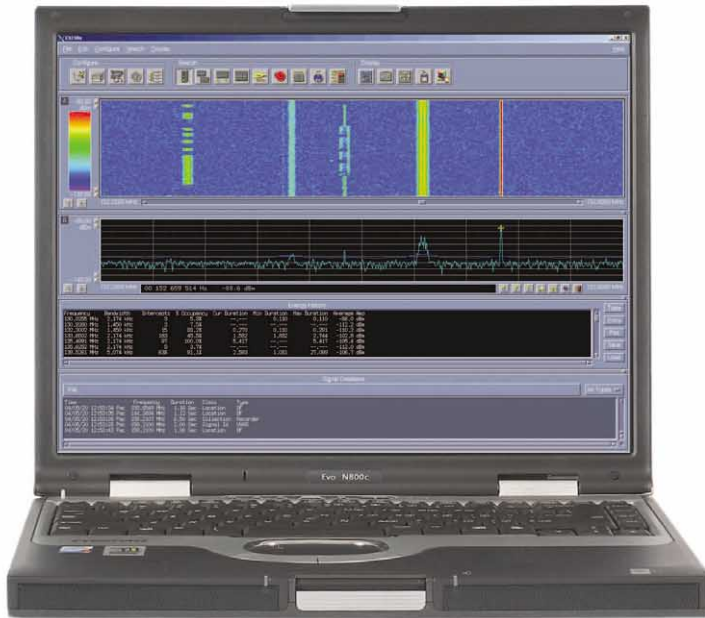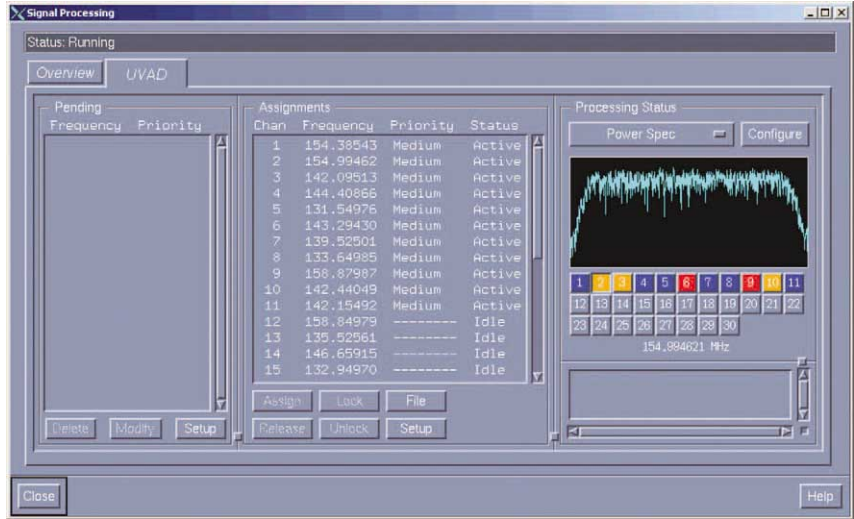
Time-domain test for voice, with recording to disk

Key features

- VHF/UHF frequency coverage
- Automatically identifies language- and speaker-independent FM voice channels
- 96 channels of narrowband voice detection with built-in recording
- Records voice channels to system disk, or LAN disks for use by multiple linguists
- Automatic up/down signal detection records the entire signal without wasting disk space
- Voice signals are time stamped
- Works in conjunction with Snapshot Radio software to demodulate and play back saved voice channels
- Saved voice signals can be demodulated and saved as .wav or .16t files for easy access and usability across computer platforms
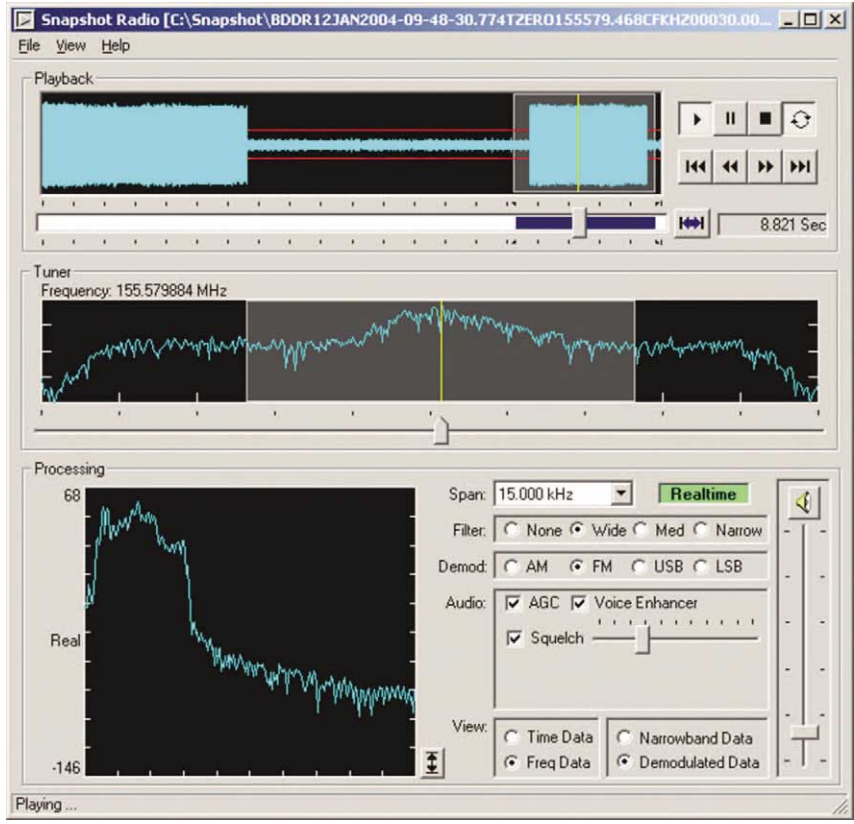
Snapshot Radio

Snapshot radio is a separate software tool that allows linguists using PCs on the system LAN to independently demodulate and listen to voice channel files saved by the VADS. E3238 acquisition hardware is not required to playback files. Several linguists can remotely access the files simultaneously, increasing productivity. For more information about Snapshot Radio see the Snapshot Radio datasheet, available from your Agilent applications engineer.

HF ALE Intercept Solution
(35688E-AL9)

At one time, those who wished to communicate over long-haul distances using the HF spectrum needed to be skilled radio operators, knowledgeable in HF propagation characteristics. In the middle of the last decade however, HF Radio technology gained a significant advantage with the introduction of HF Automatic Link Establishment (HF ALE). This new standard was developed to automatically select an HF frequency that would support a communications link between stations in a network or point-to-point without operator assistance. Governments around the world quickly adopted this standard and currently use HF ALE radios for long-haul communications.

The wideband search and narrowband collection capabilities of the E3238 Platform are perfectly suited to reliably detect and decode MIL-STD-188-141 HF-ALE communications. This solution adds a significant set of HF ALE-specific detection algorithms and analysis tools to the platform to automate the interception, collection and reporting about of communications in HF ALE networks.
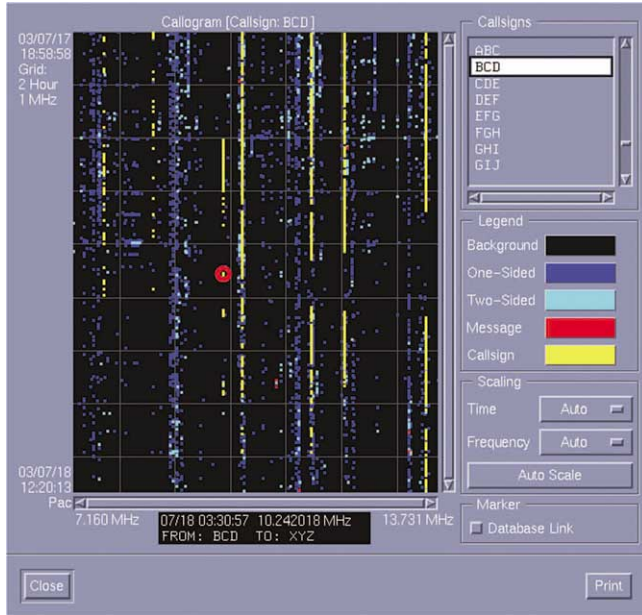
Visualize HF ALE networks graphically - The "callogram" displays HF ALE intercepts showing link activity over time and frequency. Callograms are one of the many Agilent exclusive visualization tools in the HF ALE Intercept Solution that reveal the usage patterns in the HF ALE networks.

For customers with a mission that requires intercept and collection of "pager communications" the Agilent Pager Intercept Solution automates the tedious task of searching for and intercepting pager signals, collecting and storing their content and finally searching that content for the specific text content of interest.

Pager signals are automatically intercepted, demodulated, decoded, and recorded into a database. Over 100,000 "pages" per hour can be recorded. Users can define alarms that search for new pager messages, for specific capcodes, pager parameters, and paging content including words, phrases, or numbers contained in the actual ASCII messages. Reports summarize the results of the search operation in a concise chronological report. The system can be operated remotely or left for unattended operation. A variety of pager formats are available and because the system is based upon open architecture standards, new pager signal types may be added by our consulting engineers.

Pager Intercept Solution
(35688E-PG1)

E3238 Signal Intercept and Collection Platform

Designed for the most demanding Signal Intelligence and Technical Security missions, the Agilent Technologies E3238 family of solutions utilizes an FFT-based fast-scanning, high selectivity receiver subsystem with manual and automatic tools to detect and isolate signals of interest in dense wireless signal environments.

The E3238's acquisition platform provides extremely high sweep rates (>10GHz/second) and high dynamic range to capture elusive signals. When coupled with the signal processing and automated software algorithms, these solutions significantly increase the probability of intercept of unknown emitters.

E3238 Features and Functions	Primary Benefits
- Wideband stepped FFT architecture - Exceptionally fast high-resolution hardware - Multiple Search Modes	Increases Probability of Intercept (POI) for target signals
- Automatic signal classifier functions - Innovative user interface designs - Variety of tools tailored to market needs	Increases productivity of operators
- Industry Standard VXI/COTS Platform - Standards-based software environment - Commercially developed solution	Lowers deployment and maintenance costs
- Basic system available off the shelf - Based upon commercially available hardware - GSA schedule availability - Standard and custom User Training Classes	Easy and quick to purchase and deploy
- Modular Architecture both in hardware and software - Documented open programming capability - Legacy integration services available	High re-use in future missions
- Access to Agilent measurement expertise - Appropriate security resources and spaces	Leverage Agilent's commercial product investments

By selecting different mainframes and modules a variety of mission specific systems may be built. Pictured are three example configurations:

1 VHF/UHF Signal Surveyor system

2 VHF/UHF Search and 96 Channel Collection System

3 HF Search and 128 Channel Collection and Recording System

VXI Tuners are also available for microwave frequency ranges.

Core Search System Software

The main user interface and control software 35688E uses a wide-band stepped FFT technique to achieve exceptionally fast scanning while maintaining high resolution and wide dynamic range. The search functionality is designed to find and collect information on wireless communications signals. It controls the antenna switching, tuners (or down convertors) and other acquisition hardware and the core system DSP. Modular hardware ensures solutions that cover the spectrum from DC-60 GHz (depending on the tuner installed) with sweep rates of up to 10 GHz per second across multiple antennas.

Adding Collection Hardware and Software

A complete search and collection solution is created through additional signal processing and software defined radio receivers to the system. Software defined receivers can quickly be downloaded with new energy detection and demodulation algorithms for different types of emitters. Agilent is constantly updating the number and types of signal collection tools in our library. Custom signal types may be developed by Agilent or other contractors for your precise solution requirements.

Optional Software Tools

We are continually improving the base platform and adding new software tools to our family. The E3238 family includes a suite of optional application tools that enhance the functionality of the system for specific missions and target emitters.

Model Number	Description	Function
E9051A-430	Snapshot Radio	Playback AM/FM/SSB recordings using advanced controls for linguists
35688E-MR1	Modulation Recognition	Provides a software tool that determines the type of modulation used for a given signal
35688E-ASM*	Feature studio	Graphical tool to create spectral shape filters
35688E-NBR*	Narrowband recorder	Provides a multi-channel digital recorder for the system
35688E-AU1*	Real-time audio	Adds realtime audio outputs to the specific E3238 solution
35688E-FMR*	FM signal recognizer	Detects and records any FM signal, voice or data
35688E-PLR*	CTCSS signal recognizer	Detects and records FM signals that have user-specified sub-audible tones.

* Requires that users purchase or upgrade base search software to 35688E-103 Standard E3238 Software for Windows and purchase the associated collection hardware.

E3238 Simplified Block Diagram
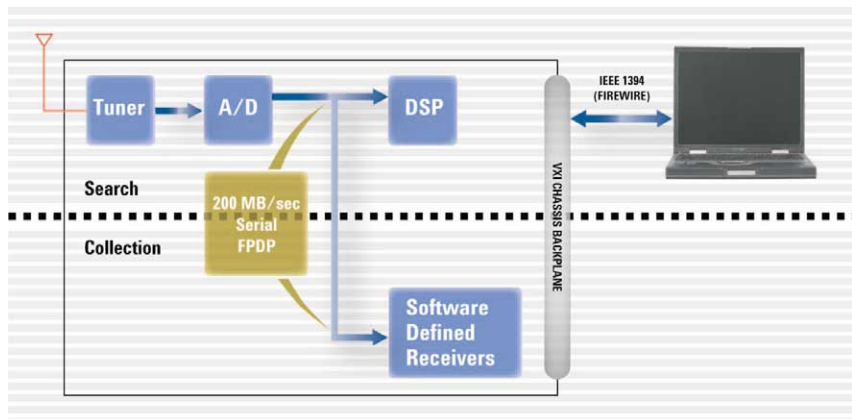
Intercept solutions may include both Search and Collection assets depending upon the mission and application requirements.

Fielding and Supporting your Solutions

Expert Application & Configuration Assistance

In addition to the platform solutions discussed earlier, Agilent Technologies has developed a large base of personnel with application expertise in signal processing and signal analysis. The Agilent applications engineers are available to help define a clear statement of work and concept of operations. This consultation process helps you configure the best value solution.

Support and Sparing Strategy

Agilent has the capability to help you define and implement both local and global support and sparing strategies for your solutions.

Training and Deployment

When it is time to deploy systems, Agilent Applications Engineers are available to offer either Standard or Custom training classes for your team. These training classes can be held either on-site or at Agilent offices worldwide.

Maintenance and Updates

The E3238 platform is designed upon a flexible, industry-based open architecture and is kept up to date with continuous investments and revisions using internally funded R&D investments. Our platforms and software solutions are designed following rigorous processes. To help you get the best value from your investment, software update services are available for all of our solutions. The core system software update services are a standard GSA product. For custom solutions, Agilent can provide you with a specific maintenance agreement upon your request.
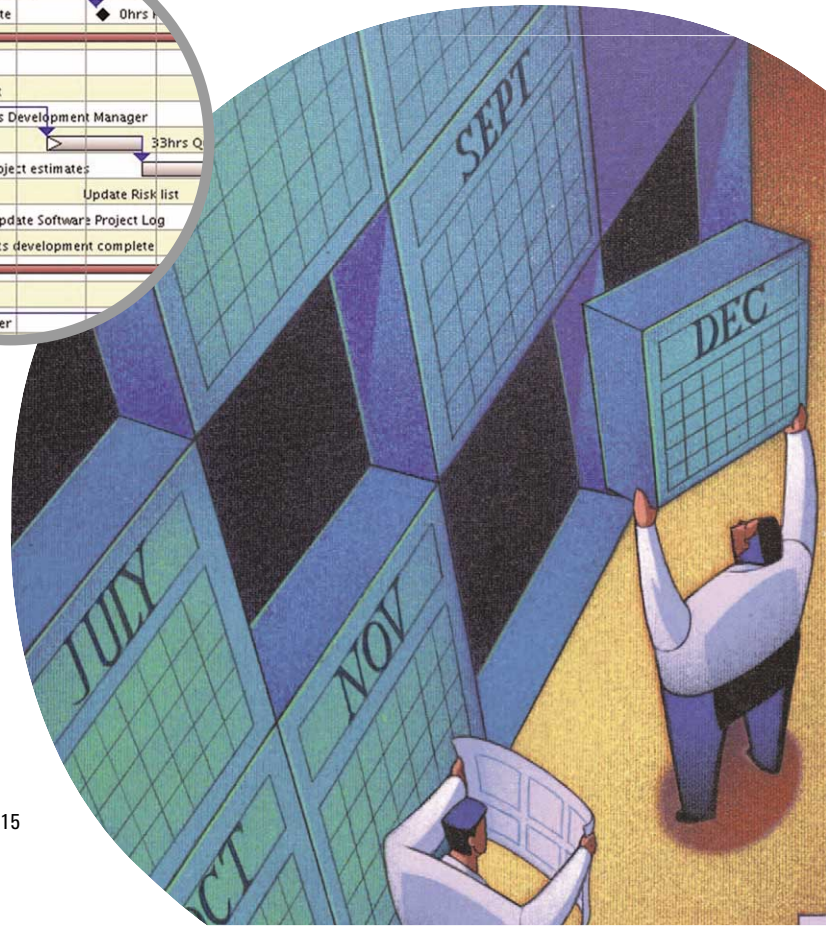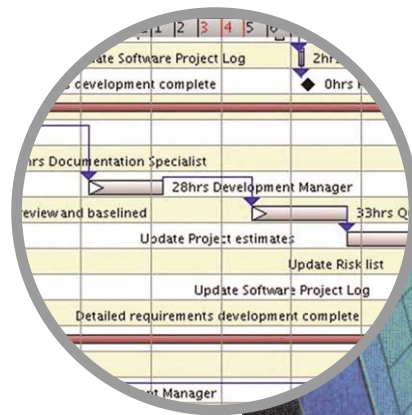
Applications and missions are constantly changing. Agilent tailored solutions blend the best of our commercial R&D investments with the program management skills to create a solution tailored to your critical needs. In addition to the solutions described in this brochure, Agilent Program Managers are able to define and deliver solutions customized for your needs.

To help you meet your changing mission requirements, Agilent Technologies has also invested in teams of extremely skilled signal processing experts with the required clearances and workspaces to aid you in defining and implementing complete solutions to your pressing problems.

Agilent uses our Solution Life Cycle process to manage the definition and creation of solutions for customers. The Solution Lifecycle is flexible and scalable yet provides ISO approved guidelines, templates and worksheets that can be adapted to the specific program. Extensive program management capabilities, processes and expertise are employed on every project to ensure Agilent created solutions meet technical, schedule and budgetary requirements.

Platform Tailoring and Customization Services

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Agilent Technologies' Test and Measurement Support, Services, and Assistance

Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Support is available for at least five years beyond the production life of the product. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

Our Promise

Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

Your Advantage

Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and onsite education and training, as well as design, system integration, project management, and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

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Agilent's Test and Measurement software and connectivity products, solutions and developer network allows you to take time out of connecting your instruments to your computer with tools based on PC standards, so you can focus on your tasks, not on your connections. Visit www.agilent.com/find/connectivity for more information.

By internet, phone, or fax, get assistance with all your test & measurement needs

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