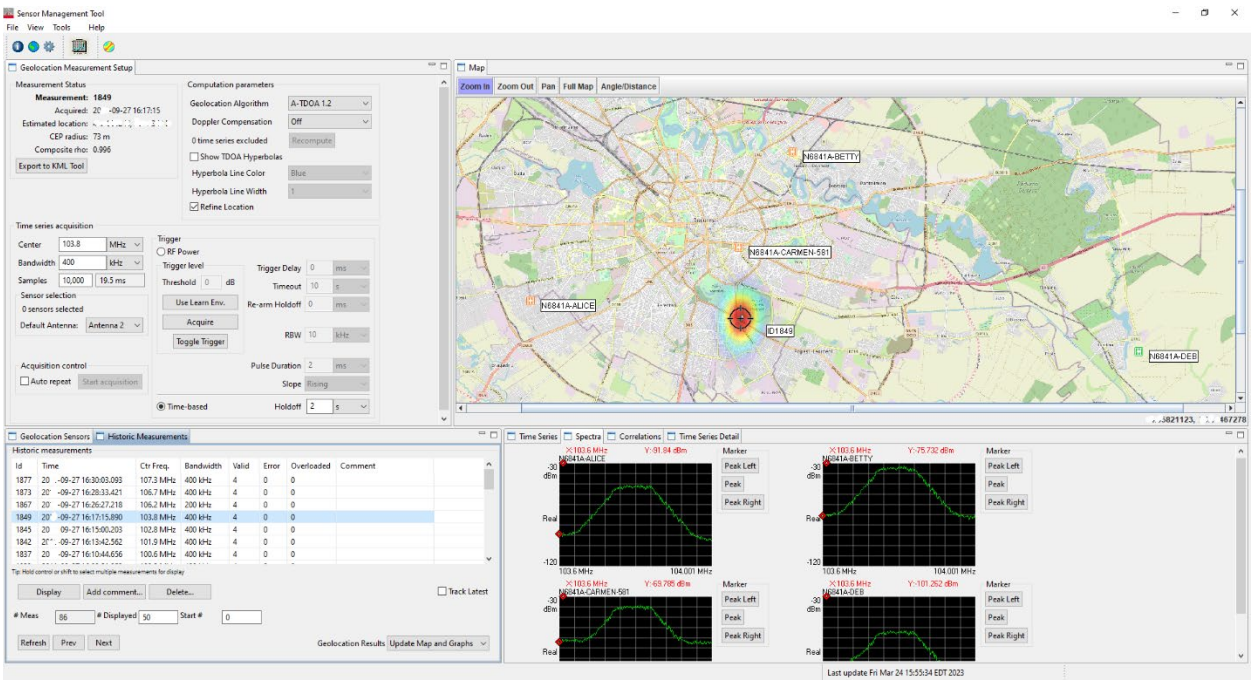
N6854A Emitter Location System

Configure an emitter location system with your desired capabilities and measurement options

Introduction

This guide will help you configure an N6841A RF sensor-based emitter location system that meets your application needs. This step-by-step process will help you select the hardware, software, services, and support that you will need.



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System Elements

There are five elements to consider as you configure the emitter location system:

- Sensors and antenna
- Software
- Processor
- Training and consulting services
- Support

Step 1. Configure sensors and antenna

Select the number and configuration of your N6841A RF Sensors

The required number of RF sensors depends on the following:

- The area's size and terrain
- Signal of interest power
- Location of the monitoring sites relative to the area to be monitored

To assist with estimating the number of sensors needed to cover an area, Keysight includes the Sensor Placement and Optimization Tool (SPOT) software with the RF Sensor Management Tool (SMT) software. The SPOT software uses a calibrated map image and propagation models to estimate the RF detection range of monitoring locations and the geolocation coverage area of a network of RF sensors. Work with your local Application Engineer to help determine the right number of RF sensors for your need. Many start-up applications begin with five RF sensors. A five-sensor network enables a mixture of fixed, temporary, and mobile sensors.

N6841A configuration required to make geolocation measurements

- **N6841A-GFP** (quoted and ordered as a standalone line item) provides "right to use" an N6841A with the Keysight N6854A Geolocation Server software and is required for each sensor used for geolocation. The quantity should match the number of sensors. Sensors used only for spectrum monitoring or signal analysis do not require this item.
- **N6841A option GPS** (quoted and ordered as an N6841A option) supplies a GPS antenna with a 2-meter cable. Select this option for sensors that will be used outdoors.
- **Other N6841A options include**:
  - **N6841A option CFP** provides a driver to connect the FieldFox analyzer as a microwave downconverter
  - **N6841A option EFP** enables embedded applications to run without an external PC or network connection
  - **N6841A option MFP** enables 8 narrowband DDC's
  - **N6841A option SP1** provides an indoor power supply and Keysight recommends purchasing at least one of the N6841A-SP1 power supplies. If the units will be battery operated or mounted outdoors, a battery or IP67 rated power supply is recommended as described in the N6841A power options case study.

For additional N6841A information, refer to the N6841A RF Sensor for Signal Monitoring Networks data sheet (5990-3839EN)

N6850A Broadband omnidirectional antenna

The Keysight N6850A Broadband Omni Antenna is a passive, omnidirectional antenna designed for use with receivers that operate up to 6 GHz. With this antenna, you can minimize installation complexity by mounting only one very compact antenna. Its low-profile design makes it ideal for inconspicuous spectrum monitoring applications. Its uniform gain pattern makes it ideal for the time difference of arrival or received signal strength geolocation techniques. It includes a 5-foot Type-N RF cable and mounting bracket.

For more information, refer to the N6850A Broadband Omni Antenna data sheet (5992-1237EN).

Step 2. Configure software

N6854A Geolocation Server software

The Keysight Geolocation Server software is an easy-to-use application for manual geolocation measurements initiated by a Time or RF power trigger. The software is downloadable from www.keysight.com/find/N6854A and requires a license. When you order the N6854A software, the license file can be retrieved from the Keysight Software Manager webpage.

The N6854A provides a perpetual node-locked license to run the Geolocation Server Software with Time Difference of Arrival (TDOA), Received Signal Strength (RSS), and Hybrid (adaptive TDOA plus RSS) geolocation algorithms.

If your organization already owns N6841A RF sensors and you wish to add geolocation capability, you can order the N6854A Geolocation Server software plus the number of N6841A-GFP options needed for the sensors in your network.

For more information, refer to the “N6854A RF Geolocation Server Software” technical overview (5989-9207EN).

Configure the Surveyor 4D Software

Surveyor 4D is a full-featured spectrum monitoring software capable of automating emitter location measurements. It can also task internal and external processes to capture and analyze spectrum events and conduct comprehensive surveys of the RF environment. The core software includes features to make manual and automated geolocation measurements, log, and display the results.

You can configure the Surveyor 4D software by selecting the core software and any additional features for your specific application.

- **N6820114E** (Required) supplies the core Surveyor 4D software.
- **N6820USDE** supplies the Universal Signal Detector.
- **N6820MR1E** supplies Modulation Recognition.
- **N6820NBRE** supplies the streaming narrowband recording feature
- **N6820EDFE** supplies a GUI, features, and filters for operation with external narrowband Direction-Finding Systems (programming is required).
- **N6820SSYE** supplies a Client-Server application, GUI, and utilities to perform synchronous sweeping of multiple RF Sensors (programming is required).
- **N6820VRXE** supplies a virtual receiver player and data endpoints that enable Surveyor 4D to process wideband IQ recordings.
- **N6820UTPE** provides an automated V/UHF voice activity detector [ITAR controlled – requires export license].
- **N6820ES-ASD** supplies user programming libraries to build custom filters, features, GUI, and alarms.

Select the N6829BS Snapshot Radio software

Snapshot Radio software enables you to produce audio from IQ or audio capture files created by Surveyor 4D or VSA. Choices of demodulation schemes include AM, FM, U/LSB, and CW. The Snapshot Radio software also includes a flexible tool for voice inversion and filtering. The file management system makes processing large numbers of recordings quick and easy.

N6829BS-103 supplies the core Snapshot Radio software and no additional options are needed.

For more information, refer to the N6829B Snapshot Radio Software Application.

Configure the PathWave Vector Signal Analysis 89601200C software

The VSA software is a widely used program capable of controlling many Keysight products including the N6841A RF sensor. The software is not required for geolocation measurements but can be used for post-analysis of IQ files made while using Surveyor 4D software. For more information, please refer to www.keysight.com/find/VSA

Typical VSA features used with the RF Sensor include:

- **89601200C** supplies the core VSA software
- **89601AYAC** supplies flexible demodulation analysis
- Add other specific wireless formats as needed

Application software licensing options

Flexible licensing options allow you to balance your project's requirements. Your application software may require consistent software operation over a full program lifecycle or may require frequent updates to maintain pace with fast-moving leading-edge applications. Keysight licensing has flexible license terms and types to address your application needs. KeysightCare provides selectable software support as well.

License term	Options
Perpetual	Use perpetual licenses indefinitely. KeysightCare Software Support is available for 1, 2, 3, or 5-year subscriptions, and is renewable.
Subscription	Use subscription licenses through the term of the subscription (6 months, 1, 2, or 3 years) KeysightCare Software Support is available through the license term.
License type	**Descriptions**
Node-locked	Use node-locked licenses on one specific instrument/computer.
Transportable	Use a transportable license with one instrument/computer at a time. Users can transfer the license to another instrument using Keysight Software Manager (internet connection required).
USB Portable	Use a USB portable license on one instrument/computer at a time. Users can transfer the license to another instrument using a certified USB dongle (available for additional purchase, Keysight part number E8900-D10).
Floating	Networked instruments/computers can access a license from a server one at a time. Purchase multiple licenses for concurrent usage. Three types of floating licenses are available: **Single Site**: 1-mile radius from the server; **Single Region**[1]: Americas; Europe; Asia; **Worldwide** (export restriction identified in End User License Agreement (EULA))

1. Americas (North, Central, and South America, Canada); Europe (European Continent, Middle Eastern Europe, Africa, India); Asia (North and South Asia Pacific Countries, China, Taiwan, Japan)

For more information see the Software Terms, Types, and KeysightCare Software Support Subscriptions flyer.

Step 3. Configure processor

Select the LTPC4 laptop computer

Purchasing the LTPC4 laptop is the easiest and best way to acquire a Keysight emitter location system that has all the software installed, is licensed, and configured. This option supplies a high-performance 15-inch HP ZBook laptop computer configured to run all the required software. For more information, please refer to the N6820ES / N6854A processor fact sheet.

	Model	Description
1	LTPC4	Laptop computer with the software installed

Step 4. Configure services

Technical assistance and startup services

Three to five days of technical training and consulting are recommended with each new Keysight emitter location system to accelerate the setup and operation of your RF Sensor network. This can include assistance with software installation, familiarization with the RF Sensor hardware, Sensor Management Tool, Surveyor 4D, and the Geolocation Server software.

Factory consulting does not include travel expenses which must be ordered separately. A statement of work must be prepared to quote the services below. A template of the standard curriculum is provided on request.

Factory services

R2004A-007 Hourly Consulting/ Engineering Assistance (order one week as quantity 40)

Travel expenses for Factory consulting:

- **R2004A-707** are travel units. Order the number needed to reach the appropriate amount.
  - Typical costs for travel in the U.S. are $1.5K per week depending on whether airfare is required.
  - Typical costs for travel outside the U.S. range from $3.5K to $6K per week depending on the location.

Local services

If there is a local Keysight Application Engineer able to deliver startup assistance and training, Field consulting can be ordered as follows. To determine the availability of local AE support, contact your Field Engineer or the Keysight Contact Center, (800) 829-4444.

- **PS-S20-100** Daily Productivity Assistance (order one week as quantity 5)

Step 5. Configure Support Plan

Service availability – United States

Confidently covered by Keysight Services

Prevent delays caused by technical questions, or system downtime due to instrument maintenance and repairs with Keysight Services. Keysight Services are here to support your test needs with expert technical support, instrument repair and calibration, software support, training, alternative acquisition program options, and more.

A KeysightCare agreement provides dedicated, proactive support through a single point of contact for instruments, software, and solutions. KeysightCare covers an extensive group of instruments, application software, and solutions and ensures optimal uptime, faster response, faster access to experts, and faster resolution.

Keysight Services

Offering	Benefits
KeysightCare KEYSIGHTCARE	KeysightCare provides elevated support for Keysight instruments and software, with access to technical support experts that respond within a specified time and ensure committed repair and calibration turnaround times (TAT). KeysightCare offers multiple service agreement tiers, including KeysightCare Assured, Enhanced, and Application Software Support. See the KeysightCare data sheet for details.
KeysightCare Assured	KeysightCare Assured goes beyond basic warranty with repair services that include committed TAT and unlimited access to technical experts.
KeysightCare Enhanced	KeysightCare Enhanced includes all the benefits of KeysightCare Assured plus Keysight's accurate and reliable calibration services, accelerated, and committed TAT, and technical response.
Keysight Support Portal & Knowledge Center	All KeysightCare tiers include access to the Keysight Support Portal where you can manage support and service resources related to your assets such as service requests, and status, or browse the Knowledge Center.
Education Services	Build confidence and gain new skills to make accurate measurements, with flexible Education Services developed by Keysight experts. Including Start-up Assistance.
Alternative acquisition options	
KeysightAccess	Reduce budget challenges with a subscription service enabling you to get the instruments, software, and technical support you want for your test needs.

Recommended calibration interval

The N6841A uses GPS or a GPS-disciplined IEEE-1588 frequency reference to periodically calibrate the reference oscillator. Because of this feature, regular factory calibration is not required.

Quote and Order Configuration Guide

Part number		Description	Remarks
Sensors			
N6841A	N6841A	RF sensor	Required
	N6841A-SP1	AC power supply (indoor only)	Recommended
	N6841A-GPS	GPS antenna	Required
	N6841A-CFP	Enables FieldFox as microwave downconverter	
	N6841A-EFP	Enables embedded programming	
	N6841A-MFP	Enables 8 narrowband DDC processing	
N6841A-GFP		"Right to use" sensor for geolocation measurements	Required
Software			
N6854A	N6854A	Core Geolocation Server Software with TDOA algorithm	Required
N6820ES	N6820114E	Core Surveyor 4D software	Recommended
	N6820USDE	Universal signal detector	
	N6820MR1E	Modulation recognition	
	N6820NBRE	Streaming narrowband recorder	
	N6820EDFE	Enables interface to external DF system	
	N6820SSYE	Enables synchronous sweep of multiple Surveyor 4D instances	
	N6820VRXE	Virtual receiver feature enables Surveyor 4D to process wideband files	
	N6820UTPE	Automated V/UHF voice activity detector (ITAR – license required)	
	N6820ES-ASD	Provides user libraries for customization of Surveyor 4D software	
N6829BS	N6829BS-103	Snapshot radio software node-locked license	
	N6829BS-LK3	Adds USB-keyed license	
VSA	89601200C	Vector signal analyzer software add 89601AYAC for flexible demod	
PC			
	LTPC4	Provides a high-performance laptop PC with software pre-loaded	
Services			
	PS-S20-100	Local application engineer training services, Daily	3 to 5 recommended
	R2004A-007	Factory consulting services, hourly	24 to 40 recommended
	R2004A-707	Travel expense for factory consulting	As needed
Support			
	SW1000-SUB-001	Surveyor 4D software subscription service, 1 year	
	SW1000-SUP-001	Surveyor 4D software KeysightCare 1 year	
	SW1000-D10	Surveyor 4D USB-keyed license with FLEX 10 dongle	
	EDEL-ONLY-01	Electronic-only delivery of license	