This guide will help you configure a geolocation system that meets your needs and includes the measurement options and capabilities you require.

N6854A Geolocation System

This step by step process will help you prepare a quotation or purchase order for a Keysight Technologies, Inc. Geolocation System using the N6841A RF Sensor.

Geolocation System

There are five elements that need to be configured:

- Hardware
- Software
- Bundle
- Training and Consulting Services
- Support

STEP 1. Configure the Hardware

N6841A Keysight RF Sensor

Included with this part number are the RF Sensor, mounting bracket with hardware and the Sensor Management Tool (SMT) software. The minimum number of Sensors required to make a geolocation measurement is three. However, depending on the kind of signals and physical terrain of your monitoring area, more Sensors may be required. Work with your local Application Engineer or the RF Sensor Support email box (listed at the end of this document) to determine the right number of RF Sensors to meet your needs. Many first time customers begin with five.

There are four options available to purchase with the N6841A:

Option N6841A-GPS supplies a GPS antenna with 2 meter cable. Select this option if the Sensor is to be used outdoors so timing reference and location data can automatically be sent to the Sensor Management Tool.

Option N6841A-SP1 supplies an indoor-rated AC adapter to power the N6841A with either 120 or 240 VAC. This option is recommended for rapid setup and configuration prior to deployment.

Option N6841A-GFP enables the RF Sensor to be used by the Keysight N6854A Geolocation Server Software. It is not required if the Sensor will only be used for spectrum monitoring or signal analysis.

Option N6841A-MFP enables the Sensor to have multiple Digital Down Converters (DDC’s) with bandwidth up to 160 kHz for RF Survey or Intercept and Collection applications.

For additional information on the N6841A, refer to the Technical Datasheet, Keysight Publication #5990-3839EN.

If you already have RF Sensors, but require a hardware upgrade, follow the guidance provided on the next page.
N6850A Broadband Omni-Directional Antenna

The N6850A is a compact omni-directional antenna designed to work with the RF Sensor. It has broad frequency coverage and a uniform antenna pattern in both azimuth and elevation to improve the ability to use power and time differences to determine emitter location.

For additional information, refer to the Technical Datasheet, Keysight publication #5992-1024EN

The N6850A ships with an innovative mounting fixture that can adapt to pole, rail, tripod or magnetic mounting kits.

N6841AF-UG1 Hardware Upgrade

The N6841AF-UG1 upgrade adds these improvements to early versions of the N6841A (prior to serial number US50310599).

- Increased processor memory from 256 MBytes to 1 GByte to provide longer capture and LOOKback memory.
- Optimized direct memory access (DMA) to improve data transfer speeds in the RF Sensor and improved operation on slow data networks.
- Improved FFT which enables gapless signal search (in 20 MHz bandwidth) and improved signal search speeds.
- FFT averaging in RF Sensor hardware to increase search performance and lower network traffic.
- New internal RF cabling for better RF performance.
- Simplified networking: fewer ports and easier setup when Sensors are behind a Virtual Private Network (VPN) or firewalls.
- New firmware that supports enhanced geo-location algorithms and faster signal processing.

NOTE: If the RF Sensor has a sticker that reads “Upgraded to 5040”, it has already been upgraded.

For more information on the hardware upgrade, refer to Keysight Service Note N6841A-01.
STEP 2. Configure the Software Applications

N6854A Geolocation Server Software

The Keysight Geolocation Server Software is an easy-to-use application for manual geolocation measurements initiated by Time or RF power trigger.

This software is downloadable from www.keysight.com/find/N6854A and requires a license to run. Free 60-day trial licenses are available and can be obtained from the webpage.

N6854A provides one license to run the Geolocation Server Software with Time Difference of Arrival (TDOA), Received Signal Strength (RSS) and Hybrid (adaptive TDOA RSS) algorithms on one PC. There is no cost associated with part number N6854A. However, it requires N6841A RF Sensors with option GFP enabled. As the RF Sensor network grows, additional Geo licenses can be obtained without added cost.

If Sensors have already been purchased, add geolocation software by ordering the N6854A plus a quantity of N6841A-GFP that represents the number of Sensors in the network.

For more information, refer to the N6854A Product Overview, publication #5989-9207EN.
STEP 2. Configure the Software Applications (continued)

N6820ES Signal Surveyor 4D Software

Signal Surveyor 4D is spectrum monitoring software 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.

When configuring Signal Surveyor 4D, you must either order the bundle, N6820ES-B02 or the basic software, N6820ES-114.

- Option N6820ES-114 supplies the basic Surveyor 4D software. (Required, UNLESS the B02 bundle is ordered)
- Option N6820ES-ASD supplies a library of user programming examples for custom filters, features, GUI and alarms
- Option N6820ES-USD supplies the Universal Signal Detector
- Option N6820ES-MR1 supplies Modulation Recognition
- Option N6820ES-EDF supplies a user interface, features and filters for operation with narrowband Direction Finding Systems (programming is required).
- Option N6820ES-UTP supplies a V/UHF FM voice activity detection capability. *This option is under ITAR control.*
- Option B02 supplies a software bundle that includes all the options listed above plus Option 1RU. (except for N6820ES-UTP)
- Option N6820ES-1RU supplies one year of software subscription service
- Option N6820ES-2RU supplies two years of software subscription service

For more information, refer to the N6820ES Product Overview, Keysight Publication #5991-2242EN.
STEP 2. Configure the Software Applications (continued)

N6829BS Snapshot Radio Software

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

N6829BS-103 supplies the Snapshot Radio software. No other options are needed.

For more information, refer to the N6829BS Product Overview, Keysight Publication #5989-2839EN.

89601B Vector Signal Analysis (VSA) Software

The VSA software is a widely used program capable of controlling many Keysight products including the N6841A. For more information, please refer to www.keysight.com/find/VSA

VSA for the RF Sensor is typically configured as indicated below:

- 89601B-200 supplies the core VSA software
- 89601B-AYA supplies flexible demodulation analysis

Other specific demodulation formats may be added as needed.
STEP 3. Consider the Geolocation Bundle for ease of ordering

N6860A Keysight Geolocation bundle

This is the easiest and best way to purchase a Keysight Geolocation system. With one part number, you get all the elements needed for a successful installation with exception of the User data network.

The N6860A Geolocation Bundle includes all the following items with a discount for ordering convenience:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 N6841A-GFP/GPS/SP1</td>
<td>RF Sensors with Sensor Management Tool software</td>
</tr>
<tr>
<td>5 N6850A</td>
<td>Broadband Omni-directional antenna</td>
</tr>
<tr>
<td>1 LTPC4</td>
<td>Laptop computer with software installed</td>
</tr>
<tr>
<td>1 N6820ES-B02</td>
<td>Signal Surveyor 4D license</td>
</tr>
<tr>
<td>1 N6854A</td>
<td>Geolocation Server Software license</td>
</tr>
<tr>
<td>1 N6829BS-103</td>
<td>Snapshot Radio software license</td>
</tr>
<tr>
<td>1 89601B-200/AYA</td>
<td>Vector Signal analyzer license</td>
</tr>
</tbody>
</table>

STEP 4. Select the Training and Consulting Services you need

Five days of technical training and consulting are recommended with each new Keysight Geolocation system. Training topics the Sensor hardware, SMT, Geolocation Server software, Surveyor 4D, VSA and operation of the RF Sensor network.

Factory consulting can be ordered as follows. Travel expense must be ordered separately.

- R2004A-007 Hourly Consulting/Principal Engineer Assistance (order one week as quantity 40)
- R2004A-707 ($500.00 travel unit)
  - Typical costs for travel in the U.S. are $1K to $2.5K per week. Travel expenses of $1,500.00 would be ordered as Quantity 3 of R2004A-707
  - Typical costs for travel outside the U.S. range from $3.5 to $6K per week depending on the location.

If there is a local Keysight Application Engineer (AE) able to deliver startup assistance and training, Field consulting is 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)

For more information about Field AEO Services, refer to Keysight publication number #5988-9120EN.
STEP 5. Configure your Support Plan

Service prices and availability – United States

The N6841A has a standard three-year warranty which begins on the date of invoice. The status of your warranty can be determined online by entering the model number and serial number of the unit. Go to www.keysight.com/find/warranty

Recommended Calibration Interval

Since the N6841A uses GPS or a GPS disciplined Grand Master to periodically calibrate the reference oscillator, no regular factory calibration is required.

Repair and Warranty Services

A repair service agreement is available for the N6841A with turnaround time of 15 days and annual cost of 312.00 USD. The repair includes post-data calibration and return shipment. Price is subject to change without notice. Taxes & shipping / handling charges not included unless otherwise noted.

An extended 5-year warranty is available for the RF Sensor and can be ordered at the time of hardware purchase by adding this part number:

R-51B-001-5C Warranty Assurance Plan – Return to Keysight. This option is highly recommended especially if the Sensor is intended for outdoor deployment.

Per-incident repair and unit exchange are also available for the N6841A and quotations can be requested on www.keysight.com/find/repair

Software subscription and maintenance

An annual software subscription service is available for the N6820ES Surveyor 4D software. This service should be purchased every year by or each license to access the latest features and enhancements. It also includes a connection to phone and email technical support. It is ordered by model number N6820ES-1RU (one year) for $1,500.00 or N6820ES-2RU for $3,000.00 (two year).

There is currently no software subscription service needed for the N6829BS Snapshot Radio or N6854A Geolocation Server software.
# Quote and Order Configuration Guide

## Sensors

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>N6841A</td>
<td>N6841A RF Sensor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N6841A-SP1</td>
<td>AC Power Supply (indoor only)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N6841A-GPS</td>
<td>GPS antenna</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N6841A-GFP</td>
<td>Enables Sensor for Geolocation measurements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N6841A-MFP</td>
<td>Enables multiple DDC's in the RF Sensor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N6841AF</td>
<td>N6841AF-UG1 Upgrade of existing early version RF Sensor (Upgrade)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N6850A</td>
<td>N6850A Supplies one Keysight Broadband Omni-directional antenna</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Software

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>N6854A</td>
<td>N6854A License for Geolocation Server Software [REQUIRED]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LTPC4</td>
<td>Provides a high-performance Laptop PC with Software pre-loaded</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N6820ES</td>
<td>N6820ES License for Signal Surveyor 4D software</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N6820ES-114</td>
<td>Basic software [REQUIRED unless ordering N6820ES-B02 bundle]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N6820ES-ASD</td>
<td>User Programming Libraries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N6820ES-USD</td>
<td>Universal Signal Detector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N6820ES-MR1</td>
<td>Modulation Recognition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N6820ES-EDF</td>
<td>Enables interface to DF system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N6820ES-UTP</td>
<td>Automated FM Voice Activity Intercept and Collection (ITAR restricted)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N6820ES-B02</td>
<td>Software Bundle of all options (with exception of N6820ES-UTP)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N6829BS</td>
<td>N6829BS-103 Snapshot Radio software</td>
<td></td>
<td></td>
</tr>
<tr>
<td>89601B-200/AYA</td>
<td>Keysight Vector Signal Analysis software with flexible demodulation option</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Training and Consulting Services

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS-S20-100</td>
<td>Field Application Engineer training services, Daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R2004A-007</td>
<td>Factory Consulting Services, Hourly (Factory override needed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R2004A-707</td>
<td>Travel expense for Factory Consulting (Factory override needed)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Support

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-51B-001-5C</td>
<td>Warranty Assurance Plan - Return to Keysight, 5 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N6820ES-1RU</td>
<td>Signal Surveyor 4D Software subscription service, 1 year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N6820ES-2RU</td>
<td>Signal Surveyor 4D Software subscription service, 2 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N6820ES-3RU</td>
<td>3 years of subscription service</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Factory Contacts

For any additional questions about this Configuration Guide, please contact:
RF Sensor Support Electronic Support mailbox: rfSensor_support@keysight.com
From Hewlett-Packard through Agilent to Keysight
For more than 75 years, we’ve been helping you unlock measurement insights. Our unique combination of hardware, software and people can help you reach your next breakthrough. Unlocking measurement insights since 1939.

myKeysight
www.keysight.com/find/mykeysight
A personalized view into the information most relevant to you.

Three-Year Warranty
www.keysight.com/find/threeyearwarranty
Keysight’s commitment to superior product quality and lower total cost of ownership. Keysight is the only test and measurement company with three-year warranty standard on all instruments, worldwide. And, we provide a full one-year warranty on many accessories, calibration devices, systems and custom products.

Keysight Assurance Plans
www.keysight.com/find/assuranceplans
Up to five years of protection and no budgetary surprises to ensure your instruments are operating to specification so you can rely on accurate measurements.

Keysight InfoLine
www.keysight.com/find/service
Keysight’s insight to best in class information management. Free access to your Keysight equipment company reports and e-library.

Keysight Channel Partners
www.keysight.com/find/channelpartners
Get the best of both worlds: Keysight’s measurement expertise and product breadth, combined with channel partner convenience.

www.keysight.com/find/N6854A

For more information on Keysight Technologies’ products, applications or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus

Americas
Canada  (877) 894 4414
Brazil  55 11 3351 7010
Mexico  001 800 254 2440
United States  (800) 829 4444

Asia Pacific
Australia  1 800 629 485
China  800 810 0189
Hong Kong  800 938 693
India  1 800 11 2626
Japan  0120 (421) 345
Korea  080 769 0800
Malaysia  1 800 888 848
Singapore  1 800 375 8100
Taiwan  0800 047 866
Other AP Countries  (65) 6375 8100

Europe & Middle East
Austria  0800 001122
Belgium  0800 58580
Finland  0800 523252
France  0805 980333
Germany  0800 6270999
Ireland  1800 832700
Israel  1 809 343051
Italy  800 599100
Luxembourg  +32 800 58580
Netherlands  0800 0233200
Russia  8800 5009286
Spain  800 000154
Sweden  0200 882255
Switzerland  0800 805353
Opt. 1 (DE)
Opt. 2 (FR)
Opt. 3 (IT)
United Kingdom  0800 0280637

For other unlisted countries:
www.keysight.com/find/contactus
(BP-01-01-16)

www.keysight.com/go/quality
Keysight Technologies, Inc.
DEKRA Certified ISO 9001:2008
Quality Management System

This information is subject to change without notice.
Published in USA, February 10, 2016
5991-2939EN
www.keysight.com