

# Keysight Technologies

## N9340B, N9342C, N9343C, N9344C Handheld Spectrum Analyzers (HSAs)



## Table of Contents

Field testing just got easier.....	3
Get the features you need in a field-ready instrument .....	4
Gain confidence in your measurements with benchtop performance in a handheld instrument.....	5
Increase productivity with the task planner.....	6
N934xC HSA features.....	7
Installation, verification, and maintenance of wireless communication systems .....	8
Identifying interference .....	9
Monitoring signals remotely .....	10
Locating sources of unwanted or unexpected signals .....	11
Site survey and mapping .....	12
Measurement capabilities.....	13
Accessories .....	15

## Field Testing Just Got Easier

*Wireless communication systems are ubiquitous. From military, law enforcement, or entertainment to medical, industrial, or broadcast industries we rely on these systems to transfer strategic information where it's needed. Keeping these systems up and running at optimum performance is no easy task—until now.*

## The N934X HSA



Key specs and functions	N9344C	N9343C	N9342C	N9340B
Maximum frequency	20 GHz	13.6 GHz	7 GHz	3 GHz
Display average noise level (DANL), normalized to 1 Hz	-155 dBm	-155 dBm	-164 dBm	-158 dBm
Phase noise	-89 dBc at 30 kHz -119 dBc at 1 MHz	-89 dBc at 30 kHz -119 dBc at 1 MHz	-89 dBc at 30 kHz -119 dBc at 1 MHz	-87 dBc at 30 kHz -120 dBc at 1 MHz
TOI	15 dBm	12 dBm	10 dBm	10 dBm
Full span sweep time	< 0.9 s	< 0.7 s	< 0.4 s	< 0.3 s
Tracking generator	7 GHz	7 GHz	7 GHz	3 GHz
Autotune	Yes	Yes	Yes	No
PowerSuite	Yes	Yes	Yes	Yes
Spectrogram display, record and playback	Yes	Yes	Yes	Yes
AM/FM and ASK/FSK modulation analysis	Yes	Yes	Yes	Yes
Cable and antenna test	No	No	Yes	No
Internal GPS receiver and antenna	Yes	Yes	Yes	No
Task planner	Yes	Yes	Yes	No
Channel scanner	Yes	Yes	Yes	No
Security features	Yes	Yes	Yes	No
USB power sensor support	U2020 X-series U2000 Series	U2020 X-series U2000 Series	U2020 X-series U2000 Series	U2000 Series
Weight with battery	3.6 kg/7.9 lbs	3.6 kg/7.9 lbs	3.6 kg/7.9 lbs	3.5 kg/7.7 lbs
Dimensions (W x H x D)	318 mm x 207 mm x 69 mm (12.5" x 8.2" x 2.7")	318 mm x 207 mm x 69 mm (12.5" x 8.2" x 2.7")	318 mm x 207 mm x 69 mm (12.5" x 8.2" x 2.7")	318 mm x 207 mm x 69 mm (12.5" x 8.2" x 2.7")
Battery life	3.5 hours	3.5 hours	4 hours	4 hours



*MIL PRF 28800 Class 2 compliant to work in rugged, outdoor environments*



## Field testing just got easier

If you are making measurements in the field, the Keysight Technologies, Inc. N934X handheld spectrum analyzer (HSA) family makes your job easier. They've got the features you need for operating in tough field environments, and their measurement performance gives you confidence the job's been done right. The HSAs let you automate routine tasks to save time and ensure consistent results. Field testing just got easier with the Keysight N934X HSAs.

- Get the features you need in a field-ready instrument
- Gain confidence in your measurements with benchtop performance in a handheld instrument
- Optional task planner reduces test setup time by 95%, delivers test automation and consistency, and makes it easy to capture test results, generate reports and share task plans with others

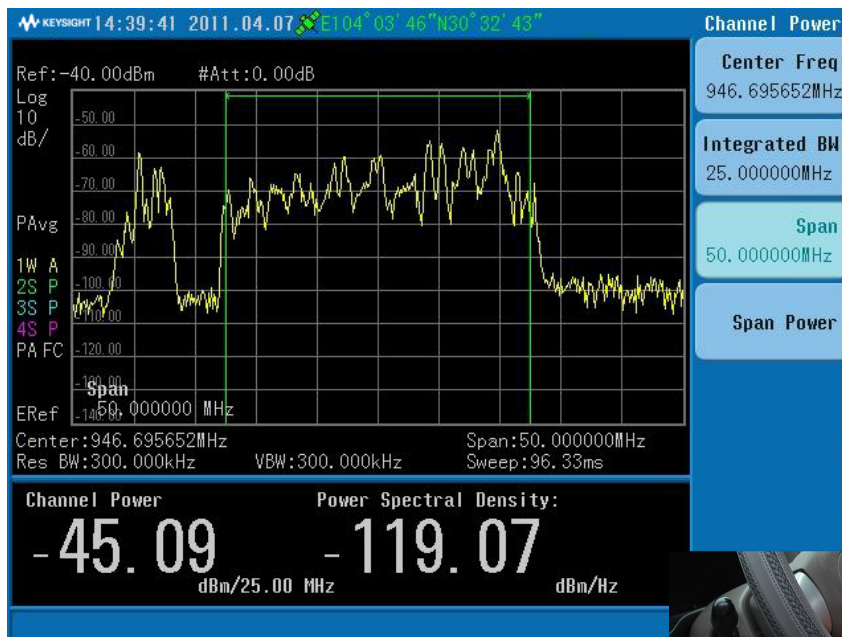


For more details, please visit  
[www.keysight.com/find/hsa](http://www.keysight.com/find/hsa)

## Get the features you need in a field-ready instrument

When you're in the field, you need equipment that will stand up to the challenges you face. Keysight's HSAs are durable and go anywhere the job takes you—they provide the features you need to make your job easier once you're there.

- Rugged design, without fans or vents, for tough field environments
- Clear screen viewing—day and night
- Optional built-in GPS receiver and GPS antenna
- Optional applications for interference analysis and spectrum monitoring
- Flexible remote control via USB/LAN. Send SCPI commands through telnet/socket connection



Optional built-in GPS receiver and internal antenna is exclusive to Keysight HSAs and supplies precise location information

*Dedicated HSA applications make monitoring spectrum and analyzing interference faster and easier*



## More reasons to take Keysight HSAs with you to the field

- **Light-weight**  
Just 3.6 kg/7.9 lbs with battery
- **Backlit keys**  
Ideal for dark-location data entry
- **Spaced keypad**  
Easily operate wearing work gloves
- **Upper and lower limit lines**  
Quickly determine pass/fail
- **MIL-PRF 28800F Class 2 compliance**  
Ensures durability and performance
- **Battery features**  
Up to 4 hours operating life, field-replaceable
- **Security features**  
Completely overwrites user data with one button press and enables/disables LAN or USB port with a password



For more details, please visit [www.keysight.com/find/hsa\\_backgrounder](http://www.keysight.com/find/hsa_backgrounder)

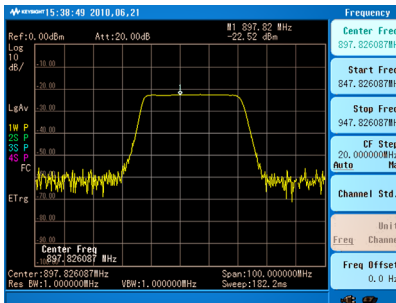
## Gain confidence in your measurements with benchtop performance in a handheld instrument

Having confidence in your measurements is critical, especially when you work in the field. Now you can take the accuracy and reliability of a benchtop spectrum analyzer with you in an HSA. In addition to field rugged features the N934X HSAs offer some of the industry's best performance in a handheld spectrum analyzer.

- Best-in-class RF performance:
  - 164 dBm typical DANL (normalized to 1 Hz), minimum sweep time < 2 ms
- Autotune
- Powerful one-button measurements in power suite for measuring channel power, occupied bandwidth, adjacent channel power ratio, and spectrum emission mask
- Measure filter, amplifier, cable, and antenna with optional built-in tracking generator and VSWR bridge
- Coverage test, interference analysis, band clearance, and spectrum monitoring with optional channel scanner and spectrum monitor
- Optional AM/FM/ASK/FSK modulation analysis, and time-gated sweep
- High-accuracy peak and average power measurements with Keysight USB power sensors



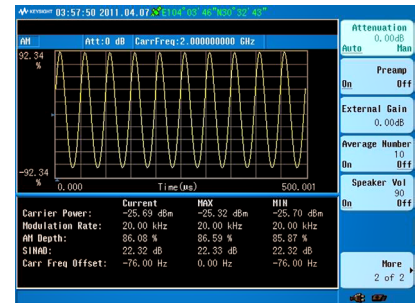
Optional U2020 X-series USB peak and average power sensor support



Optional built-in tracking generator makes it easy to test RF components like filter and amplifier in the field



For more details, please visit  
[www.keysight.com/find/N9344C](http://www.keysight.com/find/N9344C)  
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[www.keysight.com/find/N9342C](http://www.keysight.com/find/N9342C)  
[www.keysight.com/find/N9340C](http://www.keysight.com/find/N9340C)



Optional AM/FM modulation analysis helps you reliably characterize signal quality

## Performance comparison of microwave ESA models to handheld spectrum analyzers

	N9344C HSA	N9343C HSA	E4408B ESA-L	E4407B ESA-E	E4405B ESA-E
Maximum frequency	20 GHz	13.6 GHz	26.5 GHz	26.5 GHz	13.2 GHz
DANL at 13 GHz/18 GHz (10 Hz RBW)	-145/-141	-145/NA	-134/-134	-134/-134	-134/NA
Phase noise at 30 kHz/1 MHz (dBc/Hz)	-89/-119	-89/-119	-106/-120	-110/-125	-110/-125
TOI (dBm)	15	12	7.5	12.5	12.5
Weight with battery*	3.6 kg (7.9 lbs)	3.6 kg (7.9 lbs)	17.1 kg (37.7 lbs)	17.1 kg (37.7 lbs)	17.1 kg (37.7 lbs)

\* The weight for the ESA does not include a battery. This unit operates on AC power only.

## Free PC software comes with each N934X HSA

With a user-friendly interface for developing task plans and providing easy-to-use remote control functionality of HSAs, this software also supplies other useful capabilities:

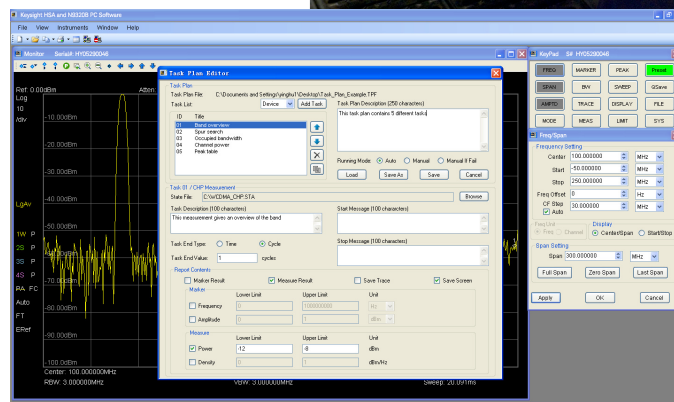
- Display and control the HSAs simultaneously. Support spectrum scan, power suite, spectrogram, and cable and antenna test
- Send files to the HSA from a PC or transfer files from the HSA to a PC
- Create channel standard, amplitude correction, limit, and task plan files
- Capture the HSA screen when it is connected to a PC
- Export trace data to a .csv file, or a .kml file, for mapping applications like Google Earth and MapInfo
- Edit and export antenna table file for field strength measurement
- Generate measurement reports for printouts

## Increase productivity with the task planner

The N9342C, N9343C, and N9344C feature an optional task planner that reduces test setup time by 95%, delivers test automation and consistency, and makes it easy to capture test results, generate reports, and share task plans with others.

- Compile multiple measurement set-ups into a single task plan
- Display customized pre-measurement instructions on screen
- Create task plans from previously saved measurements with free, easy-to-use PC software
- Copy task plan files to multiple HSAs via a LAN or USB flash drive
- Initiate test plan measurements sequentially and automatically

*Portable task plans leverage knowledge of senior technicians, improving the productivity of less experienced field personnel*



Task plans are easy to construct and adjust with PC software

For more details, please visit [www.keysight.com/find/taskplanner](http://www.keysight.com/find/taskplanner) and read the application note *Streamlining Field Test with Task Planner* <http://literature.cdn.keysight.com/litweb/pdf/5990-6041EN.pdf>

## N934xC HSA features <sup>1</sup>

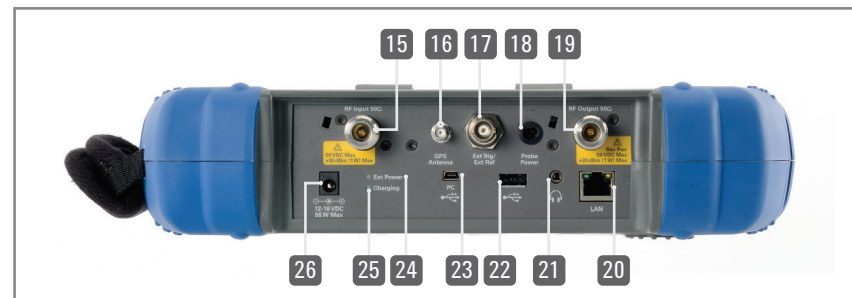
### No. Caption

- 1 168-mm (6.6-in) TFT display
- 2 Light sensor
- 3 Speaker
- 4 Softkeys
- 5 Knob
- 6 Arrow keys
- 7 Alphanumeric keys
- 8 ESC/Bksp
- 9 Peak/Marker
- 10 Enter
- 11 Shift
- 12 Preset
- 13 Function keys
- 14 Power switch
- 15 RF IN connector (50 Ω)
- 16 External GPS antenna connector
- 17 EXT TRIG IN/REF IN (BNC, female)
- 18 Probe power
- 19 RF OUT connector
- 20 LAN interface
- 21 Headphone jack
- 22 USB interface (host)
- 23 USB interface (device)
- 24 LED indicator (external power connected)
- 25 LED indicator (charging)
- 26 DC IN
- 27 Fanless design
- 28 Easle rest
- 29 Easy-grip hand strap
- 30 Replaceable batterypack

## Front panel



## Top



## Rear panel



1. The N9340B keypad design is slightly different and its picture can be accessed at [www.keysight.com/find/N9340B](http://www.keysight.com/find/N9340B)

## Ideal for any industry

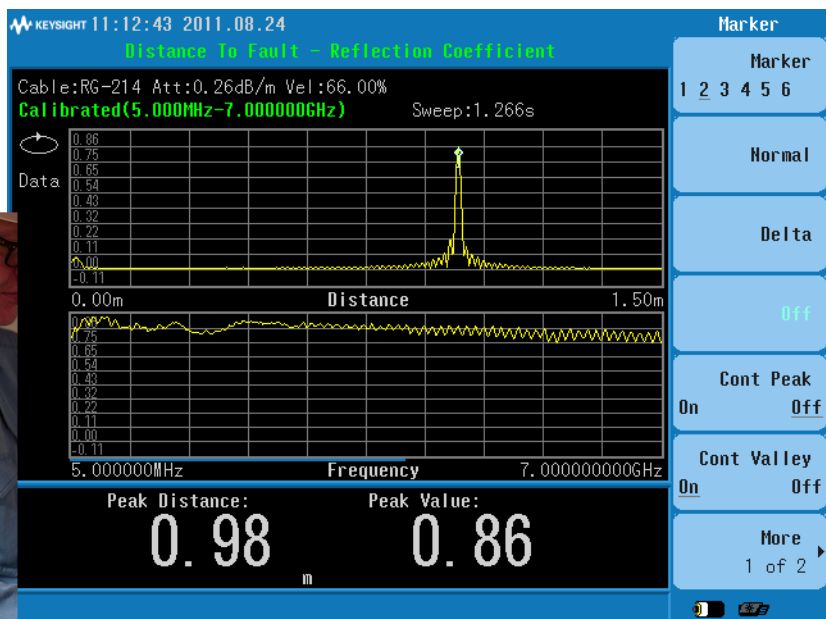
- Military
- Law enforcement
- Entertainment
- Medical
- Industrial
- Broadcasting
- Telecommunications
- Security and monitoring agencies
- Aerospace
- Utility smart grid networks
- Private mobile radio systems

## Installation, verification, and maintenance of wireless communication systems

While wireless communication systems may vary in modulation types and frequency bands, these systems share several common elements with respect to their installation, verification, and maintenance.

- Identifying interference
- Monitoring remote signals
- Testing cables and antennas
- Locating signal sources
- Conducting a site survey
- Measuring filters and amplifiers

That's why Keysight's N934X HSAs are feature-packed, general purpose signal analyzers, versatile enough to help you across the array of functions you perform in the field—before, during, and after the installation of your communication systems.



Optional cable and antenna test function offers a built-in VSWR bridge to measure cable loss, return loss, and distance-to-fault (exclusive to the N9342C HSA)

One-button-initiated measurements automate error-free data capture helping you quickly and consistently gather data



For more details, please download the N9342C/N9343C/N9344C application notes at [www.keysight.com/find/hsa](http://www.keysight.com/find/hsa)

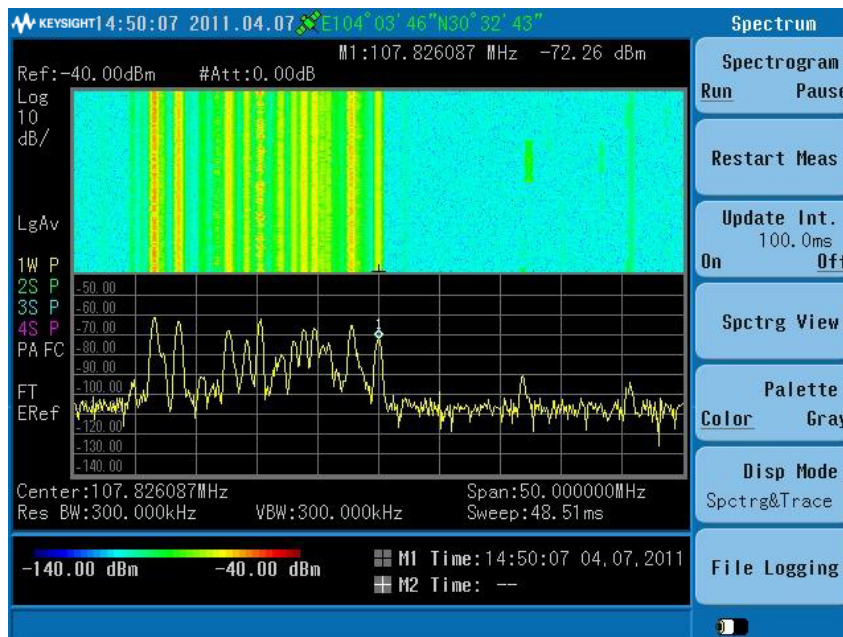


For more details, please watch the HSA demonstration guide video at [www.keysight.com/find/hsa-videos](http://www.keysight.com/find/hsa-videos)



## Identifying interference

Whether it's created by nature or man-made, intentional or inadvertent, signal interference means restoring communication integrity is the top priority. For any type of communication system—voice, video, or data—identifying and analyzing the source of interference is predicated on getting accurate, reliable results. Now you have confidence provided by a benchtop signal analyzer in a form factor that fits in your hand. That assurance helps you quickly eliminate the possibility of system malfunctions, isolate interference timing, repetition, and duration patterns, and characterize the interfering signal so that you can identify and mitigate it. All of this allows you to restore system quality quickly.



Optional spectrogram displays three dimensions of the spectrum: frequency, amplitude and time



Best-in-class DANL allows users to detect even small, noise-like signals

Keysight's economically-priced HSA family offers a variety of features that make identifying interference faster, easier, and more reliable:

- Two spectrogram markers display frequency, amplitude, and time information
- Audio alerts indicate signal strength in a specified frequency range
- Fast sweep speeds and triggering support location of bursted or intermittent signals
- Optional spectrogram display, record, and playback features create a powerful analysis tool for understanding spectrum
- One-button shortcut that adjusts the HSA for best sensitivity
- An AM/FM tune and listen feature for listening to interfering AM/FM analog signals
- Up to four traces can be simultaneously displayed with various detectors, including MAX and MIN hold
- Optional built-in tracking generator measures two-port transmission of filter and amplifiers to validate your system is working correctly before you begin evaluating sources of interference



For more details, please download the application notes at [www.keysight.com/find/hsa](http://www.keysight.com/find/hsa)

## Monitoring signals remotely

When interference is intermittent, the capability to perform remote system monitoring is valuable. Using the N934X spectrum analyzer as a sensor, you have the ability to start and stop data collection at predetermined dates and times. With the ability to monitor spectrum spanning large areas, in inhospitable or remote locations, or collect data for an extended period of time, the Keysight HSAs are ideal for use by government security agencies and military agencies, in addition to private sector installations, such as commercial broadcast.



*The spectrogram feature allows user to play back data records to view events that occurred earlier in the time record.*



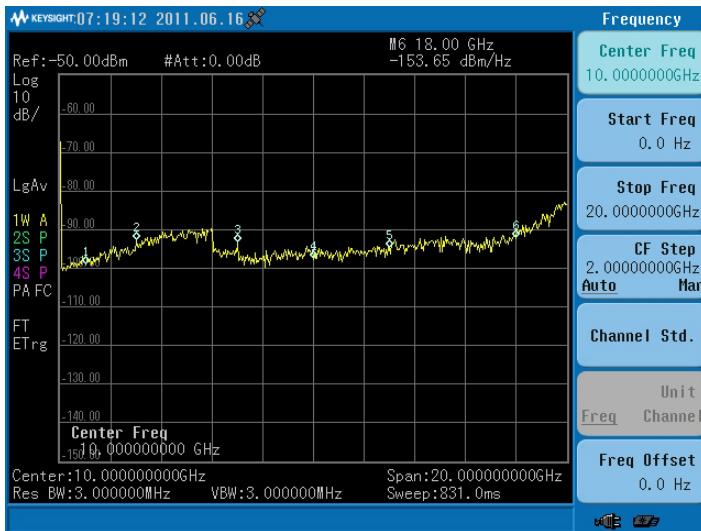
*Easy to set up and export traces via LAN or USB*

Keysight N934X HSAs offer a variety of features that make remote signal monitoring faster, easier, and more reliable:

- Control over LAN allows remote control and data transfer
- USB port allows for convenient data storage to USB memory stick or other storage device
- Optional spectrogram records up to 1,500 traces to capture events for later diagnosis
- Optional channel scanner displays and records channel power for up to 20 different channels
- Fast sweeps capture bursted or intermittent rogue signals
- AC and DC power operation enables use in a variety of locations
- Easy export of data and traces via LAN or USB



*For more details, please download the application notes at [www.keysight.com/find/hsa](http://www.keysight.com/find/hsa)*



Best in class DANL



Optional backpack, neck strap, and carrying case provide added convenience in the field

## Locating sources of unwanted or unexpected signals

Protecting your system spectrum from unwanted or unexpected signals is essential. A multi-function spectrum analyzer is indispensable for expediently pin-pointing an undesired source. The Keysight HSAs have the spectrum analyzer features you need in a convenient, portable package. These capabilities are particularly important to government agencies, the military, and industries needing to quickly identify the source of an RF or microwave signal.

Keysight's economically-priced HSA family offers a variety of features that makes locating sources of signals faster, easier, and more reliable:

- Fast sweep speeds and triggering, along with directional antenna, supports location and direction of bursted, intermittent, or continuous signals
- Narrow RBW and best-in-class dynamic range help find small hidden signals in the presence of large ones
- Optional internal GPS receiver and antenna provides precise location information and automatically stamps the GPS coordinates on each trace
- Optional directional antenna expedites signal location and audio alert indicates signal location
- Optional backpack, neck strap, and carrying case enable hands-free operation of the HSA allowing user to hold a directional antenna and communication device when searching for signals
- Multiple markers and the marker table simplify simultaneous tracking of multiple signals of interest



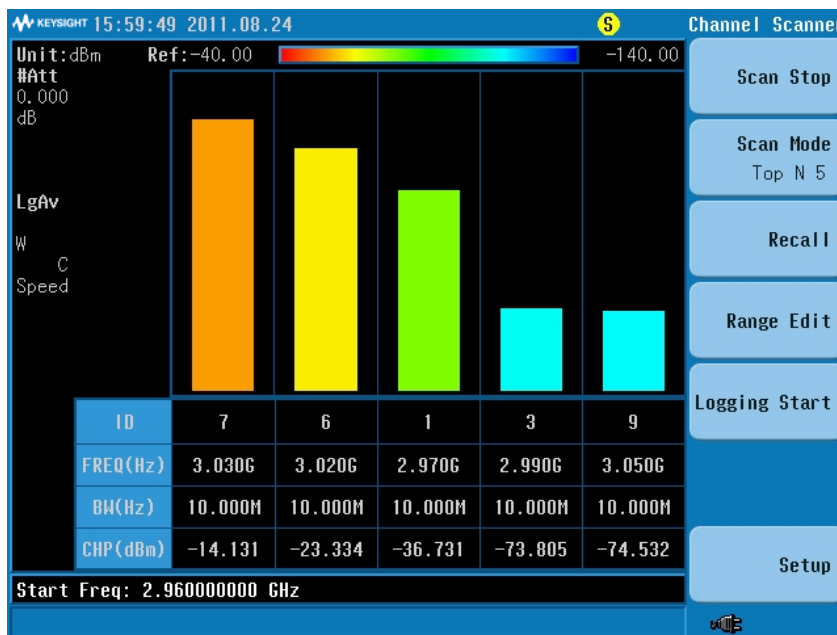
For more details, please download the application notes at [www.keysight.com/find/hsa](http://www.keysight.com/find/hsa)

# Site survey and mapping

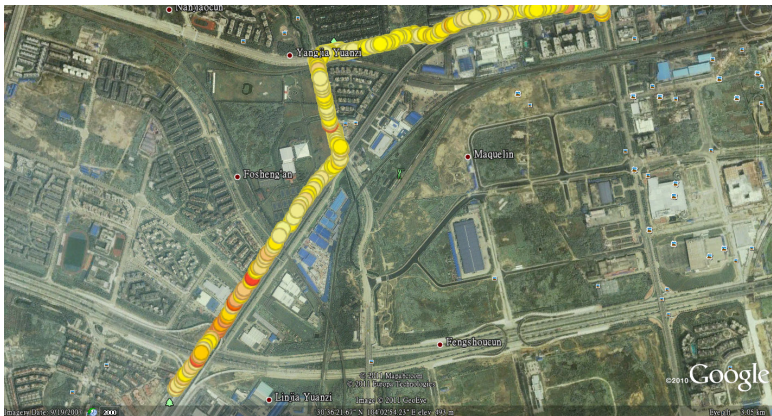
Prior to the installation of new cellular or wireless communication networks, radio station towers, WiFi networks, smart grid networks, hospital RF systems, private mobile radio systems, or military communication systems, site surveys are critical. When your job is to develop a spectral baseline for the area, an HSA in the palm of your hand makes it easier for you to identify multipath effects, noise floor level, line-of-sight opportunities, or the need for spectrum clearing. Keysight's HSAs automatically record GPS coordinates, make field strength measurements in dBμV/meter, record the results, and have the ability to identically perform these functions for every sector. The capability to quickly download measured data to generate a field strength map report that documents the spectral characteristics of the area is an added bonus.

The Keysight HSA family offers the features you want to make site doing site surveys and mapping faster, easier, and more reliable:

- The economically-priced Keysight HSAs offer the performance of a benchtop spectrum analyzer in a handheld, portable, rugged package
- Support of antenna factors and field strength measurements provide meaningful results
- The internal GPS receiver automatically stamps the GPS coordinates on each trace
- The task planner allows the measurement process to be programmed into the instrument and enables measurements to be made easily and repeatably, even by inexperienced users
- User keys allow one-button access to your seven favorite measurement setups
- Easy export of data and traces via LAN or USB memory stick allows fast integration of measurement data with commonly-used personal computer programs (such as Word, Excel, etc.)
- One-button field strength measurements ensures accuracy
- Customer can select the pre-defined radio standards such as GSM, W-CDMA, LTE and WiMAX, or create their own radio standards



HSA Channel scanner option allows the user to easily measure channel power of multiple channels and export data for mapping applications like Google Earth and MapInfo



For more details, please download the application notes at [www.keysight.com/find/hsa](http://www.keysight.com/find/hsa)



## Measurement capabilities

Description	Option	Additional information
Swept-tuned and FFT	Standard	Allows selection of swept-tuned or FFT to be made manually or defer to the mode determined by the HSA. <i>Note: FFT mode can be turned on when RBW is set to 30 kHz or lower</i>
Autotune	Standard	Automatically find, tune, and zoom in on the signal. Not available on N9340B
Trace math	Standard	Provides true power calculations with results displayed in dBm. Not available on N9340B
Simultaneous detectors	Standard	Features a total of four traces and support simultaneous detectors. Four different detectors can be used on four different traces in a single sweep
Peak table	Standard	Displays a list of up to 10 signal peaks from the selected trace. Exporting the peak table to .csv file is supported. Not available on N9340B
AM/FM tuner	Standard	Supplies AM/FM demodulated audio that can be heard with the internal speaker or the provided earphone. Speaker volume and demodulation delay time can be adjusted to meet your specific needs
Marker zoom-in/out	Standard	Moves the marker to the signal of interest, zooms in to see more details with one button push, and zooms out to see the whole frequency band. Not available on N9340B
Noise marker	Standard	Measures noise level in dBm/Hz or dBuV/Hz
Marker logging	Standard	Records the marker readout over time to a .csv file. Location information can be tagged if GPS is turned on. Not available on N9340B
Band power	Standard	Measures both power and power spectral density in a specified channel bandwidth
Channel power	Standard	Computes and displays the power between the reference marker and the associated delta marker. Results can be displayed in a bar chart, or a meter graphical user interface (GUI). An RRC filter can be set to provide matched filtering
Adjacent channel power ratio (ACPR)	Standard	Finds the transmitter's potential for interfering with a receiver on an adjacent (upper or lower) channel. Up to 6 pairs of adjacent channels can be set up. An RRC filter can be set to provide matched filtering
Occupied bandwidth (OBW)	Standard	Determines the band of frequencies that contain a specified percentage of the total power within the measurement span
Channel table	Standard	Includes the major wireless communication standards such as GSM, CDMA, W-CDMA, LTE, WiMAX, etc. The channel table can also be customized
Mapping	Standard	Captures data with marker logging, or the optional channel scanner, and exports data files (.csv and .kml) to use with mapping applications like Google Earth and MapInfo. Not available on N9340B
U2020 X-series USB power sensor support	Option PWP	Makes peak power measurements with Keysight U2020 X-series USB peak and average power sensor. Not available on N9340B
U2000 series USB power sensor support	Option PWM	Makes true average power measurements with Keysight U2000 Series USB power sensors. Standard on N9340B
Task planner	Option TPN	Reduces test setup time by 95%, delivers test automation and consistency, and makes it easy to capture test results, generate reports, and share task plans with others. Not available on N9340B

## Measurement capabilities (continued)

Description	Option	Additional information
Spectrum monitor and interference analyzer	Option SIM	Monitors the spectrum and identifies interfering signals arising from unwanted or unexpected transmissions. Allows recording and playback of captured traces
Tracking generator	Option TG7/TG3	Measures two-port transmission of filter, amplifiers, and other devices
Built-in GPS receiver and antenna	Option GPS	Provides precise location information (longitude, latitude, and altitude). The internal GPS antenna provides field convenience. Improves frequency accuracy to $\pm 50$ ppb after GPS lock. Not available on N9340B
Security features	Option SEC	Protects your confidential data with low-level, non-recoverable reformat of the whole user data memory chip and enables/disables USB or LAN port with a password. Not available on N9340B
AM/FM modulation analysis	Option AMA	Shows the modulation metrics, including: carrier power, modulation rate, AM depth/FM deviation, SINAD, and carrier frequency offset
Time-gated spectrum analysis	Option TMG	Obtains spectral information about signals in the frequency domain that are separated in the time domain using an internal or external trigger signal to separate these time-varying signals. Not available on N9340B
ASK/FSK modulation analysis	Option DMA	Shows the modulation metrics you need, including carrier power, carrier frequency offset, ASK modulation depth/index, and FSK deviation. View the demodulated signal in any of four formats: waveform, symbol, error, and eye diagram
Channel scanner	Option SCN	Scans simultaneously a maximum of 20 different channels and calculates each channel's power and displays the results in a bar or time chart. Customer can select the pre-defined radio standards such as GSM, W-CDMA, LTE and WiMAX, or create their own radio standards. Supports three scan modes: top N, bottom N, and list. Saves results in .csv or .kml format for data mapping applications like Google Earth and MapInfo. Not available on N9340B
Cable and antenna test	Option CA7	Option exclusive to the N9342C HSA. Provides VSWR, return loss, and reflection coefficient measurements, one-port cable loss measurement, and distance-to-fault (DTF) measurement. Offers dual view of DTF and frequency domain. Requires Option N9342C-TG7 and mechanical calibrator N9311X-201
Baseband input	Option BB1	Option exclusive to the N9342C HSA. Offers low frequency performance enhancement
AM/FM IBOC measurement	Option IBC	Option exclusive to the N9340B HSA. Enables the N9340B to easily make in-band on-channel (IBOC) HD radio measurements. Built-in FCC and NRFC masks are provided for quick IBOC compliance measurements of AM and FM transmitters. An auto-tune function is also featured to allow the user to capture and measure the signal of interest with the push of a single button
xDSL measurement	Option XDM	Option exclusive to the N9340B HSA. Enables the N9340B to make interference measurements on DSL lines supporting ADSL, ADSL2+, VDSL formats. The analyzer's low Displayed Average Noise Level (DANL) and ADSL and VDSL spectral masks with pass/fail test provide quick, easy and accurate network measurement results. <b>Note:</b> ADSL current probe is required to use the N9340B spectrum analyzer to make DSL measurements

## Accessories

These accessories are available for the N9340B, N9342C, N9243C, and N9344C.



### Antenna



Antenna	Frequency range	Antenna gain	Weight	Dimension	Other information
N9311x-500	70 MHz to 1,000 MHz	NA	65 g/2.3 oz	113.5 cm/3.7 ft (full length), 19.5 cm/7.7 in (retracted), 10 stages	180 degrees tilt angle adjustable, telescopic whip antenna
N9311x-501	700 MHz to 2,500 MHz	NA	70 g/2.5 oz	210 mm x 20 mm/ 8.3 in x 0.8 in	Omni-directional
N9311x-504	700 MHz to 4 GHz	4 dBi	270 g/9.5 oz	340 mm x 200 mm x 25 mm/ 13.4 in x 7.9 in x 1 in	Logarithmic-periodic
N9311x-508	680 MHz to 8 GHz	5 dBi	250 g/8.8 oz	340 mm x 200 mm x 25 mm/ 13.4 in x 7.9 in x 1 in	Logarithmic-periodic
N9311x-518	680 MHz to 18 GHz	5 dBi	250 g/8.8 oz	340 mm x 200 mm x 25 mm/ 13.4 in x 7.9 in x 1 in	Logarithmic-periodic

## Accessories (continued)



### Bandpass filter

Bandpass filter	3-dB passband	Rejection	Insertion loss	VSWR
N9311x-550	814 to 850 MHz	≥ 36 dBc at 740 MHz ≥ 36 dBc at 915 MHz	≤ 0.5 dB	≤ 1.5
N9311x-551	880 to 915 MHz	≥ 35 dBc at 862 MHz ≥ 35 dBc at 932 MHz	≤ 1 dB	≤ 1.5
N9311x-552	1,707.5 to 1,787.5 MHz	≥ 35 dBc at 1,550 MHz ≥ 35 dBc at 1,925 MHz	≤ 0.4 dB	≤ 1.5
N9311x-553	1,845 to 1,915 MHz	≥ 35 dBc at 1,770 MHz ≥ 35 dBc at 1,986 MHz	≤ 0.6 dB	≤ 1.5
N9311x-554	1,910 to 1,990 MHz	≥ 35 dBc at 1,825 MHz ≥ 35 dBc at 2,070 MHz	≤ 0.6 dB	≤ 1.5

### Adapter

N9311x-545	N9311x-541	N9311x-540	N9311x-543	N9311x-542	N9311x-544	N9311x-546	N9311x-547
<ul style="list-style-type: none"> <li>Type-N(f) to SMA(m)</li> <li>DC to 12.4 GHz</li> </ul>	<ul style="list-style-type: none"> <li>Type-N(m) to SMA(f)</li> <li>DC to 12.4 GHz</li> </ul>	<ul style="list-style-type: none"> <li>Type-N(m) to BNC(f)</li> <li>DC to 2 GHz</li> </ul>	<ul style="list-style-type: none"> <li>Type-N(f) to BNC(m)</li> <li>DC to 4 GHz</li> </ul>	<ul style="list-style-type: none"> <li>Type-N(f) to 7/16 DIN(f)</li> <li>DC to 7.5 GHz</li> </ul>	<ul style="list-style-type: none"> <li>Type-N(f) to 7/16 DIN(m)</li> <li>DC to 7.5 GHz</li> </ul>	<ul style="list-style-type: none"> <li>Type N(f) to N(f)</li> <li>DC to 18 GHz</li> </ul>	<ul style="list-style-type: none"> <li>Type N(m) to 7/16 DIN(f)</li> <li>DC to 7.5 GHz</li> </ul>

### Cable



N9311x-580	N9311x-581	N9311x-582	N9311x-583	N9311x-585	N9311x-586
<ul style="list-style-type: none"> <li>Phase stable, 1.5 m</li> <li>Type-N(m) to N(m)</li> <li>DC to 18 GHz</li> </ul>	<ul style="list-style-type: none"> <li>Phase stable, 3 m</li> <li>Type-N(m) to N(m)</li> <li>DC to 18 GHz</li> </ul>	<ul style="list-style-type: none"> <li>1.5 m</li> <li>Type-SMA(m) to SMA(m)</li> <li>DC to 8 GHz</li> </ul>	<ul style="list-style-type: none"> <li>1.5 m</li> <li>Type-BNC(m) to BNC(m)</li> <li>DC to 1 GHz</li> </ul>	<ul style="list-style-type: none"> <li>Phase stable, 1.5 m</li> <li>Type N(m) to DIN(f)</li> <li>DC to 18 GHz</li> </ul>	<ul style="list-style-type: none"> <li>Phase stable, 1.5 m</li> <li>Type N(m) to N(f)</li> <li>DC to 18 GHz</li> </ul>

### Attenuator



Attenuator	Attenuation	Port	VSWR	Power rating	Length	Weight
N9311x-560	40 dB	N(m) to N(f)	DC to 4.0 GHz: 1.15 4.0 to 8.5 GHz: 1.2	10 W average	67.3 mm/2.7 in	0.085 kg/3 oz
N9311x-561	40 dB	N(m) to N(f)	DC to 4.0 GHz: 1.2 4.0 to 8.5 GHz: 1.3	50 W average	111.8 mm/4.4 in	0.28 kg/10 oz
N9311x-562	40 dB	N(m) to N(f)	DC to 4.0 GHz: 1.2 4.0 to 8.5 GHz: 1.3	100 W average	112.0 mm/4.4 in	1.5 kg/3.3 lb

### Calibrator

Calibrator	Type	Frequency range	Directivity	Impedance	Connector	Other
N9311x-201	Mechanical calibrator	DC to 7 GHz	42 dB	50 Ω	N(m)	3-in-1 OSL