Agilent N9340A Handheld Spectrum Analyzer

Technical Overview

Put the speed and performance of Agilent spectrum analysis in the hands of your engineers

Agilent Technologies

N9340A
Handheld Spectrum Analyzer

Know your spectrum

Regardless of whether you are handling military communications, a Wireless Service Provide (WSP), or involved with spectrum management you need to avoid intermittent communication. The N9340A provides you with a reliable, accurate and detailed picture of the spectrum over which you are working.

Optimize your test time versus accuracy

When you test, you need fast data capture to help locate and identify elusive, transient interference signals. That's why every N9340A spectrum analyzer has a truly fast sweep time. It requires less time to measure across the bandwidth, to obtain more reliable test results – and helps you achieve more for the same investment of time and money.

- Frequency range: 100 kHz to 3 GHz
- RBW: 30 Hz to 1 MHz in 1-3-10 sequence
- VBW: 3 Hz to 1 MHz
- SSB Phase noise: – 87 dBc at 30 kHz offset
- DANL: (10 MHz < fc ≤ 1.5 GHz)
  - –124 dBm
  - –144 dBm with preamp
- Sweep speed
  - 10 ms to 1000 s, span ≥ 1 kHz
  - < 120 ms at full span
- Amplitude accuracy: ±1.5 dB

Gain confidence in your test results

Spurious signals and noise are of great concern to all network users. A superior combination of low displayed average noise level (DANL) and single sideband (SSB) phase noise coupled with narrower resolution bandwidth (RBW) means your signal measurements are more reliable and you will have more confidence in your test results. The N9340A's low DANL and SSB phase noise helps you detect very low-level signals (spurs or noise) which are close to the carrier. You will avoid missing these difficult-to-identify signals, which would otherwise lead to an insufficient or even incorrect understanding of the spectrum.

Best resolution available

The N9340A's RBW is the narrowest in its class. The narrow 3 dB bandwidth of the analyzer ensures that it is even easier to identify, resolve, and measure two signals that are close together. Additionally, with a resolution filter shape-factor of less than 5, the N9340A has the ability to resolve close adjacent signals with unequal amplitudes.

Moreover, the narrow RBW means that the spectrum analyzer introduces minimal noise itself, helping to further reduce noise levels and improve DANL.

Superior sensitivity

With more wireless devices on the market requiring greater bandwidth usage, the ability to discriminate between different signals becomes more challenging. It's under such demanding conditions that the superior performance of an N9340A analyzer proves its worth. The N9340A has one of the best sensitivity and selectivity specifications. The DANL is –124 dBm with preamplifier off, or –144 dBm with preamplifier (30 Hz RBW, 10 MHz < fc ≤1.5 GHz). The phase noise is –87 dBc at 30 kHz offset.

An optional preamplifier with 20 dB gain further improves analyzer sensitivity.

Speed at your fingertips

Spectrum bandwidth is a finite resource, therefore spectrum usage requires management. Most regulatory authorities responsible for administering frequency allocation require service suppliers and network operators to perform routine monitoring of signal power and transmission frequency stability.

An important application of spectrum analysis is identifying interfering signals. These often arise from illegal transmissions, and may cause impairment of services for authorized users, often resulting in financial loss.

It is possible, these interfering signals could restrict critical communications of civil aviation and emergency services, which could potentially jeopardize lives.

Some sources of interference are more intermittent than regular transmissions. Such spurious signals can be hard to eliminate because it is difficult to identify and isolate them.

With an impressively fast sweep – a minimum non-zero-span sweep time of 10 ms – an Agilent N9340A handheld spectrum analyzer increases the probability of you detecting and capturing spurious or transient signals.

Applications

- **Aerospace and defence: military communications installation and maintenance**
- **Wireless service providers: wireless network installation and maintenance**
- **Microwave and satellite links maintenance**
- **TV and broadcasting**
- **Regulatory authority spectrum management**

N9340A superior performance improves your productivity:

- **Fast sweep speed**
- **Superior sensitivity: lowest DANL**
- **Best resolution available**

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Get essential functionality and easy - to - use features right at your finger tips

Safety at high input levels

The N9340A can be used for most cases. However, should the power level exceed 33 dBm, the input protection switch activates to protect the instrument from damage.

The maximum safe input level is > +33 dBm for 3 minutes at most (50 VDC maximum).

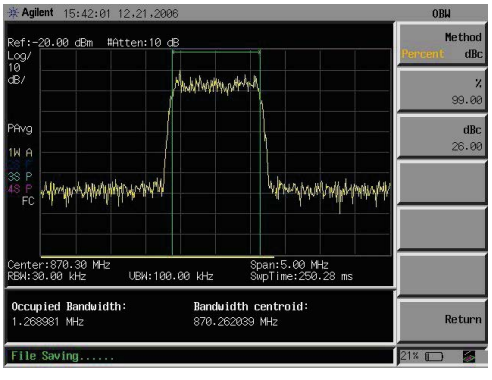
One-button measurement

The Agilent N9340A supports one-button measurements of occupied bandwidth, channel power and adjacent channel power ratio. This virtually eliminates set-up time in the field.

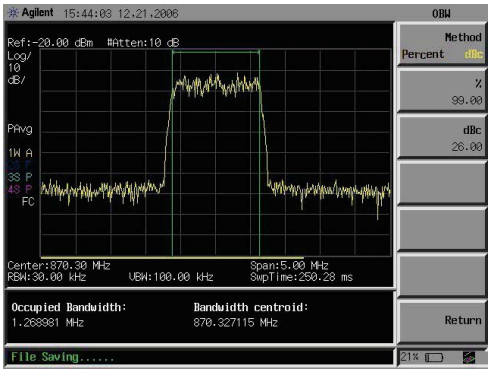
Occupied Bandwidth (OBW)

An occupied bandwidth measurement integrates the power of the displayed spectrum and puts one pair of vertical lines at the frequencies between which the interested signal is contained.

An N9340A spectrum analyzer supports two ways to measure the occupied bandwidth, in percentage or in dBc.



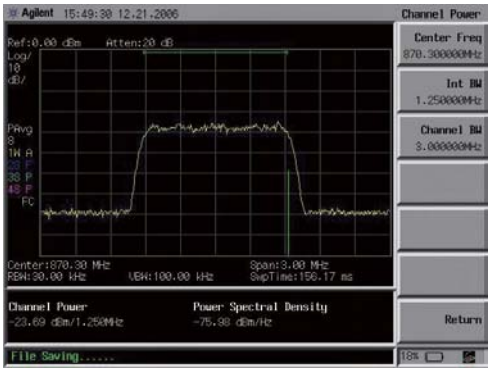
The occupied bandwidth is measured in percentage.



The occupied bandwidth is measured in dBc.

Channel Power

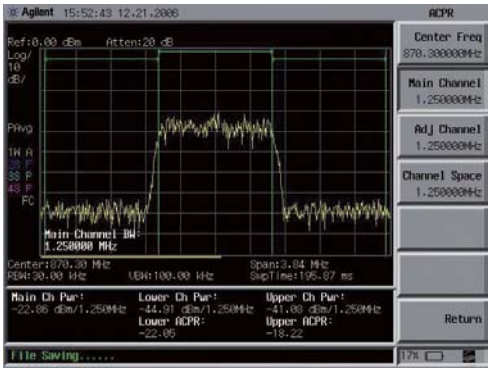
Use channel power to measure both power and power spectral density in a user-specified channel bandwidth. One pair of vertical lines on the display indicates the edges of the channel bandwidth.



It is quick and easy to set center frequency, integration bandwidth, and channel bandwidth on the panel.

Adjacent Channel Power Ratio (ACPR)

Wireless service providers need to minimize the interference caused by power leaking into adjacent transmit channels. Adjacent channel power ratio measurements help in the checking of signal spectrums and in identifying and controlling sources of interference.



Center frequency, main channel bandwidth, adjacent channel bandwidth, and channel space can be set on the panel.

N9340A optimizes usability for field use:

- **Long battery life**
- **Transflective LCD**
- **Modern USB connectivity**
- **Multi-language UI**
- **Rugged design for field use**

Simply gather measurement data in the field for later later inclusion into reports in a PC environment. USB memory stick makes it easy to transfer files of stored screen shots , measurement data and settings. Then, generate edit and print the report at a more suitable time and location.

Long battery life

Testing in the field often means operating away from main power supplies. Batteries need to have the longest possible operating time before recharging. You'll find an Agilent N9340A analyzer has superior power management, providing an impressive 4-hour battery operating time.

It's easy to operate for an entire day in the field. There is an advanced, in-built battery management system. This helps provide a useful extended battery operating time of typically four hours: with just one battery and a spare, or a quick recharging from any vehicle using the supplied auto-lighter charger, you are able to operate for an entire day away from a mains power source.

Modern USB connectivity

Detailed analysis of results in the field is not always convenient or possible. You will need to store the results for later investigation. Connecting to a PC is simple and data transfer is fast via the USB cable.
In test lab and bench-top use, the USB interface and PC software also support PC remote control of Agilent's N9340A spectrum analyzer. This allows appropriate use of a large format PC screen. Windows®-compatible software provides automatic storage of selected data and graphics.

Multi-language user interface

Users around the world will find operating Agilent N9340A is easy. In addition to English, there are ten more user-selectable, on-screen languages, including Chinese, Japanese, Korean and a number of European languages (see Specifications – General).

Tough enough for the military

You will find that this Agilent analyzer is tough enough for military applications. Apart from its generally compact and rugged construction, the large rubberized grips wrap around both ends, providing additional robust protection from rough handling. The sealed keypad and screen are moisture resistant and dust proof. Of course, there is a protective carrying case that provides further security for your analyzer.

See scans clearly

As with all the newest Agilent portable field testers, operating under challenging bright sunlight or other difficult natural lighting conditions is no problem. The larger than usual 7.2-inch (18.3 cm), transflective color LCD provides a superior high-resolution display with a clear, bright trace. There is no need to ensure you operate in the shade.

* Windows is a U.S. registered trademark of the Microsoft Corporation.

N9340A
Handheld
Spectrum Analyzer

Specifications

Specifications apply under the following conditions:

- *After a warm-up time of 30 minutes, and at least two hours of operation or storage at operating temperature*
- *Within a valid calibration period*
- *Data with no given tolerances are typical values only. Data designated as 'typical' is not covered by the product warranty.*

Frequency

Frequency

		Supplemental information
Frequency range :	100 kHz to 3 GHz (tunable to 9 kHz)	AC coupled

Internal 10 MHz frequency reference accuracy

Aging rate :	± 1 ppm / year	
Temperature stability :	± 2 ppm	0 °C to 30 °C, 30 °C to 50 °C in addition +2 ppm / 10 °C

Frequency readout accuracy with market (Start, stop, center, marker)

Marker resolution :	(frequency span) / (number of sweep points – 1)
Uncertainty :	± (frequency indication × frequency reference uncertainty +1% × span + 20% × resolution bandwidth + marker resolution+1 Hz)

Frequency reference uncertainty = (aging rate **x** *periond of time since adjustment + temperature stability)*

Marker frequency counter

Resolution:	1 Hz	
Accuracy:	± (marker frequency × frequency reference uncertainty + Counter resolution)	RBW/ span ≥ 0.02; marker level to displayed Noise level > 25 dB; frequency offset 0 Hz

Frequency reference error = (aging rate **x** *periond of time since adjustment + temperature stability)*

Frequency span

Range :	0 Hz (zero span), 1 kHz to 3 GHz
Resolution :	1 Hz
Accuracy :	± span / (sweep points – 1)

SSB phase noise

Carrier offset :		
30 kHz	< – 87 dBc (1 Hz)	20 °C to 30 °C; *Typical*
100 kHz	< – 100 dBc (1 Hz)	fc = 1 GHz; RBW 100 Hz; VBW 10 Hz; RMS detector
1 MHz	< – 120 dBc (1 Hz)	

Resolution bandwidth (RBW)

– 3 dB bandwidth :	30 Hz to 1 MHz	1- 3 - 10 sequence
Accuracy :	± 5%	*Nominal*
Resolution filter shape factor :	< 5 : 1	60 dB / 3 dB bandwidth ratio;*Nominal;* Digital, approximately Gaussian shape

Video bandwidth (VBW)

– 3 dB bandwidth :	3 Hz to 1 MHz	1- 3 - 10 sequence
Accuracy :	± 5%	*Nominal*

Amplitude

Measurement range

	Displayed average noise level (DANL) to +20 dBm
Input attnuator range:	0 to 51 dB, in 1 dB steps

Maximum safe input level

Average continuous power : ≥ + 33 dBm; 3 minutes maximum. *Norminal*

Input attenuator setting ≥ 20 dB (input protection switch active when input level> 33 dBm)

DC voltage : 50 VDC maximum

Displayed average noise level

Preamp off : Reference level ≤ – 50 dBm

100 kHz < f_c ≤ 1 MHz	<	– 90 dBm
1 MHz < f_c ≤ 10 MHz	<	– 110 dBm
f_c = 50 MHz		– 126 dBm *(Typical)*
10 MHz < f_c ≤ 1.5 GHz	<	– 124 dBm
1.5 GHz < f_c ≤ 3 GHz	<	– 117 dBm

Preamp on : Reference level ≤ – 70 dBm

100 kHz < f_c ≤ 1 MHz	<	– 115 dBm
1 MHz < f_c ≤ 10 MHz	<	– 128 dBm
f_c = 50 MHz		– 146 dBm *(Typical)*
10 MHz < f_c ≤ 1.5 GHz	<	– 144 dBm
1.5 GHz < f_c ≤ 3 GHz	<	– 136 dBm

RBW = 30 Hz; VBW = 3 Hz; input terminated 50 ohm; 0 dB attenuation; RMS detector; Trace average ≥ 40

Level display range

Log scale and units : 10 to 100 dB; ten divisions displayed; 1, 2, 5, 10 dB/ division.
dBm, dBmV, dBµV

Linear scale and units : 0 to 100% ; ten divisions displayed.
V, µA, mW, W

Sweep (Trace) points : 461

Marker level readout resolution :

Log scale 0.01 dB

Linear scale 0.01% of reference level

Detectors : Normal, Positive Peak, Sample, Negative Peak,
Log Power Average, RMS Average, Voltage Average.

Number of traces : 4

Trace functions : Clear / write; maximum hold; average;

Level measurement error : ±1.5 dB (excluding input VSWR mismatch)

0.5 dB, *Typical*

20 to 30 °C, peak detector, preamplifier off, input signal 0 dBm to –50 dBm, 20 dB input attenuation, frequency > 1 MHz, auto sweep time, RBW = 1 kHz, VBW = 1 kHz, trace average on to reduce noise

Reference level

Setting range : – 100 to + 20 dBm

Steps of 1 dB

Setting resolution :

Log scale 0.1 dB

Linear scale 1% of reference level

Accuracy : 0

Because reference level affects only the display not the measurement, it causes no additional error in measurement results from trace data markers

RF Input VSWR (at tuned frequency)

Attenuator setting 0 dB	< 1.8 : 1	10 MHz to 3.0 GHz, *Nominal*
Attenuator setting 10 dB	< 1.8 : 1	100 kHz to 10 MHz, *Nominal*
	< 1.5 : 1	10 MHz to 2.5 GHz, *Typical*
	< 1.8 : 1	2.5 GHz to 3.0 GHz, *Typical*
Attenuator setting 20 dB	< 1.6 : 1	100 kHz to 10 MHz, *Nominal*
	< 1.4 : 1	10 MHz to 3.0 GHz, *Typical*

Spurious response

Second harmonic distortion : (second harmonic intercept)	< –70 dBc	Mixer level = – 40 dBm
Third - order intermodulation : (third order intercept)	+ 10 dBm, *Typical*	Third-order intermodulation products; 2 x –20 dBm; reference level –10 dBm; center frequency 300 MHz; frequency separation 200 kHz
Input related spurious :	< –70 dBc	–40 dBm signal at input mixer, carry offest > 1 MHz.
Inherent residual response :	< –88 dBm	Input terminated and 0 dB RF attenuation, preamplifier off, reference level –30 dBm, f > 30 MHz, RBW ≤ 10 kHz

Sweep

Sweep time

Range :	10 ms to 1000 s	Span ≥ 1 kHz
	6 µs to 200 s	Span = 0 Hz (zero span)
Sweep mode :	Continuous; single	
Trigger source :	Free run; video; external	
Trigger slope :	Selectable positive or negative edge	
Trigger delay :		
Range	6 µs to 200 s	
Resolution	6 µs	

Front panel input / output

RF input

Connector and impedance :	Type -N female; 50 Ω	*Nominal*
VSWR :	< 1.5 : 1	10 MHz to 3.0 GHz, input attenuator ≥ 10 dB

10 MHz reference / External trigger input

Reference input frequency :	10 MHz	
Reference input amplitude :	0 to + 10 dBm	
Trigger voltage :	5 V TTL level (12.6 V, 150 mA maximum)	*Nominal*
Connector and output impendance :	BNC female; 50 Ω	*Nominal*

USB interface

Host connector and protocol :	A plug; Version 1.1
Device connector and protocol :	AB plug; Version 1.1

General

Display

Resolution :	640 x 480 pixels	
Size and type :	7.2 inch (183 mm) STN transflective; color display	

Languages

On-Screen GUI :	English, Simplified Chinese, Traditional Chinese, French, German, Italian, Japanese, Korean, Russian, Spanish, Portuguese.	

Power requirements and calibration

Voltage :	90 to 120 or 195 to 263 VAC; 47 to 63 Hz 12 to 18 VDC; < 25 W	Auto-ranging
Power consumption :	12 W	*Typical*
Battery :		
Operating time (fully charged battery)	4 hours 3 hours	Tracking generator off Tracking generator on
Charging time	3 hours	
Life time	300 to 500 charge cycles	
Warm-uptime :	30 minutes	
Calibration cycle :	One year	

Environmental and size

Temperature range :	– 10 to + 50 °C – 40 to + 70 °C	Operating (Battery: 0 to 50 °C) Storage (Battery: –20 to 50 °C)
Relative humidity :	< 95%	
Weight :	3 kg (6.6 lb)	Net (shipping) approximately; (3.5 kg with battery)
Dimensions :	318 × 207 × 69 mm	Approximately (W x H x D)

Options

RF preamplifier (Option PA3)

Frequency range :	1 MHz to 3 GHz	
Gain :	20 dB	*Nominal*

Tracking generator (Option TG3)

Frequency range :	5 MHz to 3 GHz	
Output level :	0 to –25 dBm	1 dB steps
Output flatness :	± 3 dB	Referenced to 50 MHz, 0 dBm
VSWR :	< 2.0 : 1	*Nominal*
Connector and impedance :	Type-N female; 50Ω	*Nominal*

Ordering Information

Model number	Description
N9340A	**handheld spectrum analyzer 100 kHz to 3.0 GHz**

Accessories supplied as standard with each

- Multi-language Quick Start Tutorial
- CD-ROM of the manual
- Soft carrying case

Options

N9340A-PA3	3 GHz preamplifier
N9340A-TG3	3 GHz tracking generator
N9340A-1TC	Hard transit case
N9340A-1DC	Automotive 12 VDC adaptor
N9340A-BAT	Spare battery pack
N9340A-ADP	Spare AC/DC adaptor
N9340A-ABA	Manual – English
N9340A-AB2	Manual – Chinese
N9340A-ABJ	Manual – Japanese

Warranty and service

Standard warranty is one year.

R-51B-001-3C	1 year Return-to-Agilent warranty extended to 3 years

Calibration

R-50C-001-3 3 year coverage	Agilent Calibration Upfront Support Plan

Hard transit case
N9340A-1TC

Soft carrying case

Spare AC/DC adaptor

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Remove all doubt

Our repair and calibration services will get your equipment back to you, performing like new, when promised. You will get full value out of your Agilent equipment throughout its lifetime. Your equipment will be serviced by Agilent-trained technicians using the latest factory calibration procedures, automated repair diagnostics and genuine parts. You will always have the utmost confidence in your measurements.

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