



# Agilent N9342C Handheld Spectrum Analyzer (HSA)

Data Sheet



## Field testing just got easier

The Agilent N9342C handheld spectrum analyzer (HSA) is more than easy-to-use — its measurement performance gives you the assurance you need to know the job's been done right.

- \* Best-in-class RF specifications ensure precise measurements
- \* Field ready - rugged, weather-resistant design
- \* Automate complex tasks for consistent results

# Agilent N9342C Handheld Spectrum Analyzer (HSA)

## Your job just got easier

- Best-in-class displayed average noise level (DANL),  $-164$  dBm/Hz typical
- Fastest sweep: minimum sweep time  $< 2$  ms
- Task Planner saves up to 95% test setup time and enables test automation
- Ergonomic backpack ensures comfort and provides true hands-free operation

### Definitions and requirements

This data sheet contains specifications and supplemental information for Agilent N9342 handheld spectrum analyzer. The differences between specifications, typical performance, and nominal values are described as follows.

#### Definitions

Specifications describe the performance of parameters covered by the product warranty and apply to temperature ranges  $-10$  to  $50^{\circ}$  C, unless otherwise noted.

95th percentile values indicate the breadth of the population ( $>2$ ) of performance tolerances expected to be met in 95% of the cases with a 95% confidence, for any ambient temperature in the range of  $20^{\circ}$  to  $30^{\circ}$  C. In addition to the statistical observations of a sample of instruments, these values include the effects of the uncertainties of external calibration references. These values are not warranted. These values are updated occasionally if a significant change in the statistically observed behavior of production instruments is observed.

Typical describes additional product performance information that is not covered by the product warranty. It is performance beyond specification that 80% of the units exhibit with a 95% confidence level over the temperature range  $20^{\circ}$  to  $30^{\circ}$  C. Typical performance does not include measurement uncertainty.

Nominal values indicate expected performance, or describe product performance that is useful in the application of the product, but is not covered by the product warranty.

#### Conditions required to meet specifications

The following conditions must be met for the analyzer to meet its specifications.

- The analyzer is within its calibration cycle.
- Under auto couple control, except when Swp Time Rule is set to Accuracy.
- Any analyzer that has been stored at a temperature range inside the allowed storage range but outside the allowed operating range must be stored at an ambient temperature within the allowed operating range for at least two hours before being turned on.
- The analyzer has been turned on at least 30 minutes.

### Certification

Agilent Technologies certifies that this product met its published specifications at the time of shipment from the factory. Agilent Technologies further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology (NIST), to the extent allowed by the Institute's calibration facility, and to the calibration facilities of other International Standards Organization (ISO) members.



# N9342C Handheld Spectrum Analyzer (HSA) Specifications

Specifications		Supplemental information
<b>Frequency</b>		
Frequency range	100 kHz to 7 GHz (tunable to 9 kHz)	AC coupled
<b>Internal 10 MHz frequency reference accuracy</b>		
Aging rate	± 1 ppm/year	
Temperature stability	± 1 ppm in addition +2 ppm/10° C	0° C to 30° C 30° C to 50° C
<b>Frequency readout accuracy with marker (start, stop, center, marker)</b>		
Marker resolution	(frequency span)/(sweep points – 1)	
Uncertainty	± (frequency indication × frequency reference uncertainty +1% × span +20% × resolution bandwidth + marker resolution +1 Hz)	Frequency reference uncertainty = (aging rate x period of time since adjustment + temperature stability)
<b>Marker frequency counter</b>		
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
<b>Frequency span</b>		
Range	0 Hz (zero span), 100 Hz to 7 GHz	
Resolution	1 Hz	
Accuracy	± (0.22% x span + span/( sweep points – 1))	Nominal
<b>SSB phase noise</b>		
Carrier offset		
30 kHz	< –86 dBc/Hz, typical –89 dBc/Hz	20° C to 30° C
100 kHz	< –97 dBc/Hz, typical –101 dBc/Hz	Center frequency 500 MHz
1 MHz	< –117 dBc/Hz, typical –119 dBc/Hz	
<b>Resolution bandwidth (RBW)</b>		
–3 dB bandwidth	10 Hz to 3 MHz	1-3-10 sequence
Accuracy	± 5%, RBW = 10 Hz to 1 MHz ± 10%, RBW = 3 MHz	Nominal
Resolution filter shape factor	< 5:1	60 dB/3 dB bandwidth ratio; nominal; digital, Gaussian-like
<b>Video bandwidth (VBW)</b>		
–3 dB bandwidth	1 Hz to 3 MHz	1-3-10 sequence
Accuracy	± 10%, VBW = 1 Hz to 1 MHz	Nominal

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## Specifications *(continued)*

### Amplitude specifications

### Supplemental information

Measurement range		
<b>Preamp off, 100 kHz to 2 MHz</b>	Displayed average noise level (DANL) to +10 dBm	
<b>Preamp off, 2 MHz to 7 GHz</b>	Displayed average noise level (DANL) to +20 dBm	
<b>Input attenuator range</b>	0 to 50 dB, in 1 dB steps	
Maximum safe input level		
<b>Average continuous power</b>	+33 dBm, 3 minutes maximum, 2 MHz to 7 GHz	Input attenuator setting $\geq$ 20 dB
<b>DC voltage</b>	$\pm$ 50 VDC maximum	
Displayed average noise level <sup>1</sup>		
<b>Preamp off</b>		Reference level $\leq$ -50 dBm
100 kHz to 1 MHz	-108 dBm, typical -127 dBm	
1 MHz to 10 MHz	-128 dBm, typical -146 dBm	
10 MHz to 500 MHz	-142 dBm, typical -146 dBm	
500 MHz to 2.5 GHz	-141 dBm, typical -145 dBm	
2.5 GHz to 4 GHz	-140 dBm, typical -144 dBm	
4 GHz to 6 GHz	-138 dBm, typical -142 dBm	
6 GHz to 7 GHz	-136 dBm, typical -140 dBm	
<b>Preamp on</b>		Reference level $\leq$ -70 dBm
100 kHz to 1 MHz	-131 dBm, typical -150 dBm	
1 MHz to 10 MHz	-148 dBm, typical -163 dBm	
10 MHz to 500 MHz	-161 dBm, typical -164 dBm	
500 MHz to 2.5 GHz	-159 dBm, typical -162 dBm	
2.5 GHz to 4 GHz	-158 dBm, typical -161 dBm	
4 GHz to 6 GHz	-155 dBm, typical -158 dBm	
6 GHz to 7 GHz	-150 dBm, typical -154 dBm	
Level display range		
<b>Log scale</b>	10 dB to 100 dB, 10 divisions displayed, 1, 2, 5, 10 dB/division	
<b>Linear scale</b>	0 to 100%, 10 divisions displayed	
<b>Scale units</b>	dBm, dBmV, dB $\mu$ V, W, V, dBmV EMF, dB $\mu$ V EMF, V EMF	
<b>Sweep (trace) points</b>	461	
<b>Marker level readout resolution</b>		
Log scale	0.01 dB	
Linear scale	$\leq$ 1% of signal level (nominal)	
<b>Detectors</b>	Normal, positive peak, sample, negative peak, average (video, RMS, voltage)	
<b>Number of traces</b>	4	
<b>Trace functions</b>	Clear/write, maximum hold, minimum hold, average	
<b>Level measurement error</b>	$\pm$ 1.5 dB (excluding input VSWR mismatch)	20° C to 30° C, peak detector, preamp off, input signal -50 dBm to 0 dBm, 95% percentile. Swp Time Rule is set to Accuracy. Adds additional $\pm$ 0.3 dB when Swp Time Rule is set to Speed.
	$\pm$ 0.6 dB, typical	

1. RMS detector, trace averaging > 40, 0 dB input attenuation, input terminated 50 Ohm, 1 kHz resolution bandwidth, normalized to 1 Hz, 20° C to 30° C

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## Specifications *(continued)*

### Amplitude specifications *(continued)*

### Supplemental information

Reference level <sup>2</sup>		
<b>Setting range</b>	-100 to +30 dBm	Steps of 1 dB
<b>Setting resolution</b>		
Log scale	0.01 dB	
Linear scale	Same as log (2.236 $\mu$ V to 7.07 V)	
<b>Accuracy</b>	0	
RF Input VSWR (at tuned frequency)		
<b>10 MHz to 3 GHz</b>	Nominal < 1.5:1	10 dB or 20 dB attenuation
<b>3 GHz to 7 GHz</b>	Nominal < 2.0:1	
Spurious response		
<b>Second harmonic distortion</b>	< -65 dBc, 50 MHz to 3 GHz < -70 dBc, 3 GHz to 7 GHz	Mixer signal level at -30 dBm, input attenuation 0 dB, preamp off, 20° to 30° C
<b>Third order intermodulation distortion</b> (third order intercept)	+7 dBm, 50 MHz to 300 MHz +10 dBm, 300 MHz to 7 GHz	Two -20 dBm tones at input mixer, spaced by 100 kHz, input attenuation 0 dB, preamp off, reference level > -30 dBm, 20° to 30° C
<b>Input related spurious</b>	< -75 dBc	-30 dBm signal at input mixer Exception: -65 dBc (F1 - 21.4 MHz, with F1 input frequency) -65 dBc (F1 - 5.35 MHz, with F1 input frequency) -65 dBc (F1 - 4155 MHz, with F1 input frequency)
<b>Inherent residual response</b>	< -90 dBm, typical -98 dBm	Input terminated and 0 dB RF attenuation, preamplifier off

2. Reference level only affects the display not the measurement, so trace data markers do not cause additional errors in measurement results.

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## Specifications *(continued)*

### Sweep specifications

### Supplemental information

Sweep time		
<b>Range</b>	2 ms to 1000 s 600 ns to 200 s	Span $\geq$ 100 Hz Span = 0 Hz (zero span)
<b>Sweep mode</b>	Continuous, single	
<b>Sweep time rule</b>	Accuracy, speed	
<b>Trigger source</b>	Free run, video, external	
<b>Trigger slope</b>	Selectable positive or negative edge	
<b>Trigger delay</b>	$\pm$ 12 ms to $\pm$ 12 s (nominal)	Span = 0 Hz (zero span)

### Front panel input/output

### Supplemental information

RF input		
<b>Connector and impedance</b>	Type-N female, 50 $\Omega$	Nominal
10 MHz reference/external trigger input		
<b>Reference input frequency</b>	10 MHz	
<b>Reference input amplitude</b>	0 to +10 dBm	
<b>Trigger voltage</b>	5 V TTL level	Nominal
<b>Connector</b>	BNC female, 50 $\Omega$	Nominal

### USB interface

<b>Host connector</b>	USB Type-A female Compatible with USB 2.0 full speed
<b>Device connector</b>	USB Type-mini AB female Compatible with USB 2.0 full speed

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## Specifications *(continued)*

### General specifications

### Supplemental information

Display		
<b>Resolution</b>	640 x 480 pixels	
<b>Size and type</b>	6.5 inch ( 170 mm ) TFT color display	
Languages		
<b>On-screen GUI</b>	English	
Power requirements and calibration		
<b>Adaptor voltage</b>	100 to 240 V AC, 50 - 60 Hz 15 V DC, 5.3 A, 80 W max	Auto-ranging
<b>Power consumption</b>	15 W	Typical
<b>Battery</b>		
Operating time	4 hours	Tracking generator off, preamplifier off
(fully charged battery)	3 hours	Tracking generator on, preamplifier off
Charging time	3 hours	
Life time	300 to 500 charge cycles	
<b>Warm-up time</b>	30 minutes	
<b>Calibration cycle</b>	One year	

### Environmental and size

<b>Temperature range</b>	-10 to +50° C -40 to +70° C	Operating (Battery: 0 to 50° C) Storage (Battery: -20 to 50° C)
<b>Relative humidity</b>	< 95%	
<b>Weight</b>	3.4 kg (7.5 lb)	Net (shipping) approximately, (3.7 kg/8.1 lbs with battery) Approximately (W x H x D)
<b>Dimensions</b>	318 x 207 x 69 mm (12.5 x 8.15 x 2.7 in)	

### Option specifications

### Supplemental information

Spectrum monitor (Option SIM)		
<b>Three display modes</b>	Spectrogram Spectrum trace Combination of spectrogram and spectrum trace in one screen	
RF preamplifier (Option PA7)		
<b>Frequency range</b>	100 kHz to 7 GHz	
<b>Gain</b>	25 dB	Nominal
Tracking generator (Option TG7)		
<b>Frequency range</b>	5 MHz to 7 GHz	
<b>Output level</b>	0 to -20 dBm	1 dB steps
<b>VSWR</b>	< 2.0:1	Nominal
<b>Connector and impedance</b>	Type-N female, 50 Ω	