Keysight Technologies

N9342C Handheld Spectrum Analyzer (HSA)

7 GHz

Data Sheet

KEYSIGHT TECHNOLOGIES

Unlocking Measurement Insights

Field testing just got easier

www.keysight.com/find/hsa
If you are making measurements in the field, the N9342C handheld spectrum analyzer (HSA) makes your job easier. It's got the features you need for operating in tough field environments, and its measurement performance gives you confidence the job's been done right. The N9342C HSA lets you automate routine tasks to save time and ensure consistent results. Field testing just got easier with the Keysight Technologies, Inc. N9342C HSA.

Your job just got easier:

- Get the features you need in a field-ready instrument.
- Gain confidence in your measurements with benchtop performance in a handheld instrument.
- Innovative task planner (www.keysight.com/find/taskplanner) 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.

Definitions and requirements

This data sheet contains specifications and supplemental information for the Keysight N9342C handheld spectrum analyzer. The differences between specifications, typical performance, and nominal values are described as follows.

Definitions

"Specifications" describe the performance of parameters and apply to temperatures ranging from –10 to 50 °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 to 30 °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 occurs.

"Typical" describes additional product performance information. It is performance beyond specification that 80% of the units exhibit with a 95% confidence level over the temperature range of 20 to 30 °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.

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

Keysight certifies that this product met its published specifications at the time of shipment from the factory. Keysight 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.

Specifications

Specification			Supplemental information
Frequency			
Frequency range		100 kHz to 7 GHz (usable to 9 kHz)	AC coupled. Select Option BB1 for low frequency performance enhancement
Internal 10 MHz frequency reference accuracy			
Aging rate		± 1 ppm/year	
Temperature stability		± 1 ppm	Referenced to frequency reading at 25 °C. Temperature varied at max. of 2 °C per minute. Control voltage held at voltage control range midpoint
Frequency readout accuracy with marker (start, stop, center, marker)			
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 × period 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 span			
Range		0 Hz (zero span), 100 Hz to 7 GHz	
Resolution		1 Hz	
Accuracy		± (0.22% × span + span/(sweep points - 1))	Nominal
SSB phase noise			
Carrier offset	30 kHz	< –86 dBc/Hz, typical –89 dBc/Hz	20 to 30 °C
	100 kHz	< –97 dBc/Hz, typical –99 dBc/Hz	Center frequency 500 MHz
	1 MHz	< –115 dBc/Hz, typical –119 dBc/Hz	
Resolution bandwidth (RBW)			
–3 dB bandwidth		10 Hz to 3 MHz	1-3-10 sequence
Accuracy		± 5%, RBW = 10 Hz to 1 MHz	Nominal
		± 10%, RBW = 3 MHz	
Resolution filter shape factor		< 5:1	Nominal; 60 dB/3 dB bandwidth ratio; digital, Gaussian-like
EMI bandwidth (CISPR compliant)		200 Hz, 9 kHz, 120 kHz, 1 MHz	Option EMC required
Accuracy		± 10% nominal	
Resolution filter shape factor		< 5:1 nominal	–60 dB/–6 dB bandwidth ratio
Video bandwidth (VBW)			
–3 dB bandwidth		1 Hz to 3 MHz	1-3-10 sequence
Accuracy		± 10%, VBW = 1 Hz to 1 MHz	Nominal

Specifications *(continued)*

Amplitude specifications				**Supplemental information**
Measurement range				
100 kHz to 2 MHz		Displayed average noise level (DANL) to +10 dBm		Preamp off
2 MHz to 7 GHz		Displayed average noise level (DANL) to +20 dBm		
Input attenuator range		0 to 50 dB, in 1 dB steps		
Maximum safe input level				
Average continuous power		+33 dBm, 3 minutes maximum		Input attenuator setting ≥ 20 dB, 2 MHz to 7 GHz
DC voltage		± 50 VDC maximum		
Displayed average noise level [1]				
Preamp off		Normalized to 1 Hz	Minimum RBW	
100 kHz to 1 MHz		–108 dBm, typical –127 dBm	–98 dBm, typical –117 dBm	Reference level ≤ –50 dBm
1 to 10 MHz		–128 dBm, typical –146 dBm	–118 dBm, typical –136 dBm	
10 to 500 MHz		–142 dBm, typical –146 dBm	–132 dBm, typical –136 dBm	
500 MHz to 2.5 GHz		–141 dBm, typical –145 dBm	–131 dBm, typical –135 dBm	
2.5 to 4 GHz		–140 dBm, typical –144 dBm	–130 dBm, typical –134 dBm	
4 to 6 GHz		–138 dBm, typical –142 dBm	–128 dBm, typical –132 dBm	
6 to 7 GHz		–136 dBm, typical –140 dBm	–126 dBm, typical –130 dBm	
Preamp on				
100 kHz to 1 MHz		–131 dBm, typical –150 dBm	–121 dBm, typical –140 dBm	Reference level ≤ –70 dBm
1 to 10 MHz		–148 dBm, typical –163 dBm	–138 dBm, typical –153 dBm	
10 to 500 MHz		–161 dBm, typical –164 dBm	–151 dBm, typical –154 dBm	
500 MHz to 2.5 GHz		–159 dBm, typical –162 dBm	–149 dBm, typical –152 dBm	
2.5 to 4 GHz		–158 dBm, typical –161 dBm	–148 dBm, typical –151 dBm	
4 to 6 GHz		–155 dBm, typical –158 dBm	–145 dBm, typical –148 dBm	
6 to 7 GHz		–150 dBm, typical –154 dBm	–140 dBm, typical –144 dBm	
Level display range				
Log scale		10 to 100 dB, 10 divisions displayed, 1, 2, 5, 10 dB/division		
Linear scale		0 to 100%, 10 divisions displayed		
Scale units		dBm, dBmV, dBµV, W, V, dBmV EMF, dBµV EMF, V EMF		
Sweep (trace) points		461		
Number of markers		6		
Marker functions		Normal, frequency counter, noise marker, band power and AM/FM demod (tune and listen)		
Marker level readout resolution	Log scale	0.01 dB		
	Linear scale	≤ 1% of signal level		Nominal
Detectors		Normal, positive peak, sample, negative peak, average (video, RMS, voltage), quasi-peak (option EMC required)		
Number of traces		4		

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

Specifications *(continued)*

Amplitude specifications (continued)				**Supplemental information**
Level display range (continued)				
Trace functions		Clear/write, maximum hold, minimum hold, average		
Level measurement error		Excluding input VSWR mismatch ± 1.5 dB		20 to 30 °C, 30 to 70% RH, peak detector, preamp off, input signal –50 to 0 dBm, 95% percentile Swp Time Rule is set to Accuracy Adds ± 0.3 dB when Swp Time Rule is set to Speed Adds ±0.4 dB with 5-min warm-up
Reference level [1]				
Setting range		–100 to 30 dBm		Steps of 1 dB
Setting resolution	Log scale	0.01 dB		
	Linear scale	Same as log (2.236 µV to 7.07 V)		
Accuracy		0		
RF input VSWR (at tuned frequency)				
10 MHz to 3 GHz		< 1.5:1		Nominal, 10 or 20 dB attenuation
3 to 7 GHz		< 2.0:1		
Spurious response				
Second harmonic distortion		< –65 dBc, 50 MHz to 3 GHz		Mixer signal level at –30 dBm, input attenuation 0 dB, preamp off, 20 to 30 °C
		< –70 dBc, 3 to 7 GHz		
Third order intermodulation distortion (third order intercept)		5-min warm-up	30-min warm-up	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
	50 to 300 MHz	+5.5 dBm	+7 dBm	
	300 MHz to 7 GHz	+8.5 dBm	+10 dBm	
Input related spurious		< –73.5 dBc	< –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)
Inherent residual response		< –85 dBm, typical –93 dBm	< –90 dBm, typical –98 dBm	Input terminated and 0 dB RF attenuation, preamplifier off

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

Specifications *(continued)*

Sweep specifications		**Supplemental information**
Sweep time		
Range	2 ms to 1000 s	Span ≥ 100 Hz
	600 ns to 200 s	Span = 0 Hz (zero span)
Sweep mode	Continuous, single	
Sweep time rule	Accuracy, speed	
Trigger source	Free run, video, external, RF burst	
Trigger slope	Selectable positive or negative edge	
Trigger delay	± 12 ms to ± 12 s	Nominal, span = 0 Hz (zero span)
Front panel input/output		**Supplemental information**
RF input		
Connector and impedance	Type-N female, 50 Ω	Nominal
10 MHz reference/external trigger input		
Reference input frequency	10 MHz	
Reference input amplitude	0 to +10 dBm	
Trigger voltage	5 V TTL level	Nominal
Connector	BNC female, 50 Ω	Nominal
Probe power		
Voltage/current		+15 Vdc, ± 7% at 0 to 150 mA (nominal)
		–12.6 Vdc, ± 10% at 0 to 150 mA (nominal)
		GND
Connectivity		
USB host	USB Type-A female, compatible with USB 2.0 full speed	
USB device	USB Type-mini AB female, compatible with USB 2.0 full speed	
LAN	RJ-45, 10 Base-T	
General specifications		**Supplemental information**
Display		
Resolution	640 pixels x 480 pixels	
Size and type	170 mm (6.5 in) TFT color display	
Internal memory		
System memory	64 MB	For system use. Not user accessible.
User memory	64 MB	User accessible. Able to store about 14,000 traces.
Languages		
On-screen GUI	English, Simplified Chinese, Traditional Chinese, French, German, Italian, Japanese, Korean, Russian, Spanish, Portuguese	

Specifications *(continued)*

General specifications (continued)		**Supplemental information**
Power requirements and calibration		
Adaptor voltage	100 to 240 V AC, 50 to 60 Hz	Auto-ranging
	15 V DC, 5.3 A, 80 W max	
Power consumption	15 W	Typical
Battery operating time (fully charged battery)	4 hours	Tracking generator off, preamplifier on
	3 hours	Tracking generator on, preamplifier on
Charging time	3 hours	
Life time	300 to 500 charge cycles	
Warm-up time	5 minutes	
Calibration cycle	One year	
Environmental and size		
Temperature range	–10 to +50 °C	Operating (battery: 0 to 50 °C)
	–40 to +70 °C	Storage (battery: –20 to 50 °C)
Altitude	9,144 meters (30,000 feet)	Operating with battery
	3,000 meters (9,840 feet)	Operating with AC to DC adapter
	15,240 meters (50,000 feet)	Non-operating
Relative humidity	< 95%	
Weight	3.2 kg (7 lbs)	Net (shipping) approximately, 3.6 kg (7.9 lbs) with battery
Dimensions	318 mm × 207 mm × 69 mm (12.5 in x 8.15 in x 2.7 in)	Approximately (W × H × D)
Option specifications		**Supplemental information**
Channel scanner (Option SCN)		
Scan modes	Top N, bottom N, and list	
Channels displayed	1 to 20	
Display orientation	Vertical	Number of channels ≤ 5
	Horizontal	Number of channels > 5
Chart	Bar chart, and time chart	
Log file	.CSV and .KML	
Radio standards	Pre-defined and user-defined. Pre-defined standards include the major wireless communication standards such as GSM, CDMA, W-CDMA, LTE, WiMAX, etc.	
Spectrum monitor (Option SIM)		
Display modes	Spectrogram	
	Spectrum trace	
	Combination of spectrogram and spectrum trace in one screen	
RF preamplifier (Option PA7)		
Frequency range	100 kHz to 7 GHz	
Gain	25 dB	Nominal
Tracking generator (Option TG7)		
Frequency range	5 MHz to 7 GHz	
Output level	0 to –20 dBm	1 dB steps
VSWR	< 2.0:1	Nominal
Connector and impedance	Type-N female, 50 Ω	

Specifications *(continued)*

Option specifications (continued)		**Supplemental information**
AM/FM modulation analysis (Option AMA)		
Frequency range	10 MHz to 7 GHz	
Carrier power accuracy	± 1.8 dB	Nominal
Carrier power range	–30 to +10 dBm	100 kHz to 2 MHz
	–30 to +20 dBm	2 MHz to 7 GHz
Carrier power displayed resolution	0.01 dBm	
AM measurement		
Modulation rate	20 Hz to 100 kHz	
Accuracy	1 Hz	Nominal (modulation rate < 1 kHz)
	< 0.1% modulation rate	Nominal (modulation rate > 1 kHz)
Depth	5 to 95%	
Accuracy	± 4%	Nominal
FM measurement		
Modulation rate	20 Hz to 200 kHz	
Accuracy	1 Hz	Nominal (modulation rate < 1 kHz)
	< 0.1% modulation rate	Nominal (modulation rate > 1 kHz)
Depth	20 Hz to 400 kHz	
Accuracy	± 4%	Nominal
ASK/FSK modulation analysis (Option DMA)		
Frequency range	2.5 MHz to 6 GHz	
Carrier power accuracy	± 2 dB	Nominal
Carrier power range	–30 to +20 dBm	Nominal
Carrier power displayed resolution	0.01 dBm	
ASK measurement		
Symbol rate range	100 Hz to 100 kHz	
Modulation depth/index	5 to 95%	
Accuracy	± 4%	Nominal
Displayed resolution	0.1%	
FSK measurement		
FSK deviation	100 Hz to 400 kHz	
Symbol rate range	100 Hz to 20 kHz	$1 \leq \beta^{1} \leq 20$
	20 to 50 kHz	$1 \leq \beta \leq 8$
	50 to 100 kHz	$1 \leq \beta \leq 4$
Accuracy	± 4%	Nominal
Displayed resolution	0.01 Hz	

1. ß is the ratio of frequency deviation to symbol rate (deviation/rate)

Specifications *(continued)*

Option specifications (continued)		**Supplemental information**
Time-gated spectrum analysis (Option TMG)		
Gated sweep		
Span range	Any span	
RBW range	> = 1 kHz	VBW is fixed and equal to RBW [1]
Gate delay range	12 µs to 10 s	200 ns resolution
Gate length range	84 µs to 10 s	200 ns resolution
Gate sources	External	
	Periodic timer	Sync sources include free and external Period: 0 to 20.0 s (It should be greater than gate delay plus gate length) Offset: –5 to +5 s
Cable and antenna test (Option CA7)		
Frequency range	5 MHz to 7 GHz	
Frequency resolution	100 kHz	
Output power	–4 to +2 dBm	Nominal
Measurement speed	2 s (full span 5 MHz to 7 GHz)	
Number of data points	461	
Directivity of calibrator	> 40 dB	N9311X-201 mechanical OSL calibrator
Return loss		
Range	0 to 60 dB	
Accuracy	$A = 20 \times \log10\ (1.1 + 10^{(-(D-RL)/20)} + 0.016 \times 10^{(-RL/20)} + 10^{(-3+RL/20)})$	Nominal, after average
	D: Directivity of calibrator RL: Return loss value of DUT	
Resolution	0.01 dB	
Voltage standing wave ratio (VSWR)		
Range	1 to 65	
Resolution	0.01	
Accuracy	Refer to return loss accuracy	
Cable loss		
Range	0 to 30 dB	
Resolution	0.01 dB	
Distance-to-fault (DTF)		
Vertical range	0 to 60 dB	Return loss
	1 to 65	VSWR
Range	(Number of data points -1) x resolution	Number of data points = 461
Resolution (meter)	$(1.5 \times 10^8) \times (V_p)/(f_2\text{-}f_1)$ Hz	V_p is the cable's relative propagation velocity
		f_2 is the stop frequency
		f_1 is the start frequency
Immunity to interference		
On-channel	+17 dBm	Nominal
On-frequency	–5 dBm	Nominal

1. For efficiency and convenience, RBW is restricted to be equal to or greater than 1 kHz and VBW is restricted to be equal to RBW.

Specifications *(continued)*

Option specifications (continued)		**Supplemental information**
Built-in GPS receiver and GPS antenna (Option GPS)		
GPS information tagging	Longitude, latitude, and altitude	
GPS antenna	Built-in	
Frequency accuracy with GPS on	± 50 ppb	
External GPS antenna connector	SMA-F	External GPS antenna, N934xC-GPA, is offered as an optional accessory
USB peak and average power sensor support (Option PWP)		
Power sensor supported	Keysight U2020 X-series USB peak and average power sensor	
Frequency range	50 MHz to 40 GHz	Sensor dependent
Peak power dynamic range	–30 to +20 dBm	
USB average power sensor support (Option PWM)		
Power sensor supported	Keysight U2000 Series USB power sensor	
Frequency range	9 kHz to 24 GHz	Sensor dependent
Dynamic range	–60 to +44 dBm	Sensor dependent
Security features (Option SEC)		
Security erase	Erase the entire user flash memory by writing single character “1” over all memory locations	Non-recoverable
Port control	Disable/enable LAN port or USB port	
Task planner for test automation (Option TPN)		
Task plan execution mode	Auto, manual, and manual if fail	
Task plan file	.TPN	Complementary task plan editor is available with HSA PC software
Number of tasks	Maximum 20 in a single .TPN file	
Measurements supported	Regular spectrum analysis and power suite (channel power, ACPR, and OBW)	

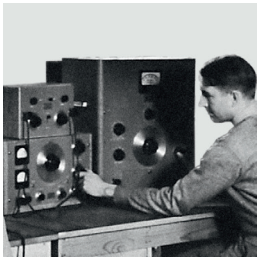
Visit **www.keysight.com/find/taskplanner** for more information.

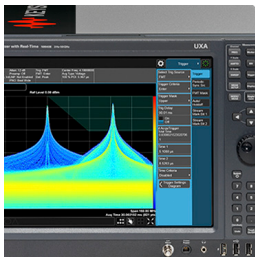
Specifications *(continued)*

Option specifications (continued)			**Supplemental information**
Baseband input (Option BB1)			
Frequency range	9 kHz to 12 MHz, usable to 3 kHz		
Frequency span	100 Hz to 11.997 MHz		
Frequency resolution	1 Hz		
Measurement range	9 kHz to 2 MHz	Displayed average noise level (DANL) to +10 dBm	
	2 MHz to 12 MHz	Displayed average noise level (DANL) to +20 dBm	
Overall amplitude accuracy	9 kHz to 100 kHz	± 2.5 dB	20 to 30 °C, 30 to 70% RH, peak detector, preamp off, input signal –50 to 0 dBm, 95% percentile
	100 kHz to 12 MHz	± 1.5 dB	
	Normalized to 1 Hz	Minimum RBW	
Displayed average noise level	9 kHz to 100 kHz, nominal –145 dBm	9 kHz to 100 kHz, nominal –135 dBm	RMS detector, trace averaging > 40, 0 dB input attenuation, input terminated 50 Ω, reference level < –35 dBm
	100 kHz to 12 MHz, –155 dBm, typical –158 dBm	100 kHz to 12 MHz, –145 dBm, typical –148 dBm	
Phase noise	10 kHz nominal –118 dBc/Hz		Center frequency 10 MHz
	30 kHz nominal –120 dBc/Hz		
	100 kHz nominal –127 dBc/Hz		
	> 200 kHz nominal –130 dBc/Hz		
Residual responses	< –120 dBm nominal		9 kHz to 12 MHz
Second harmonic distortion	< –55 dBc nominal		Input frequency > 100 kHz, mixer signal level at –30 dBm, input attenuation 0 dB, preamp off, reference level –30 dBm, 20 to 30 °C
Third order intermodulation distortion	< –55 dBc nominal		Two –20 dBm tones at input mixer, spaced by 100 kHz, input attenuation 0 dB, preamp off, reference level ≥ –20 dBm, 20 to 30 °C
VSWR	< 2.0:0 nominal		10 or 20 dB attenuation, 300 kHz to 12 MHz

Evolving Since 1939

Our unique combination of hardware, software, services, and people can help you reach your next breakthrough. We are unlocking the future of technology.
From Hewlett-Packard to Agilent to Keysight.





myKeysight

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

www.keysight.com/find/emt_product_registration
Register your products to get up-to-date product information and find warranty information.

KEYSIGHT SERVICES
Accelerate Technology Adoption.
Lower costs.

Keysight Services
www.keysight.com/find/service
Keysight Services can help from acquisition to renewal across your instrument's lifecycle. Our comprehensive service offerings—one-stop calibration, repair, asset management, technology refresh, consulting, training and more—helps you improve product quality and lower costs.

CALIBRATION UP TO 10 YEARS WARRANTY
ASSURANCE PLANS

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

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/N9342C

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 0260637

For other unlisted countries:
www.keysight.com/find/contactus
(BP-9-7-17)

DEKRA Certified
ISO9001 Quality Management System

www.keysight.com/go/quality
Keysight Technologies, Inc.
DEKRA Certified ISO 9001:2015
Quality Management System

KEYSIGHT TECHNOLOGIES
Unlocking Measurement Insights

Published in USA, December 1, 2017
5990-5587EN
www.keysight.com