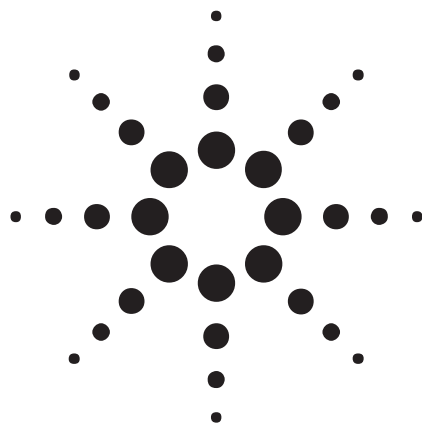


Agilent N9310A RF Signal Generator

Technical Overview



All the capability
and reliability of an
Agilent instrument
you need—at a price
you've always wanted



N9310A RF Signal Generator



Agilent Technologies

Low-cost manufacturing



This implies performing just sufficient performance checks to get the product finished and launched into the production as quickly as possible.

If you're wondering how to reduce manufacturing test overheads without compromising quality, your answer is here.

You'll even find an N9310A RF signal generator fits your budget for those mini R&D projects or when your need initiate a low-cost project for product enhancements and extensions.

Needing to build today's consumer electronics devices better, faster?

An increasing number of today's consumer electronics devices incorporate sophisticated RF technologies. You'll be trying hard to ensure the quality of their product design and production while simultaneously reducing costs and time to market.

Dual language options enhance usability anywhere

As manufacturing moves around the world, so will your engineers and technicians. Therefore, meeting the challenge of operating in a multi-lingual environment is essential.

Now, that's easy with the N9310A RF signal generator.

It already provides built-in dual-language (English and Chinese) on-screen instructions, parameters and softkeys shortly, other languages will follow.

So, regardless of where you deploy your engineering and hardware resources, everyone will find operating an N9310A signal generator straightforward.

Agilent's new low-cost, compact signal generator, the N9310A, finds application in low-cost R&D projects as well as high-volume electronics manufacturing.



When you want to make effortless automated tests, or use the generator remotely, simply connect your PC to the signal generator through the built-in USB interfaces.



Low-cost ATE – for true, low-cost volume manufacturing

There's often a need to integrate a number of signal generators into automated test systems. You'll find this surprisingly affordable with N9310A RF signal generators. It is easy and inexpensive to add a number of these signal generators to your existing ATE systems.

Alternatively, you may simply want to operate your signal generator remotely. USB ports on back panels make interconnection easy.

Optional rack mount kit enables simple stacking with other test equipment in standard test racks. The rackmounted signal generator is full width and a compact, standard 3U height.



Multi-language display and instruction help ensure easy operation of your signal generator, no matter who's using it.



Agilent's new low-cost, compact signal generator provides a money-saving solution in high-volume manufacturing applications.

Now you know the signal generator to choose when you are ramping up your volume manufacturing. Moreover, you can be confident that the price and performance will please your management team, too.

Installation & maintenance

**Handy, practical
and easy to
use in the field**

Make the N9310A signal generator — one of Agilent new Value Plus range of testers — part of your solution to simple, economic professional test.

When you are out on the road or testing in the field, you will find the optional carrying case provides appropriate protection for your N9310A signal generator.

Signal generators are one of the essential basic test tools used during general purpose RF product development test.



The N9310A can become portable with handle and bumper. It makes it an ideal choice for installation and maintenance.

**Large, color display helps easy,
remote set up and operation**

To help check set up of output values and parameters when operating at a distance from the generator, users will welcome the large, color screen.

A clear, bright color screen with associated, easy-to-read soft keys helps users quickly set up signal output parameters.

When you are competing for the world market, you'll want to win by supplying the best products, and at prices lower than those of your competitors.

You will want the world know you have the best. And part of that 'best' is using the best test equipment — equipment that the rest of the world has come to rely upon.

For years, Agilent test equipment has helped many top companies achieve these goals. Now, with the exceptionally low price of the N9310A signal generator, you can afford to own the test equipment you always wanted.

**An effective, professional field
installation and maintenance tool**

It's not just in consumer electronics that demand is shifting toward lower-cost and just-enough performance of the test instruments. Many installation and maintenance tasks have the same demand.

Being small and lightweight, an N9310A signal generator is as convenient for field troubleshooting use as it is for bench-top use, where space is often at a premium.



Performing general purpose installation and maintenance, or service and repair, but don't want more test functionality than necessary — Agilent's N9310A RF signal generator is your answer.

R&D

Performing essential R&D — yet to an ever tighter budget?

Just because your customers are forcing you to work to tighter margins, doesn't mean they want you to compromise on quality.

Even the simplest or most basic of today's electronics products with RF content demand adequate and proper design verification.

Nevertheless, you know that it's not every day that each of your development engineers needs the full functionality of a high-performance signal generator.

That's the time to give them an Agilent N9310A RF signal generator.

They'll be properly equipped to make all those essential tests and you can rely on Agilent's experience, expertise, customer support and service, while continuing to grow your business.

If you've been wondering how to get the best out of your limited R&D budget, then it's time to experience the new generation of Agilent's test equipment.



**Helps you move ahead
of your competition**

Education

Educating tomorrow's technicians and engineers — but restricted on your capital spend?

Help your students and trainees gain the edge. Now you don't need to compromise on the quality of their test equipment. Nor do you need to limit them to one piece of equipment to a class.

This signal generator, part of the low-cost series from Agilent Technologies allows you to put Agilent's renowned quality and precision into every student's hands.

Educators hold Agilent testers in the highest esteem. Therefore, you can be confident and proud of your standards in the classroom, and your students will have confidence in their experimental results.

Your students will be able to focus on RF circuit experimentation and exercises, because signal generator operation is straightforward. Yet you'll find it has sufficient performance for many basic research projects, too, where you need a good, general-purpose local oscillator/signal source.

Affordable test instrumentation for every student

No compromise on Agilent support



Using Agilent test equipment in your educational establishment guarantees you are upholding the highest standards for the future, for tomorrow's engineers.

Affordable, fast support

When you are relying on Agilent test equipment for your manufacturing process, installation procedures, or maintenance programs, you need to know that you can rely on superior customer support in case of problems.

Buying test equipment from Agilent's new low-cost series still puts you in touch with top-line service and support when you need it. So, you can be confident that you are making the right choice for the right price.

Take a closer look — see what value with usability really means



One of Agilent Technologies
new test instruments in the
compact, low-cost series

Now that we've convinced you
an Agilent N9310A RF signal
generator has everything you
need - check out availability-
and buy with confidence.

You'll find its performance and
our delivery is as sharp as our
price.

Specifications

Specifications apply under the following conditions:

- After a warm-up time of 45 minutes
- At an ambient temperature specified in the data sheet, and within a valid calibration period
- Data designed as “typical” or “nominal” are not covered by product warranty

Supplemental Information

Frequency

Range:	9 kHz to 3.0 GHz	
Resolution:	0.1 Hz	
Switching speed:	< 10 ms	within 0.1 ppm of final frequency

Internal Reference Oscillator

Stability:	< ±1ppm/year	Aging
	< ±1ppm	Temperature over 0 to 45 °C

Timebase Reference Output

Frequency:	10 MHz
Amplitude:	> 0.35 Vrms level into 50 Ω
Connector:	BNC female

External Reference Input

Range:	2 MHz, 5 MHz, 10 MHz
Amplitude:	0.5 ~ 2 Vrms
Connector and impedance:	50 Ω ; BNC female

Output

Power:	–127 to +13 dBm	+20 dBm settable
Resolution:	0.1 dB	
Accuracy:	< ±1dB	$F_c \geq 100 \text{ kHz}, -120 \leq \text{Level} \leq +13\text{dBm}, 20 \text{ to } 30 \text{ }^\circ\text{C}$
Switching speed:	< 10 ms	< 0.3 dB deviation
VSWR (typical) :	< 1.6	$1.5 \text{ MHz} \leq F_c < 2.5 \text{ GHz}$
	< 1.8	$2.5 \text{ GHz} \leq F_c \leq 3 \text{ GHz}$
Output connector and impedance:	N-type; 50 Ω nominal	

Reversal Power Protection

DC voltage:	30 V	
RF power:	+36 dBm	1 minute; the warning for reversed power protection is nominally at +25 dBm

Spectral Purity

SSB Phase Noise: < -95 dBc/Hz

Residual FM: < 30 Hz rms; < 90 Hz peak
< 20 Hz rms

Harmonics: < -30 dBc

Non-harmonics: < -50 dBc

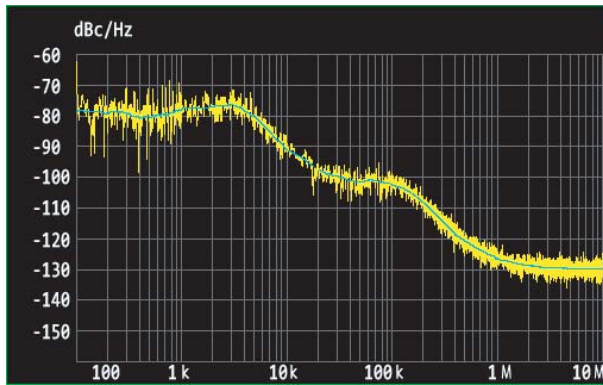
Typical, $F_c = 1$ GHz; at 20 kHz offset

CW mode, $F_c = 1$ GHz; BW = 0.3 to 3 KHz
ResFM optimized mode

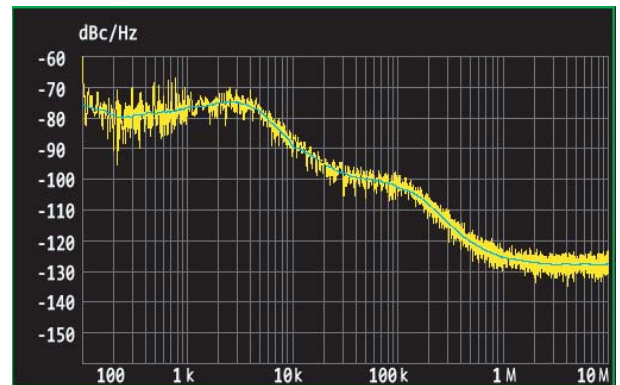
Level ≤ 0 dBm, $F_c \geq 1$ MHz

Level ≤ 0 dBm, >10 kHz from carrier

Characteristic SSB Phase Noise



$f_c = 1000$ MHz



$f_c = 2000$ MHz

Sweep Modes

RF and LF:

LF Sweep range: 20 Hz to 80 kHz

RF Sweep range: 9 kHz to 3 GHz

Sweep points: 2 to 1001

Dwell time: 10 ms to 1s

Amplitude:

Sweep range: -127 to +13 dBm

Sweep points: 2 to 1001

Dwell time: 10 ms to 1s

Simultaneous Modulation*

		AM		I/Q	FM		ΦM	Pulse	
		Internal	External		Internal	External		Internal	External
AM	Internal	—	•	—	•	•	•	—	—
	External	•	—	—	•	•	•	—	—
I/Q		—	—	—	•	•	•	•	•
FM	Internal	•	•	•	—	•	—	•	•
	External	•	•	•	—	—	—	•	•
ΦM		•	•	•	—	—	—	•	•
Pulse	Internal	—	—	•	•	•	•	—	—
	External	—	—	•	•	•	•	—	—

* N9310A only has one external modulation input connector. The simultaneous external modulations are applied to the same input signal.

Amplitude Modulation (Fc ≥ 100 kHz)

Operating modes:	Internal, external AC	
Range:	0 to 100%	Envelope peak < maximum specified power
Resolution:	0.1%	
Rates:	20 Hz to 20 kHz	
Accuracy:	< ± (5 % of setting +0.2%)	1 kHz, 0 dBm and 80% modulation, 0.3 to 3 kHz bandwidth
Distortion:	< 2%	1 kHz, 0 dBm and 80% modulation, THD
External input:	MOD IN connector	
Sensitivity:	0.5 Vpeak	Input voltage for 100% modulation depth
Input impedance:	BNC; > 100 kΩ	Nominal

Frequency Modulation (Fc ≥ 100 kHz)

Operating modes:	Internal, external AC	
Frequency deviation:	20 Hz to 100 kHz	
Resolution:	< 1%	Minimum 1 Hz
Rates:	20 Hz to 80 kHz	
Distortion:	< 1%	1 kHz rate, THD, Deviation = 50 kHz
Deviation accuracy:	< ± (5 % of FM deviation +300 Hz)	1 kHz, 0 dBm and 50 kHz deviation, 0.3 to 3 kHz bandwidth
Carrier frequency		
Deviation:	< 200 Hz	Relative to carrier; external mode
External input:	MOD IN connector	
Sensitivity:	0.5 Vpeak	Input voltage for 100 kHz modulation deviation
Input impedance:	BNC; > 100 kΩ	Nominal

Phase Modulation (Fc ≥ 100 kHz)

Operating modes:	Internal	
Phase deviation:	0 to 10 rad 0 to 5 rad	Rate ≤ 10 kHz 10 kHz < Rate ≤ 20 kHz
Resolution:	< 1%	
Rates:	300 Hz to 20 kHz	
Deviation accuracy:	< ± (5% of FM deviation +0.2 rad)	1 kHz rate, 0.3 to 3 kHz bandwidth
Distortion:	< 1.5%	1 kHz rate, THD, Deviation = 5 rad
Input impedance:	BNC; > 100 kΩ	Nominal

Pulse Modulation

Operating modes:	Internal, external	
On/Off ratio:	≥ 40 dB	
Rise/fall time:	$< 3 \mu\text{s}$	
Pulse width:	100 μs to 1s	Internal, external
Pulse period:	200 μs to 2s	Internal
Time resolution:	1 μs	
Input connector and voltage level:	BNC female; TTL	

Modulation Source

Internal	Provides a modulation signal for AM, FM, phase modulation and LF out	
Waveform:	Sine	
Frequency range:	20 Hz to 80 kHz	
Resolution:	0.1 Hz	
Accuracy:	0.005%	Typical

LF Out (Internal Modulation Source)

Amplitude:	0 to 3 V _{peak}	Level to high impedance
Output voltage		
Resolution:	$< 1\%$	1 mV minimum resolution
Frequency response:	$< \pm 0.2$ dB	20 Hz to 20 kHz
Total Harmonic		
Distortion:	$< 0.1\%$	Typical; 20 Hz to 20 kHz, 30 kHz low pass filter
Connector and impedance:	BNC female; $< 1\Omega$	Front panel

I/Q Modulation (Option 001 only)

Operating mode:	External I/Q inputs	
VSWR:	< 1.5	
Full scale input:	$\sqrt{I^2 + Q^2} = 0.5V_{\text{rms}}$	
Modulation frequency		
range:	DC to 40 MHz	At 3 dB points
Carrier suppression:	40 dBc	Typical; Modulation frequency = 10 kHz
QPSK EVM:	3%	Typical; 1Msps. 0.22 RRC Filter
GMSK Phase error:	1.2° rms	Typical; 1Msps. BT= 0.5
Connector and impedance:	BNC female; 50 Ω	Rear panel

USB Connector

USB Host interface:	3 x A Plug	V 1.1 protocol
USB Device interface:	1 x B Plug	V 1.1 protocol

General

Power requirement:	100~240 Vac; 50~60 Hz	Auto-ranging
Power consumption:	65 W	
Temperature range:	5 ~ 45 °C	Operating
	-20 to 70 °C	Storage
Weight:	9.2 kg	Approximately
Dimensions:	132.5 x 320 x 400 mm	H x W x D



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For more information on repair and calibration services, go to:

www.agilent.com/find/removealldoubt

www.agilent.com
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