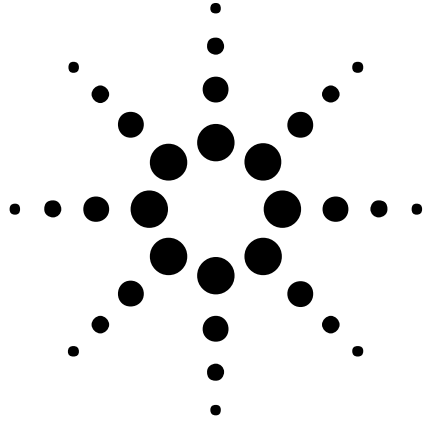


# Agilent N9310A RF Signal Generator

## 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 you 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.

## 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.



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



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.

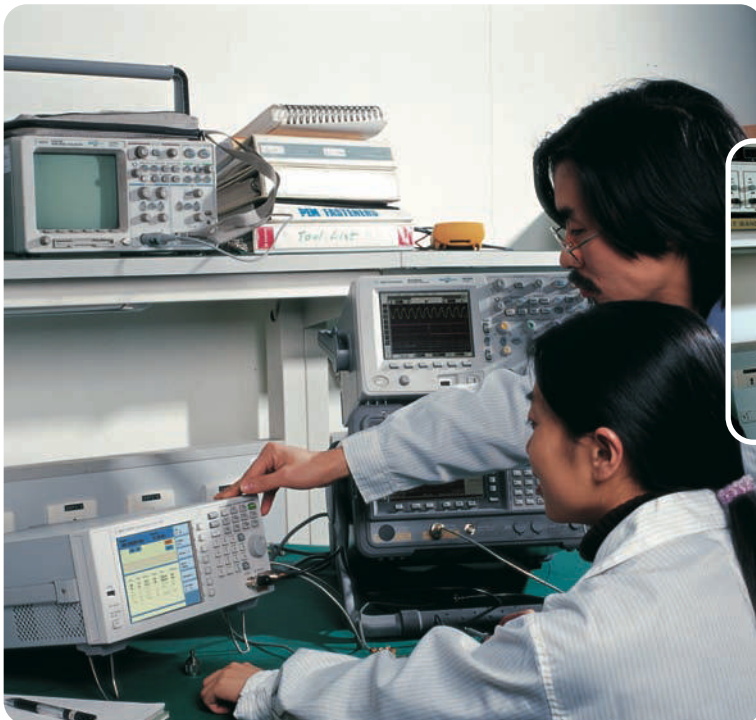
Even the simplest or most basic of today's electronics products with RF content demand adequate and proper design verification.

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.

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## Take a closer look – see what value with usability really means



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.

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

# Specifications

## Supplemental Information

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### Frequency

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

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### Internal Reference Oscillator

<b>Stability:</b>	< ±1ppm/year < ±1ppm	Aging Temperature over 0 to 45 °C
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### Timebase Reference Output

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

### External Reference Input

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

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### Output

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

### Reversal Power Protection

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

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## Spectral Purity

<b>SSB Phase Noise:</b>	< -95 dBc/Hz	Typical, Fc = 1 GHz; at 20 kHz offset
<b>Residual FM:</b>	< 30 Hz rms; < 90 Hz peak < 20 Hz rms	CW mode, Fc = 1 GHz; BW = 0.3 to 3 KHz ResFM optimized mode
<b>Harmonics:</b>	< -30 dBc	Level ≤ 0 dBm, Fc ≥ 1 MHz
<b>Non-harmonics:</b>	< -50 dBc	Level ≤ 0 dBm, >10 kHz from carrier

## Sweep Modes

<b>RF and LF:</b>	
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
<b>Amplitude:</b>	
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	–	–	•	•	•	•	–	–

## Amplitude

### Modulation (Fc > 100 kHz)

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

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

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## Frequency Modulation

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

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## Phase Modulation

<b>Operating modes:</b>	Internal	
<b>Phase deviation:</b>	0 to 10 rad 0 to 5 rad	Rate ≤ 10 kHz 10 kHz < Rate ≤ 20 kHz
<b>Resolution:</b>	< 1%	
<b>Rates:</b>	300 Hz to 20 kHz	
<b>Deviation accuracy:</b>	< ± (5% of FM deviation +0.2 rad)	1 kHz rate
<b>Distortion:</b>	< 1.5%	1 kHz rate, THD, Deviation = 5 rad
<b>External input:</b>	MOD IN connector	
<b>Sensitivity:</b>	1 Vpeak	Input voltage for 10 rad modulation deviation
<b>Input impedance:</b>	BNC; > 100 kΩ	Nominal

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## Pulse Modulation

<b>Operating modes:</b>	Internal, external, AC/DC	
<b>On/Off ratio:</b>	≥ 40 dB	
<b>Rise/fall time:</b>	< 3 μs	
<b>Pulse width:</b>	100 μs to 1s	Internal, external
<b>Pulse period:</b>	200 μs to 2s	Internal
<b>Time resolution:</b>	1 μs	
<b>Input connector and voltage level:</b>	BNC female; TTL	

## Internal Modulation Source

<b>Waveform:</b>	Sine	
<b>Frequency range:</b>	20 Hz to 80 kHz	
<b>Resolution:</b>	0.1 Hz	
<b>Accuracy:</b>	0.005%	Typical

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**LF Out**  
(Internal  
Modulation Source)

<b>Amplitude:</b>	0 to 3 V <sub>peak</sub>	Level to high impedance
<b>Output voltage</b>		
<b>Resolution:</b>	< 1%	1 mV minimum resolution
<b>Frequency response:</b>	< ± 0.2 dB	20 Hz to 20 kHz
<b>Total Harmonic</b>		
<b>Distortion:</b>	< 0.1%	20 Hz to 20 kHz
<b>Connector</b>		
<b>and impedance:</b>	BNC female; < 1 Ω	Front panel

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**I/Q Modulation**  
(Option 001 only)

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

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**USB Connector**

<b>USB Host interface:</b>	3 x A Plug	V 1.1 protocol
<b>USB Device interface:</b>	1 x B Plug	V 1.1 protocol

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**General**

<b>Power requirement:</b>	100~240 Vac; 50~60 Hz	Auto-ranging
<b>Power consumption:</b>	65 W	
<b>Temperature range:</b>	5 ~ 45 °C	Operating
	-20 to 70 °C	Storage
<b>Weight:</b>	9.2 kg	Approximately
<b>Dimensions:</b>	132.5x320x400 mm	H x W x D

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# Ordering information

Model Number	Description	Note
N9310A	RF Signal Generator	Range: 9 kHz to 3 GHz
Option 001	Analog I/Q input capability	Requires external stimulus
Option 1HB	Handle and bumpers	
Option 1CM	Rackmount flange kit	
Option 1TC	Hard transit case	

## Manuals

N9310-90000	Chinese User's Guide
N9310-90002	Chinese Quick Start Guide
N9310-90000	English User's Guide
N9310-90002	English Quick Start Guide

## CD

N9310-84500	Manual software CD.
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## Warranty and service

Standard warranty is one year

R-51B-001-3C	1-year return to Agilent warranty extended to 3 years
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## Calibration <sup>1</sup>

R-50C-011-3	Agilent calibration upfront support plan 3-year coverage
N9310A-0BW	Service manual, assembly level

<sup>1</sup> Option not available in all countries

## Agilent Technologies' Test and Measurement Support, Services, and Assistance

Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Support is available for at least five years beyond the production life of the product. Two concepts underlie Agilent's overall support policy: Our Promise and Your Advantage.

### Our Promise

Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you receive your new Agilent equipment, we can help verify that it works properly and help with initial product operation.

### Your Advantage

Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

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