

Noise Figure Analyzers

10 MHz to 1.5 GHz, 3 GHz, 6.7 GHz and 26.5 GHz Noise Figure Analyzers

- A flexible and intuitive user interface
- Easy measurement setup
- Low instrumentation uncertainty
- Color graphical display of noise figure and gain versus frequency
- Enhanced PC and printer connectivity
- SNS, 346 and 347 Series noise source compatible
- Ability to automatically upload ENR calibration data from SNS Series noise source
- Local oscillator control through second dedicated GP-IB
- 3-year warranty as standard



N8973A

NFA Series

A Flexible and Intuitive User Interface

The user interface on the new NFA series of Noise Figure Analyzers is intuitive and easy to use, with easy-to-find keys, which are sized and then placed in the relevant key group according to function. The soft-key depths have been kept to a minimum and there are clear visual indicators on the screen showing the current machine state.

Easy Measurement Setup

The NFA series of Noise Figure Analyzers now takes the pain out of complex measurement setups, with their simple but instructive menus. The built-in help button gives key function and remote programming commands, that should eliminate the need to carry manuals when setting up measurements.

Low Instrumentation Uncertainty

When making noise figure measurements, a key parameter to be aware of is measurement uncertainty. The NFA has a low instrumentation uncertainty to aid in accurate and repeatable measurement of manufacturers' components. In addition, to aid customers in setting their components/systems specifications, Agilent has produced a web-based uncertainty calculator that will give customers information on how to improve and classify their measurement specifications more accurately.

For more information, visit our web site at: www.agilent.com/find/nf

Increase Measurement Throughput

In manufacturing environments, fast measurement speed and repeatability are critical. The NFA series of Noise Figure Analyzers now include many features that can reduce your measurement time and increase throughput. The frequency list function allows you to select specific points within a complete measurement span to make your measurement. The Sweep averaging function allows a real-time update to the screen during a measurement, as you adjust the performance of the DUT during a sweep. Both these functions, as well as the limit line functionality for quick and easy pass/fail testing and the additional ability to recall complete calibrated instrument states, increase productivity and measurement throughput.

Enhanced Connectivity

The built-in floppy disk drive, GPIB, RS232 serial and Printer port connectors allow quick and easy data transfer between the analyzer and a PC or workstation. There is also a built-in VGA connector for connecting a large-screen monitor.

Color Graphical Display

To enhance usability, the new Noise Figure Analyzers now come with an integrated 17 cm full color LCD display, for simultaneous viewing of noise figure and gain against frequency. There are three different formats for viewing measurements, the two separate channel or combined graph format, a table format, and a spot frequency noise figure and gain measurement "meter" format.

Ease of Automation

The NFA series of Noise Figure Analyzers include 2 industry-standard GPIB ports and an RS232 serial port, to aid in the automated control of the instrument. The second GPIB port is dedicated to Local oscillator control. The default control language is SCPI, but users can also define custom LO commands.

Ease of Integration

To aid with the integration of the new analyzer into manufacturing environments, Agilent has produced a Programmers Reference Manual containing example programs to help migrate to the new system. The NFA is not code compatible with the 8970B, nor can it control the 8971C.

Full Measurement Capability

Features present in all NFA series noise figure analyzers

- ENR data automatically loaded into NFA series noise figure analyzer when using SNS noise source
- Floppy disk loading and saving of ENR data when used with a 346 or 347 noise source
- Enhanced analysis through Limit lines and Marker functions
- Enhanced PC and printer connectivity and VGA output
- Internal data storage capable of storing up to 30 different state, trace, and setup files (dependent upon measurement complexity)
- 4 MHz measurement bandwidth
- Frequency list mode, which enables the user to avoid known, polluted frequencies during a measurement or, used tactically to speed up a measurement

Features only Available on the N8973A, N8974A, N8975A

- Lower noise figure measurement uncertainty $\pm < 0.05$ dB
- Six user selectable bandwidths (100 KHz, 200 KHz, 400 KHz, 1 MHz, 2 MHz, and 4 MHz)
- Enhanced speed

N8972A
N8973A
N8974A
N8975A

Noise Figure Analyzers

10 MHz to 1.5 GHz, 3 GHz, 6.7 GHz and 26.5 GHz Noise Figure Analyzers (cont.)

N8972A
N8973A
N8974A
N8975A

NFA Series Key Specifications

Specifications apply over 0°C to +55°C unless otherwise noted. The analyzer will meet its specifications after 2 hours of storage within the operating temperature range, 60 minutes after the analyzer is turned on, with Alignment running. A user calibration is required before corrected measurements can be made.

Frequency Range

NFA Series:

N8972A 10 MHz to 1.5 GHz
N8973A 10 MHz to 3 GHz
N8974A 10 MHz to 6.7 GHz
N8975A 10 MHz to 26.5 GHz

Measurement Speed (nominal)

	8 Averages	64 Averages
N8972A:	<100 ms/measurement	<80 ms/measurement
N8973A:	<50 ms/measurement	<42 ms/measurement
N8974A:	<70 ms/measurement	<50 ms/measurement
N8975A:	<70 ms/measurement	<50 ms/measurement

Measurement Bandwidth (nominal)

N8972A: 4 MHz
N8973A, N8974A, N8975A: 4 MHz, 2 MHz, 1 MHz, 400 kHz, 200 kHz, 100 kHz

Noise Figure and Gain

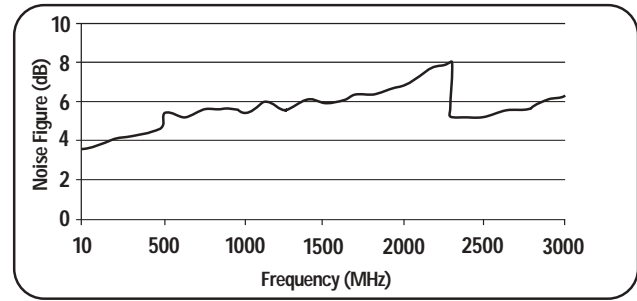
(Performance is dependent upon ENR of noise source used)

N8972A	Noise Source ENR		
	4 – 7 dB	12 – 17 dB	20 – 22 dB
Noise Figure			
Measurement range	0 to 20 dB	0 to 30 dB	0 to 35 dB
Instrument uncertainty	±<0.1 dB	±<0.1 dB	±<0.15 dB
Gain			
Measurement range	-20 to +40 dB		
Instrument uncertainty	±<0.17 dB		

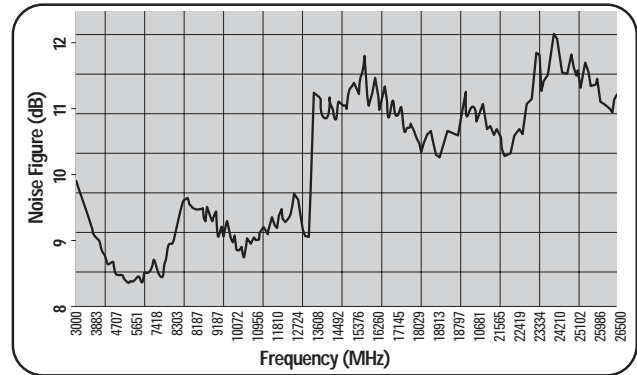
N8973A, N8974A and N8975A (10 MHz to 3.0 GHz)	Noise Source ENR		
	4 – 7 dB	12 – 17 dB	20 – 22 dB
Noise Figure			
Measurement range	0 to 20 dB	0 to 30 dB	0 to 35 dB
Instrument uncertainty	±<0.05 dB	±<0.05 dB	±<0.1 dB
Gain			
Measurement range	-20 to +40 dB		
Instrument uncertainty	±<0.17 dB		

N8974A and N8975A (>3.0 GHz)	Noise Source ENR		
	4 – 7 dB	12 – 17 dB	20 – 22 dB
Noise Figure			
Measurement range	0 to 20 dB	0 to 30 dB	0 to 35 dB
Instrument uncertainty	±<0.15 dB	±<0.15 dB	±<0.2 dB
Gain			
Measurement range	-20 to +40 dB		
Instrument uncertainty	±<0.17 dB		

Characteristic¹ Noise figure at 23°C ± 3°C (10 MHz to 3.0 GHz)



Characteristic¹ Noise figure at 23°C ± 3°C (3.0 GHz to 26.5 GHz)



Characteristic values are met or bettered by 90% of instruments with 90% confidence.

Frequency Reference

	Standard	Opt.1D5
Aging	±<2 ppm ¹ /year	±<0.1 ppm/year
Temperature stability	±<6 ppm	±<0.01 ppm
Settability	±<0.5 ppm	±<0.01 ppm

Tuning Accuracy (Start, Stop, Center, Marker)

4 MHz Measurement Bandwidth (default on all models of Noise Figure Analyzer)

Frequency	Error
10 MHz – 3.0 GHz	±<Reference error + 100 kHz
3.0 GHz – 26.5 GHz	±<Reference error + 400 kHz

<4MHz Measurement Bandwidth (functionality not present in N8972A)

Frequency	Error
10 MHz – 3.0 GHz	±<Reference error + 20 kHz
3.0 GHz – 26.5 GHz	±<Reference error + 20% of measurement bandwidth

¹ Parts Per Million (10e-6)

Noise Figure Analyzers

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General Specifications

Dimensions

Without handle: 222 mm H x 375 mm W x 410 mm D
With handle (max): 222 mm H x 409 mm W x 515 mm D

Weight (typical, without options)

N8972A: 15.3 kg
N8973A: 15.5 kg
N8974A: 17.5 kg
N8975A: 17.5 kg

Data Storage (nominal)

Internal drive: 30 traces, states or ENR tables
Floppy disk: 30 traces, states or ENR tables

Power Requirements

On (line 1): 90 to 132 V rms, 47 to 440 Hz, 195 to 250 V rms, 47 to 66 Hz
Power consumption: <300 W
Standby (line 0): <5 W

Temperature Range

Operating: 0°C to +55°C
Storage: -40°C to +70°C

Humidity Range

Operating: Up to 95% relative humidity to 40°C (non-condensing)
Altitude range: Operating to 4,600 meters

Calibration Interval

1-year minimum recommended

Electromagnetic Compatibility

Complies with the requirements of the EMC directive 89/336/EEC. This includes Generic Immunity Standard EN 50082-1:1992 and Radiated Interference Standard CISPR 11:1990/EN 55011:1991, Group 1 Class A. The conducted and radiated emissions performance typically meets CISPR 11:1990/EN 55011:1991 Group 1 Class B limits.

Warranty

3-Year warranty as standard

Key Literature

Noise Figure Analyzers, NFA Series, Brochure, p/n 5980-0166E
Noise Figure Analyzers, NFA Series, Data Sheet, p/n 5980-0164E
Noise Figure Analyzers, NFA Series, Configuration Guide, p/n 5980-0163E
Fundamentals of RF and Microwave Noise Figure Measurements, App note 57-1, p/n 5952-8255E
Noise Figure Measurement Accuracy, App note 57-2, p/n 5952-3706
10 Hints for Making Successful Noise Figure Measurements, p/n 5980-0228E
N8972A and N8973A, NFA Series, Noise Figure Analyzer Programming Examples, p/n 5968-9498E

Ordering Information

N8972A 10 MHz to 1.5 GHz NFA Series Noise Figure Analyzer
N8973A 10 MHz to 3.0 GHz NFA Series Noise Figure Analyzer
N8974A 10 MHz to 6.7 GHz NFA Series Noise Figure Analyzer
N8975A 10 MHz to 26.5 GHz NFA Series Noise Figure Analyzer

All options, other than those marked with *, can be ordered at any time for use with an instrument.

Frequency Reference

N897xA-1D5 NFA series high stability frequency reference*

Calibration Documentation

N897xA-A6J NFA series ANSI Z540 compliant calibration with test data*

Accessories

N897xA-1CP NFA series rackmount and handle kit
N897xA-UK9 NFA series front panel cover
N897xA-1FP NFA series calibration, performance verification and adjustment software

Documentation

A hard copy and CD version of the English language Quick Reference Guide, User's Guide, Programmers Reference, and Calibration and Performance Verification Manual are included with the NFA as standard. Selections can be made to change the localization of the manual set or to delete the hardcopy.

N897xA-AB0 NFA series manual set for Taiwan – Chinese localization
N897xA-AB1 NFA series manual set – Korean localization
N897xA-AB2 NFA series manual set – Chinese localization
N897xA-ABE NFA series manual set – Spanish localization
N897xA-ABF NFA series manual set – French localization
N897xA-ABZ NFA series manual set – Italian localization
N897xA-ABD NFA series manual set – German localization
N897xA-ABJ NFA series manual set – Japanese localization
N897xA-OB0 Delete hardcopy manual set*

Note: The localized options will include a localized version of the Quick Reference Guide and User Guide, and an English language version of the Programmers Reference, and Calibration and Performance Verification Manual.

Additional Documentation

N897xA-OB1 NFA series manual set (English version)
N897xA-OB2 NFA series user manual (English version)
N897xA-OBF NFA series programmers reference (English version)

Service Options:

Warranty and Service

Standard warranty is 3 years.

For warranty and service of 5 years, please order R-51B-001-5F: "3 year Return-to Agilent warranty extended to 5 years" (quantity = 1).

Calibration²

For 3 years, order 36 months of the appropriate calibration plan shown below. For 5 years, specify 60 months.

R-50C-001 Standard calibration plan*

R-50C-002 Standard compliant calibration plan*

² Options not available in all countries

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