Agilent U8903A Audio Analyzer
Make an Audible Difference
Data Sheet

Capabilities

- Select generator, analyzer, graph and sweep modes with one-button access
- Measure at DC and from 10 Hz to 100 kHz
- Characterize signal-to-noise ratio, SINAD, IMD, DFD, THD+N ratio, THD+N level, crosstalk, and more
- Apply weighting functions, standard filters and custom filters
- Stimulate the device with high-quality signals and arbitrary waveforms
- View numerical and graphical displays of measurement results
- Connect to a PC through GPIB, LAN/LXI - C and USB interfaces

LXI class C certified

Whether listening to mono, stereo or surround, the human ear knows what sounds good. Measuring "how good," however, can be a challenge. The Agilent U8903A audio analyzer helps you measure and quantify audio performance in applications such as wireless audio, analog components and ICs, and consumer audio.

Across the audio spectrum and beyond, this scalable, single-unit solution provides versatile measurement functions, diverse test signals and powerful analysis capabilities. Whatever your application, the U8903A can help you make an audible difference in device performance.

Step up from the HP 8903B

The U8903A is the next-generation replacement for the widely used HP 8903B audio analyzer. Application note "*Migrating Code from the 8903B to U8903A*" (5990-4135EN) provides compatible equivalent commands, and sample test programs comparing the old R2D2 codes with new U8903A SCPI commands.

Agilent Technologies

The U8903A audio analyzer combines the functionality of a distortion meter, SINAD meter, frequency counter, AC voltmeter, DC voltmeter and FFT analyzer with a low-distortion audio source. On the bench or in a test system, its accuracy and versatility will help you make an audible difference in your end product.

Measure and analyze essential audio parameters

With the U8903A, you can measure below, across and above the audio spectrum with its 10 Hz to 100 kHz frequency range and built-in DC measurements. Its dual input channels let you perform stereo audio, frequency response, wireless and component tests—all at a single-channel price.

Easily characterize parameters such as signal-to-noise ratio, SINAD, intermodulation distortion (IMD), different-frequency distortion (DFD), total harmonic distortion (THD+N ratio, THD+N level), crosstalk and more. Additional measurement capabilities include AC level, DC level, frequency count and frequency spectrum (through FFT analysis; see Figure 1).

For all measurements, you can apply weighting functions as well as low-pass, high-pass and standard filters (Figure 2). You can also create custom filters using MATLAB® and other applications and upload them through the analyzer's USB port. Filters and weighting functions can be applied one, two or three at a time.

Generate high-quality test signals

The built-in, dual-channel signal generator lets you stimulate your device with a variety of high-quality signals: sine (–105 dB noise floor), square, rectangular, noise (Gaussian and rectangular), two-tone and multi-tone (up to 60) (see Figure 3). To simulate complex and real-world signals, you can also create arbitrary waveforms with up to 16,384 points and a 321.5 kHz sampling rate.

The output voltage range is 0 V to 8 Vrms with 1% accuracy. For unbalanced connections, you can select 50 Ω or 600 Ω output impedance.

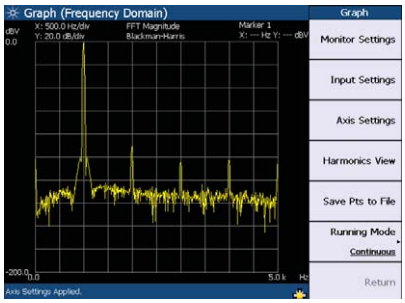


Figure 1. Perform FFT analysis with up to 32 Kpoints and a wide selection of informative graphing functions.

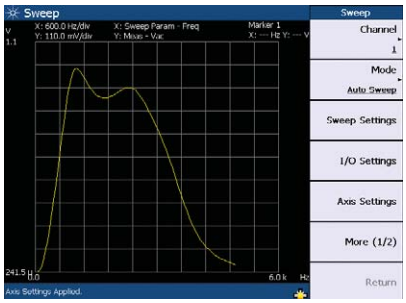


Figure 2. Apply an extensive selection of filters, including a variety of weighting functions.

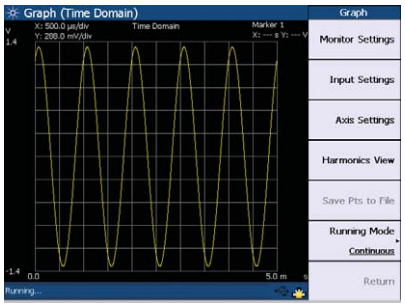


Figure 3. Utilize high-quality test signals that provide low distortion and low noise level.

Easily perform manual and automated tests

One-button access makes it easy to select the four main operating modes: analyzer, generator, graph and sweep. The 5.7-inch color display provides numeric readouts as well as graphical views of analog sweeps, FFT spectra and more.

For PC-based control on the bench or in a test system, the U8903A includes GPIB, LAN/LXI – C, and USB interfaces. If your system currently uses an HP 8903B audio analyzer, the application note "*Migrating Code from the 8903B to U8903A*" (5990-4135EN) describes compatible equivalent commands and provides sample test programs comparing the old R2D2 codes with new U8903A SCPI commands.

	U8903A	HP 8903B
Frequency range	DC and 10 Hz to 100 kHz	20 Hz to 100 kHz
Frequency accuracy	5 ppm (0.0005%)	0.004%

Table 1. Comparison of frequency range and accuracy

	U8903A	HP 8903B
AC voltage input range	0 V to 140 V_{rms}	0.3 mV_{rms} to 300 V_{rms}
AC accuracy	± 1%	± 4%
DC voltage input range	0 to ± 200 V	4 V to 300 V
DC accuracy	± 1%	± 1%

Table 2. Comparison of accuracy and ranges in AC and DC level measurements

	U8903A	HP 8903B
Frequency range	10 Hz to 100 kHz	20 Hz to 100 kHz
Residual THD+N (signal distortion) at 80 kHz BΩ	≤ –101 dB (at 1 kHz, 1 V_{rms}), 20 Hz to 20 kHz	–80 dB (or 15 µV), 20 Hz to 20 kHz
Accuracy	± 0.5 dB (< 20 kHz) ± 0.7 dB (< 100 kHz)	± 1 dB (20 Hz to 20 kHz) ± 2 dB (20 kHz to 100 kHz)

Table 3. Comparison of range and residual THD+N measurements

Replace your 8903B and add next-generation capabilities

For nearly two decades, the HP 8903B provided unparalleled versatility and performance in audio applications. Today, the U8903A audio analyzer builds on the legacy of the 8903B by offering faster single-point measurements (0.4 sec vs. 3.0 sec) as well as a wider frequency range, expanded performance and greater functionality (Tables 1, 2 and 3). Because the U8903A is based on the latest digital technologies, we also predict greater instrument uptime on the bench and in test systems.

With the U8903A, you can configure measurements faster through its graphical user interface (GUI) and one-button selection of major operating modes. The color screen lets you view dual-parameter displays from one or two channels as well as graphical displays of sweeps, frequency spectra and more (Figure 4).

(4a)

(4a)

Figures 4a and 4b. The new U8903A audio analyzer (4a) offers numerous improvements over the widely used HP 8903B (4b)

Take a closer look

Front panel

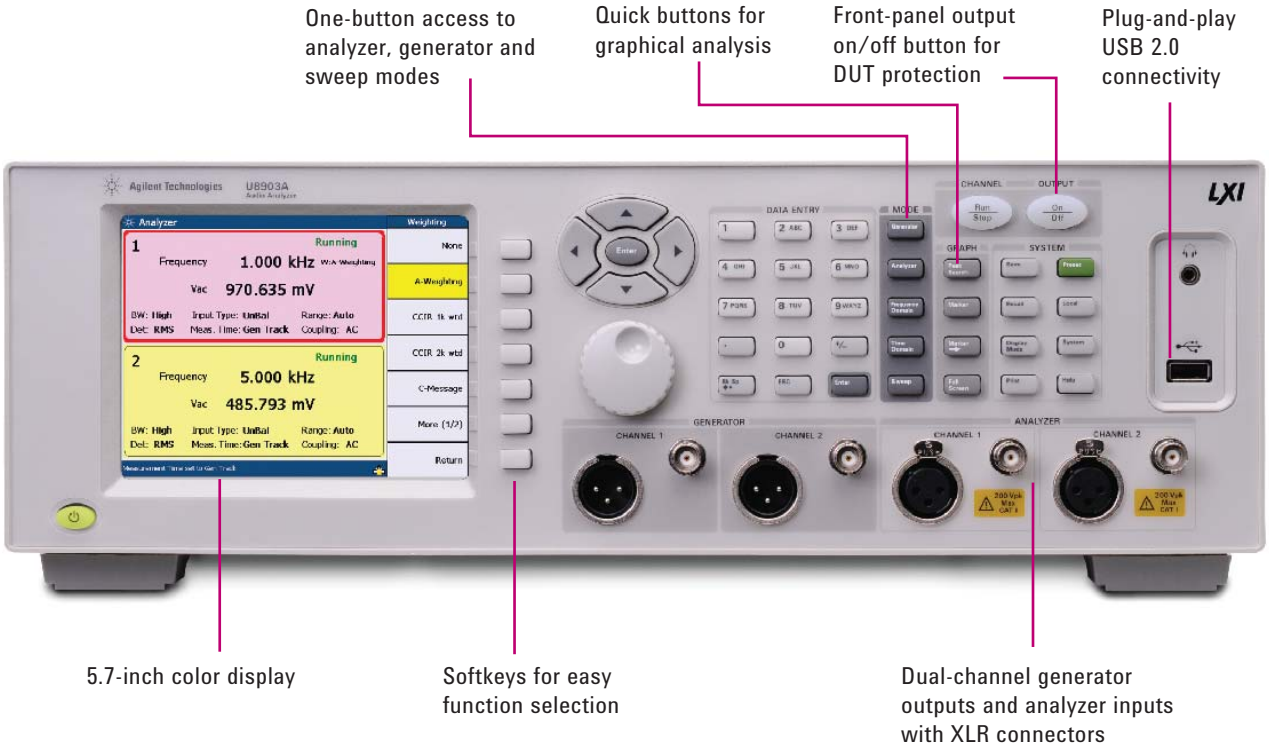


Figure 5. U8903A audio analyzer, front view

Rear panel

Figure 6. U8903A audio analyzer, rear view

Address challenging audio applications

General audio testing

The U8903A provides essential measurement capabilities that enable efficient analysis of audio amplifiers and other devices in the audio chain. For example, the analyzer includes balanced and unbalanced outputs and inputs. It also provides a wide selection of filters and enhances your flexibility by making it easy to upload customized filters. With an array of sweep functions and flexible data display formats for each measurement, you'll be ready to address a wide range of challenging audio applications.

Amplifier testing

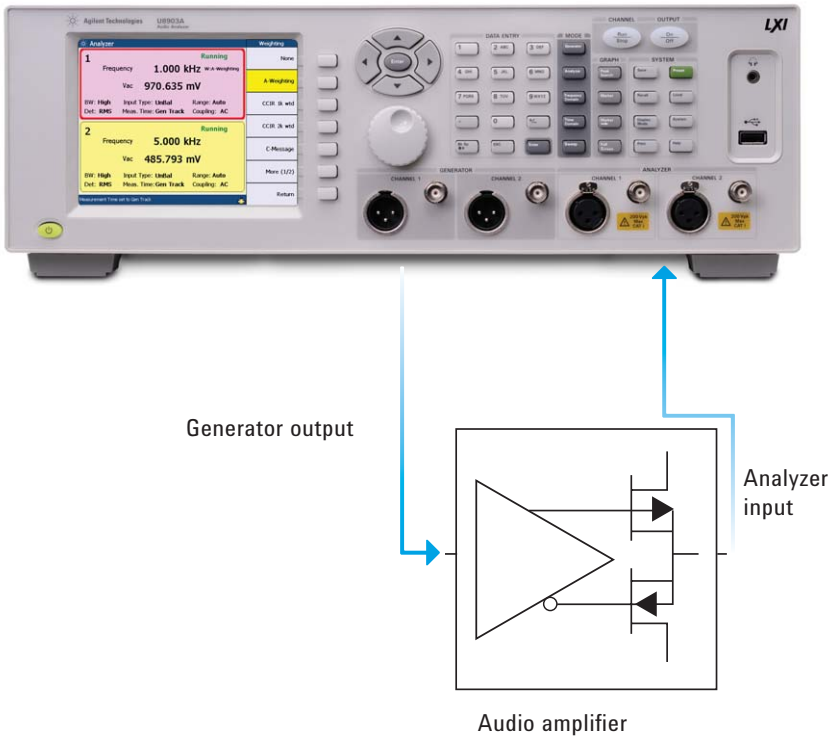


Figure 7. Audio testing using the U8903A

Balanced inputs

In the quest for higher output power, many audio amplifiers use bridged output stages. Such amplifiers can be difficult to characterize because their outputs cannot be grounded. To test these devices, the usual approach has been to use a balanced, calibrated isolation transformer connected to an analyzer with an unbalanced input.

The widely used HP 8903B eliminated the need for a transformer, but it was still necessary to float the analyzer input before connecting the bridged device and making measurements. With the U8903A, you simply make a balanced connection with an XLR connector and make measurements—no floating required.

Standard and custom filters

A selection of built-in filters simplifies audio measurements by providing weighting networks required by international standards. These include CCIR, CCIR/ARM and CCIT weighting filters; a C message filter; and an ANSI "A" weighting filter. In addition to the standard filters, you can create custom filters using applications such as MATLAB or Agilent VEE and upload the filters through the analyzer's USB port. The U8903A also includes selectable 15 kHz, 20 kHz and 30 kHz low-pass filters to reject unwanted, out-of-band signals and noise.

Display scaling and formatting

U8903A gives you flexible control over data displays. For example, you can choose volts, millivolts, dBm into 600 Ω (or other resistance values), or watts for AC level measurements, and select percent or dB for distortion measurements.

Address challenging audio applications (continued)

Swept measurements

With its internal audio source and precise digital control, the U8903A can perform automatic swept measurements of frequency response, distortion and signal-to-noise. For example, to check the frequency response of an active filter, only a few steps are required. After connecting the device and setting the required source level, simply enter the start and stop frequencies, and then press the "Sweep" key (Figure 8).

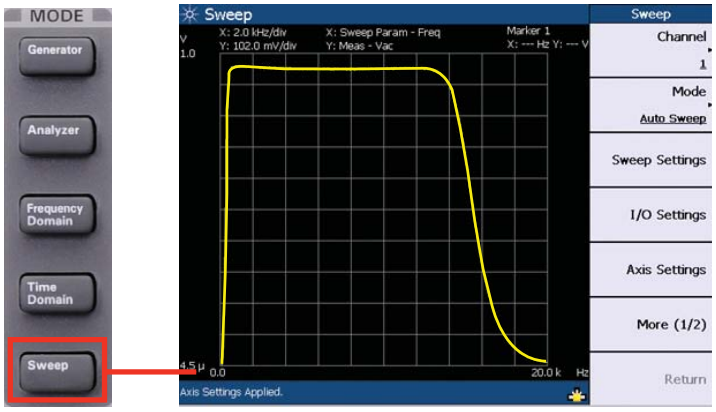


Figure 8. Use a single button to access the swept measurement mode

Transmitter and receiver testing

The U8903A includes several measurement features that simplify the testing of the transceivers used in devices such as car radios, telephones, mobile radios, broadcast radios, FM tuners and television. The U8903A can handle all of these applications when combined with a modulating signal generator for receiver testing and a signal analyzer for transmitter testing (see diagrams).

Receiver testing

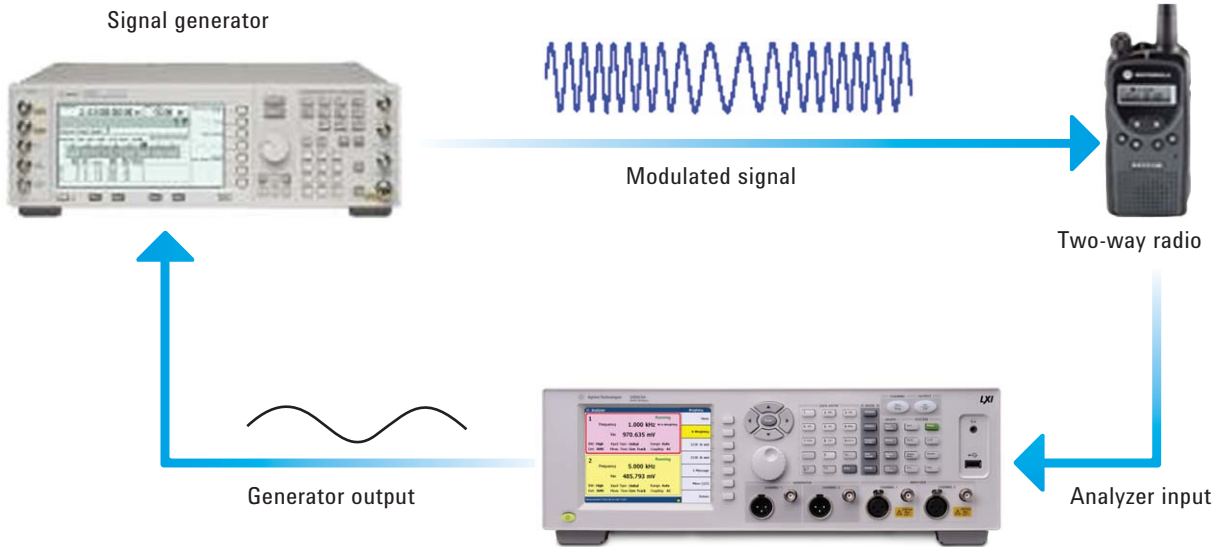


Figure 9. Receiver testing using the U8903A

Address challenging audio applications (continued)

Transmitter testing

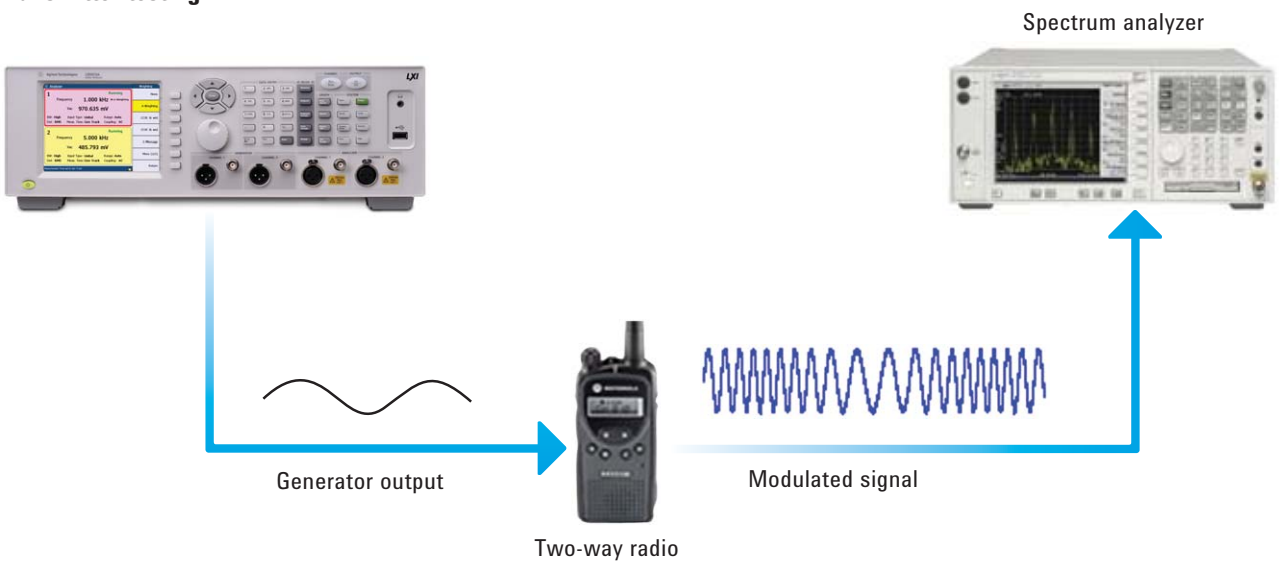


Figure 10. Transmitter testing using the U8903A and a spectrum analyzer

True-RMS detection

To accurately characterize signals with high noise content, true-RMS detection is required. The U8903A employs true-RMS detection for all signals with crest factor less than three. In addition, quasi-peak detection (CCIR 468-4) and peak-to-peak detection are also available through softkey selections.

Built-in filters

The U8903A includes a variety of essential filters for transmitter and receiver testing. Its CCITT, CCIR, and C-message weighting filters meet international standards for receiver testing. For transmitter testing, the seven-pole 400 Hz high-pass filter provides better than 40 dB rejection of signals up to 250 Hz, letting you measure transmitter audio distortion to 1% without disabling squelch signals.

For even greater flexibility, you can apply custom filters created using applications such as MATLAB and Agilent VEE. Once you've uploaded a filter via the U8903A's USB port, it can be applied to your measurements through a softkey selection. In all, you can apply up to three filters at a time.

SINAD measurements

Commonly used to test FM receivers, SINAD measurements must be made repeatedly when checking receiver sensitivity or adjacent-channel selectivity. To smooth out the typically noisy signals that are present during receiver testing, the analyzer's SINAD mode employs extra filtering circuits. These have been optimized for high speed and excellent repeatability: The U8903A provides distortion and SINAD measurements with an acquisition time of less than 1.5 seconds and a measurement rate of greater than two reading per second after locking.

Signal-to-noise ratio

To characterize signal quality in AM receivers, the U8903A can automatically make the necessary signal-to-noise ratio measurements. It does this by monitoring the incoming AC signal level while turning its low-distortion source on and off.

Characteristics

Power consumption

250 VA

Power requirements

- 100 V_{ac} to 240 V_{ac}
- 47 Hz to 63 Hz

Operating environment

- Operating temperature from 0 °C to 55 °C
- Relative humidity at 20% to 80% RH (noncondensing)
- Altitude up to 3000 m
- Pollution degree 2
- Installation category II

Storage compliance

–55 °C to 75 °C

Safety compliance

Certified with:

- IEC 61010-1:2001/EN61010-1:2001 (2nd Edition)
- Canada: CAN/CSA-C22.2 No. 61010-1-04
- USA: Ansi/UI 61010-1:2004

Emc compliance

- IEC 61326-1:2005/EN 61326-1:2006
- Canada: ICES-001:2004
- Australia/New Zealand: AS/NZS CISPR11:2004

Dimensions (W x D x H)

425.6 mm (16.76 in) x 405.0 mm (15.94 in) x 133.6 mm (5.25 in)

Weight

< 8.5 kg (without cards)

Warranty

One year for U8903A

Three months for standard-shipped accessories (see page 13)

Specifications

The following specifications are based on performance with 30 minutes of warm-up time and a temperature from 0 °C to 55 °C, unless stated otherwise.

Audio generator

Generated waveform	Sine, dual sine, variable phase, square, noise (Gaussian and rectangular), arbitrary, DC, multitone, SMPTE IMD (1:1, 4:1, and 10:1), DFD (IEC 60118/IEC 60268)
Sine, dual sine, and variable phase	
Frequency	
Range	5 Hz to 80 kHz
Accuracy	5 ppm
Resolution	0.1 Hz
Output	
Range (balanced)	0 V to 16 V_{rms}
Range (unbalanced/common)	0 V to 8 V_{rms}
Amplitude accuracy	± 1%
Amplitude resolution	1 μV_{rms} (limited to five digits of resolution)

Specifications (continued)

Flatness	
20 Hz to 20 kHz	± 0.01 dB
5 Hz to 80 kHz	± 0.1 dB
THD + N at 1 kHz, 1 V_{rms}, 20 Hz to 20 kHz bandwidth	≤ –95 dB (at 23 °C ± 5°C) ≤ –92 dB (from 0 °C to 55 °C)
Dual sine ratio range	0 dB to 100 dB
Phase	–180 ° to 179.99 °
Sweep	Frequency, amplitude, phase
Square	
Frequency	
Range	5 Hz to 30 kHz
Output	
Range (balanced)	0 V to 45.2 V_{pp}
Range (unbalanced/common)	0 V to 22.6 V_{pp}
Amplitude accuracy (at 1kHz)	2%
Rise time	< 2 µs
SMPTE IMD (1:¼:1/10:1)	
Frequency	
Low frequency (LF) tone	40 Hz to 500 Hz
High frequency (HF) tone	2 kHz to 60 kHz
Output	
Range (balanced)	0 V to 16 V_{rms}
Range (unbalanced/common)	0 V to 8 V_{rms}
Mixed ratio (LF:HF)	10:1, 4:1, or 1:1
Residual IMD (20 Hz to 20 kHz)	≤ –92 dB
Sweep	Upper frequency, lower frequency, amplitude
DFD (IEC 60118/IEC 60268)	
Frequency	
Difference frequency	80 Hz to 2 kHz
Upper frequency	3 kHz to 80 kHz
Center frequency	3 kHz to 79 kHz
Output	
Range (balanced)	0 V to 16 V_{rms}
Range (unbalanced/common)	0 V to 8 V_{rms}
Inherent distortion (20 Hz to 20 kHz)	≤ –101 dB
Sweep	Upper frequency, center frequency, amplitude
Arbitrary/multitone	
Sample rate	312.5 kHz
Length	32 to 32768 points/channel
Maximum number of tones	(Length/2) – 1
Noise	
Type	Gaussian, rectangular
Output	
Range (balanced)	0 V to 7.2 V_{rms} (Gaussian), 0 V to 13.16 V_{rms} (rectangular)
Range (unbalanced/common)	0 V to 3.6 V_{rms} (Gaussian), 0 V to 6.58 V_{rms} (rectangular)
DC	
Output	
Range (balanced)	–22.6 V to 22.6 V
Range (unbalanced/common)	–11.3 V to 11.3 V
Amplitude accuracy	± 1.5%
DC offset	
Applicable for all waveform types except variable phase, DC, and square	

Specifications (continued)

Output level	
Range	–11.3 V to 11.3 V
Amplitude accuracy	± 1.5%
Output characteristic	
Connection type	
Balanced	XLR
Unbalanced	BNC
Common mode	XLR
Impedance	
Balanced	100 Ω, 600 Ω
Unbalanced	50 Ω, 600 Ω
Output current limit (typical)	50 mA
Maximum output power into 600 Ω	
Balanced (600 Ω)	20 dBm
Unbalanced (600 Ω)	14 dBm
Crosstalk	
20 Hz to 20 kHz	≤ –101 dB (at 23 °C ± 5 °C)
	≤ –99 dB (from 0 °C to 55 °C)
20 kHz to 80 kHz	≤ –85 dB

Audio analyzer

Input characteristics	
Connection type	
Balanced	XLR
Unbalanced	BNC
Coupling	DC, AC
Measurement bandwidth	
Low	30 kHz
High	100 kHz
Input ranges	400 mV to 140 V_{rms}
Measurement range	< 1 µV [1] to 140 V_{rms}
Maximum rated input	200 Vp for altitude up to 3000 m
Impedance	
Balanced	200 kΩ
Unbalanced	100 kΩ
Flatness	
20 Hz to 20 kHz	± 0.01 dB [2] (at 23 °C ± 5 °C)
	± 0.012 dB [3] (from 0 °C to 55 °C)
20 kHz to 100 kHz	± 0.1 dB (at 23 °C ± 5 °C)
	± 0.15 dB (from 0 °C to 55 °C)
CMRR	
≤ 20 kHz (input range ≤ 6.4 V)	≥ 70 dB [4]
≤ 20 kHz (input range > 6.4 V)	≥ 40 dB [4]
Crosstalk	
20 Hz to 20 kHz	≤ –101 dB
Input protection	Overload protection for all ranges, onscreen warning message on the front panel

THD + N and SINAD	
Fundamental frequency range	10 Hz to 100 kHz
Display range	-999.999 dB to 0 dB
Accuracy < 20 kHz < 100 kHz	 ± 0.5 dB ± 0.7 dB
Input Voltage Range	< 1µV to 140 Vrms
Residual distortion (at 1 kHz, 1 Vrms, 20 Hz to 20 kHz bandwidth)	≤ -101 dB
3 dB measurement bandwidth	> 130 kHz
Detection	RMS
Display resolution	% up to 3 decimal places (dB up to 2 decimal places)
Signal to noise	
Fundamental frequency range	10 Hz to 100 kHz
Display range	–999.999 dB to 0 dB
Accuracy < 20 kHz < 100 kHz	 ± 0.5 dB ± 0.7 dB
Input voltage range	< 1 µV to 140 Vrms
Residual distortion (at 1 kHz, 1 Vrms, 20 Hz to 20 kHz bandwidth)	≤ –101 dB
Triggering	
Type	Free run, external
Level	5 V
Minimum trigger high voltage	1.25 V
Maximum trigger low voltage	0.5 V
Input impedance	> 50 kΩ
Amplitude	
DC measurement range	0 to ± 200 V
DC accuracy	± 1%
AC accuracy (20 Hz to 100 kHz)	± 1% (at 23 °C ± 5 °C) ± 2% (from 0 °C to 55 °C)
AC level detection	RMS, peak-to-peak, quasi peak
Over range	80% from the peak of the range value will trigger change to next lower range
Frequency	
Range	10 Hz to 100 kHz
Minimum input	1 mV (S/N > 40 dB)
Accuracy	5 ppm
Resolution	6 digits
Phase	
Accuracy < 20 kHz < 100 kHz	 ± 2 ° ± 4 °
Minimum input	1 mV (S/N > 40 dB)
Resolution	0.01 °
SMPTE IMD	
Residual IMD	≤ 0.0025% (–92 dB)

[1] Defined by 24-bit measurement.
[2] ± 0.01 dB – 0.001 dB/Hz below 50 Hz.
[3] ± 0.012 dB – 0.001 dB/Hz below 50 Hz.
[4] When AC coupled, CMRR will deteriorate at low frequencies.

Specifications (continued)

Graph mode

Size/acquisition length	256, 512, 1024, 2048, 4096, 8192, 16384, 32768
Window	Rectangular, Hann, Hamming, Blackman-Harris, Rife-Vincent 1 and 3, Flattop
Amplitude accuracy (flattop window)	± 0.1 dB (± 1.2%)
Display mode	
Time domain	Normal, interpolate, peak, absolute value
Frequency domain	displays highest FFT bin between graph points

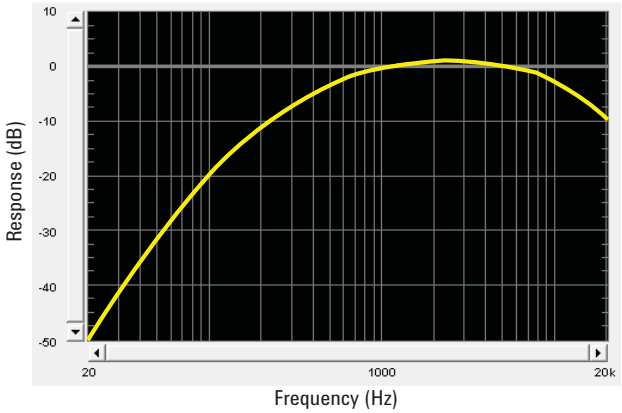
Audio filters

Low pass filter	• 15 kHz low pass • 20 kHz low pass • 30 kHz low pass • User-defined [1]
High pass filter	• 20 Hz high pass • 100 Hz high pass • 400 Hz high pass • User-defined [1]
Weighting filter	• A-weighting (ANSI-IEC "A" weighted, per IEC Rec 179) • CCIR 1K weighted (CCIR Rec. 468) • CCIR 2K weighted (Dolby 2K) • C-Message (C-Message per IEEE 743) • CCITT (ITU-T Rec. O.41, ITU-T Rec. P.53) • User-defined [1]

[1] User-defined filters can be uploaded through standard I/O connections.

Specifications (continued)

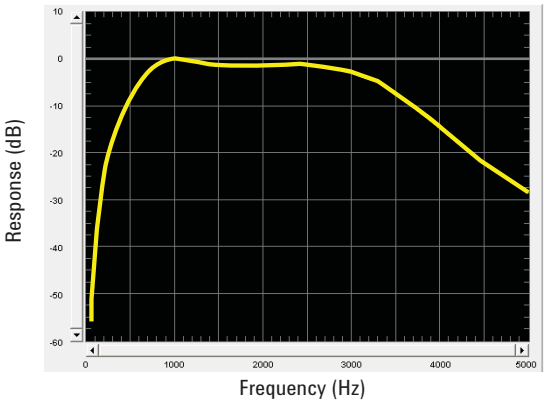
"A" weighting filter frequency response



"A" Weighting Filter (ANSI-IEC "A" weighted, per IEC Rec. 179)
Deviation from ideal response:
±0.1 dB at 1 kHz
±0.5 dB, 20 Hz to 10 kHz
±0.1 dB, at 10 kHz to 20 kHz

Figure 11. "A"weighting filter frequency response

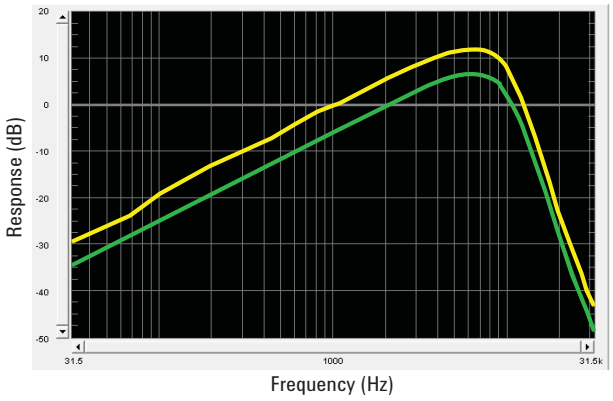
CCIR-2K weighting filter (Dolby 2K)
Deviation from ideal response: same as listed previously under CCIR-1K weighting filter.



C-Message weighting filter (C-Message per IEEE 743)
Deviation from ideal response:
±0.1 dB, at 1 kHz
±1.0 dB, 60 Hz to 5 kHz

Figure 12. CCIR-2K weighting filter

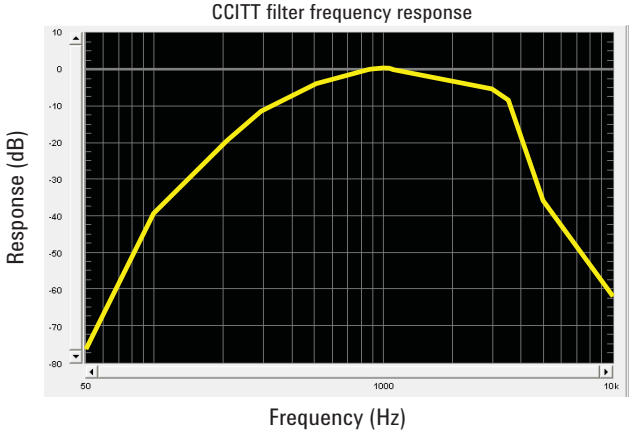
CCIR-1k filter and CCIR-2k filter frequency response



CCIR-1K weighting filter (CCIR Rec. 468)
Deviation from ideal response:
±0.1 dB, at 6.3 kHz
±0.2 dB, at 6.3 kHz to 7.1 kHz
±0.4 dB, at 7.1 kHz to 10 kHz
±0.5 dB, at 200 Hz to 6.3 kHz
±1.0 dB, at 31.5 kHz to 200 kHz, 10 kHz to 20 kHz
±2.0 dB, at 20 kHz to 31.5 kHz

Figure 13. CCIR-1k filter and CCIR-2K filter frequency response

CCITT filter frequency response



CCITT message weighting filter (ITU-T Rec. 0.41, ITU-T Rec. P.53)
Deviation from ideal response:
±0.2 dB, at 800 Hz
±1.0 dB, at 300 Hz to 3 kHz
±2.0 dB, at 50 Hz to 3.5 kHz
±3.0 dB, at 3.5 kHz to 5 kHz

Figure 14. CCITT filter frequency response

Specifications (continued)

Sweep capability

Frequency sweep (sine and dual sine waveforms)	
Start point	5 Hz to 80 kHz
Stop point	5 Hz to 80 kHz
Amplitude spot value (balanced)	0 V to 16 V_{rms}
Amplitude spot value (unbalanced/common)	0 V to 8 V_{rms}
Frequency sweep (square waveform)	
Start point	5 Hz to 30 kHz
Stop point	5 Hz to 30 kHz
Amplitude spot value (balanced)	0 V to 22.6 V_{rms}
Amplitude spot value (unbalanced/common)	0 V to 11.3 V_{rms}
Frequency sweep (SMPTE IMD 1:¼:1/10:1 Waveform)	
Start point (upper frequency)	2 kHz to 60 kHz
Start point (lower frequency)	40 Hz to 500 Hz
Stop point (upper frequency)	2 kHz to 60 kHz
Stop point (lower frequency)	40 Hz to 500 Hz
Amplitude spot value (balanced)	0 V to 16 V_{rms}
Amplitude spot value (unbalanced/common)	0 V to 8 V_{rms}
Frequency sweep (DFD IEC 60118/IEC 60268 Waveform)	
Start point (upper frequency)	3 kHz to 80 kHz
Start point (center frequency)	3 kHz to 79 kHz
Stop point (upper frequency)	3 kHz to 80 kHz
Stop point (center frequency)	3 kHz to 79 kHz
Amplitude spot value (balanced)	0 V to 16 V_{rms}
Amplitude spot value (unbalanced/common)	0 V to 8 V_{rms}
Difference frequency spot value	80 Hz to 2 kHz
Voltage sweep	
Start point (balanced)	0 V to 16 V_{rms} [1]
Start point (unbalanced/common)	0 V to 8 V_{rms} [1]
Stop point (balanced)	0 V to 16 V_{rms} [1]
Stop point (unbalanced/common)	0 V to 8 V_{rms} [1]
Frequency spot value (sine and dual sine waveforms)	5 Hz to 80 kHz
Frequency spot value (square waveform)	5 Hz to 30 kHz
Frequency spot value (SMPTE IMD 1:¼:1/10:1 waveform)	40 Hz to 500 Hz (lower frequency), 2 kHz to 60 kHz (upper frequency)
Frequency spot value (DFD IEC 60118/IEC 60268 waveform)	3 kHz to 80 kHz (upper frequency), 3 kHz to 79 kHz (center frequency), 80 Hz to 2 kHz (difference frequency)
DC sweep	
Start point (balanced)	–22.6 V to 22.6 V
Start point (unbalanced/common)	–11.3 V to 11.3 V
Stop point (balanced)	–22.6 V to 22.6 V
Stop point (unbalanced/common)	–11.3 V to 11.3 V
Phase sweep	
Start point	–180 ° to 179.99 °
Stop point	–180 ° to 179.99 °

[1] This range is applicable for sine wave only.

Ordering Information

Model number	Description
U8903A – 200	2-channel audio analyzer

Standard-shipped accessories

LAN and USB cables, power cord, product reference CD-ROM (contains *U8903A Quick Start Guide* and *User Guide*), *Quick Start Guide*, 1GB USB flash memory device and certificate of calibration.

Figure 15. Included accessories

Optional accessories

U8903A - 101
Male BNC to male BNC cable; 1.2 m

U8903A - 102
Male BNC to male RCA cable; 2 m

U8903A - 103
Male XLR to female XLR cable; 2 m

U8903A - 908
Rack mount kit – standard 3U

U8903A – ABJ
Japanese User Guide (hardcopy)

Agilent Email Updates

www.agilent.com/find/emailupdates
Get the latest information on the products and applications you select.

www.lxistandard.org
LXI is the LAN-based successor to GPIB, providing faster, more efficient connectivity. Agilent is a founding member of the LXI consortium.

Agilent Channel Partners

www.agilent.com/find/channelpartners
Get the best of both worlds: Agilent's measurement expertise and product breadth, combined with channel partner convenience.

Remove all doubt

Our repair and calibration services will get your equipment back to you, performing like new, when promised. You will get full value out of your Agilent equipment throughout its lifetime. Your equipment will be serviced by Agilent-trained technicians using the latest factory calibration procedures, automated repair diagnostics and genuine parts. You will always have the utmost confidence in your measurements. For information regarding self maintenance of this product, please contact your Agilent office.

Agilent offers a wide range of additional expert test and measurement services for your equipment, including initial start-up assistance, onsite education and training, as well as design, system integration, and project management.

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

www.agilent.com/find/removealldoubt

www.agilent.com
www.agilent.com/find/audioanalyzer

For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office. The complete list is available at:

www.agilent.com/find/contactus

Americas

Canada	(877) 894 4414
Latin America	305 269 7500
United States	(800) 829 4444

Asia Pacific

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Thailand	1 800 226 008

Europe & Middle East

Austria	43 (0) 1 360 277 1571
Belgium	32 (0) 2 404 93 40
Denmark	45 70 13 15 15
Finland	358 (0) 10 855 2100
France	0825 010 700*
	*0.125 €/minute
Germany	49 (0) 7031 464 6333
Ireland	1890 924 204
Israel	972-3-9288-504/544
Italy	39 02 92 60 8484
Netherlands	31 (0) 20 547 2111
Spain	34 (91) 631 3300
Sweden	0200-88 22 55
Switzerland	0800 80 53 53
United Kingdom	44 (0) 118 9276201

Other European Countries:
www.agilent.com/find/contactus

Revised: October 1, 2009

Product specifications and descriptions in this document subject to change without notice.

Printed in USA, May 11, 2010
5990-3831EN

Agilent Technologies