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
- Code compatible with HP8903B
- 2 in 1 screen (generator and analyzer in the same display screen)

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.

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 helps you make an audible difference in your end product.

Agilent Technologies

Replace your 8903B and add next-generation capabilities

For nearly two decades, the HP 8903B provided unparalleled versatility and performance in audio applications. The U8903A builds on the legacy of the 8903B by offering faster single-point measurements (0.4 sec versus 3.0 sec) as well as a wider frequency range, expanded performance, and greater functionality (Tables 1, 2, and 3). 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 1).

To makes the transition easy, the next-generation replacement for the HP 8903B audio analyzer features a built-in code emulator which automatically converts 8903B R2D2 code directly into SCPI commands used by the U8903A. The Agilent application note *Migrating Code from the 8903B to U8903A* (5990-4135EN) and the *U8903A Programming Guide* (U8903-90027) provide additional resources to assure you get the most from this new class of audio analyzer.

Table 1. Comparison of frequency range and accuracy

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

	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 to 300 V
DC accuracy	± 1%	± 1%

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

	U8903A	HP 8903B
Frequency range	10 Hz to 100 kHz	20 Hz to 100 kHz
Residual THD+N (signal distortion) at 80 kHz BW	≤ –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 to 100 kHz)

Figure 1. The new U8903A audio analyzer (left) offers numerous improvements over the widely used HP 8903B (right).

Address Challenging Audio Applications

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, frequency spectrum, and FFT analysis (Figure 2).

For all measurements, you can apply weighting functions as well as low-pass, high-pass, and standard filters (Figure 3). 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.

U8903A also provides a 2 in 1 screen, which simultaneously displays the generator and analyzer information (Figure 5). This allows the user to change the generator (source) setting while monitoring the analyzer results in real 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) (Figure 4). To simulate complex and real-world signals, you can also create arbitrary waveforms with up to 16,384 points and at 312.5 kHz sampling rate.

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

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.

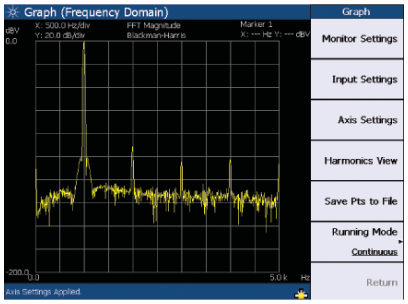


Figure 2. Perform FFT analysis with up to 32 Kpoints and a wide selection of informative graphing functions

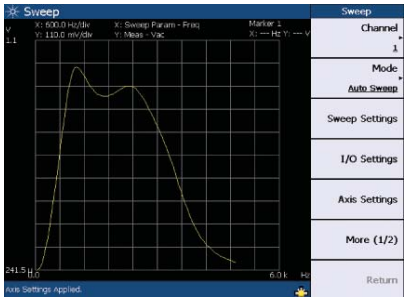
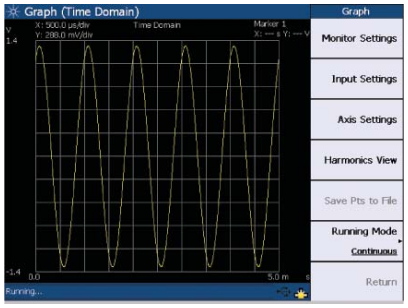


Figure 3. Apply an extensive selection of filters, including a variety of weighting functions



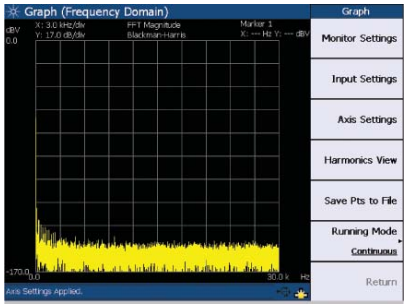


Figure 4. Utilize high-quality test signals that provide low distortion and low noise level

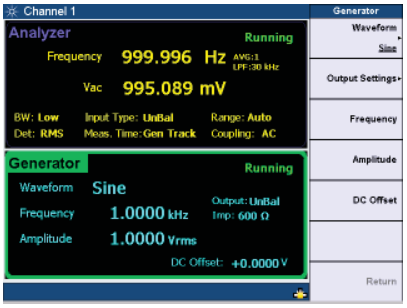


Figure 5. 2 in 1 screen generator and analyzer in the same display screen

Take a Closer Look

Front panel

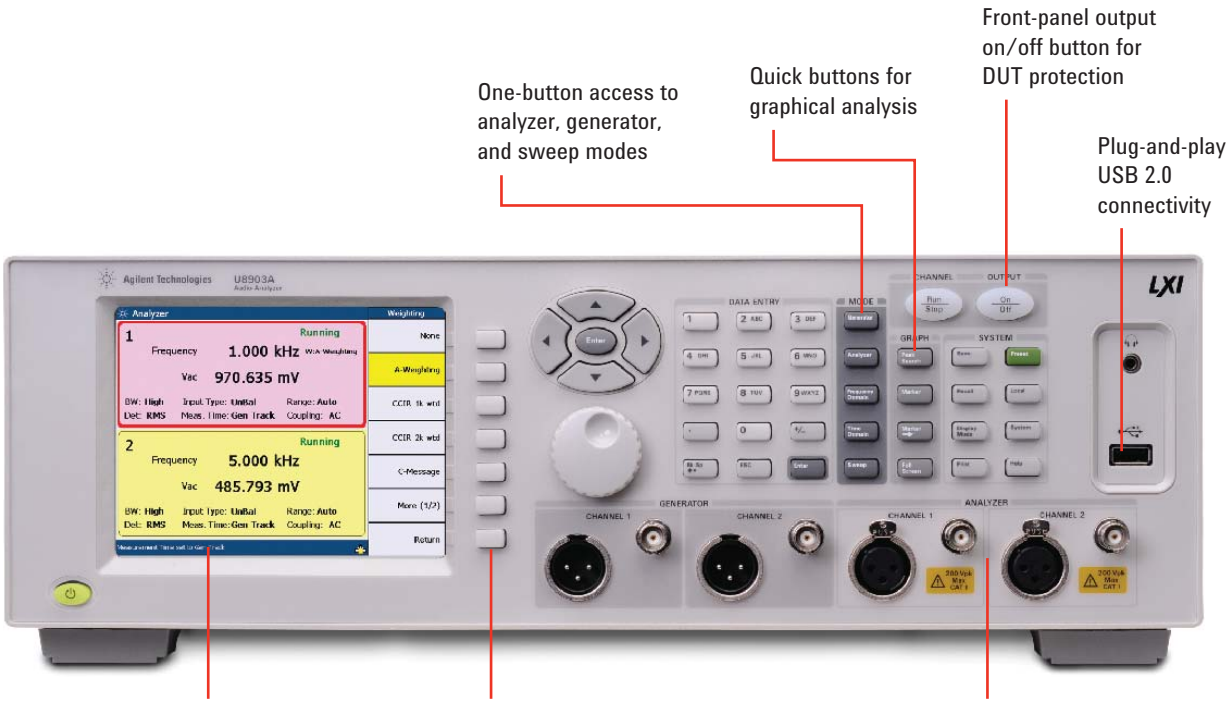


Figure 6. U8903A audio analyzer, front view

Rear panel

Figure 7. U8903A audio analyzer, rear view

Advance Measurement Testing

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.

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, 20, 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.

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 9).

Amplifier testing

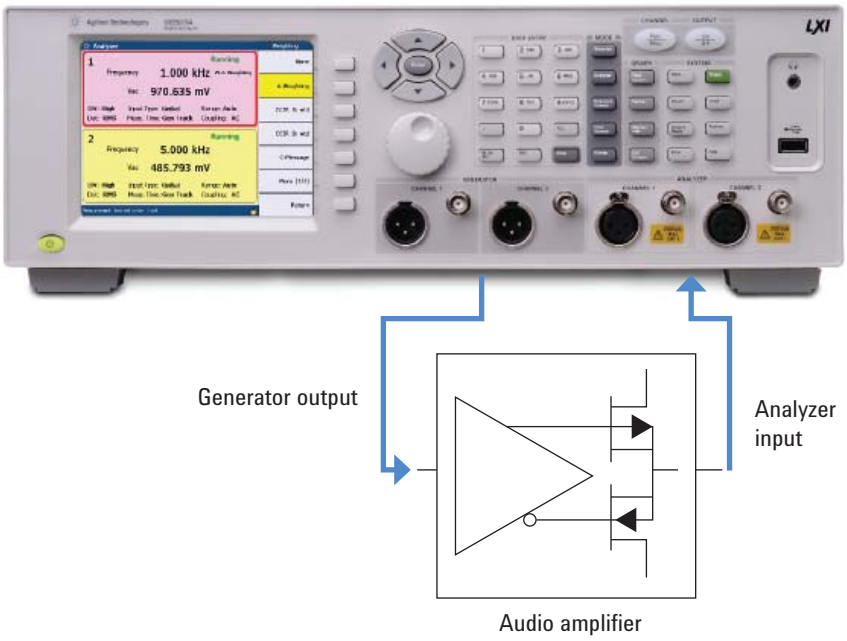


Figure 8. Audio testing using the U8903A

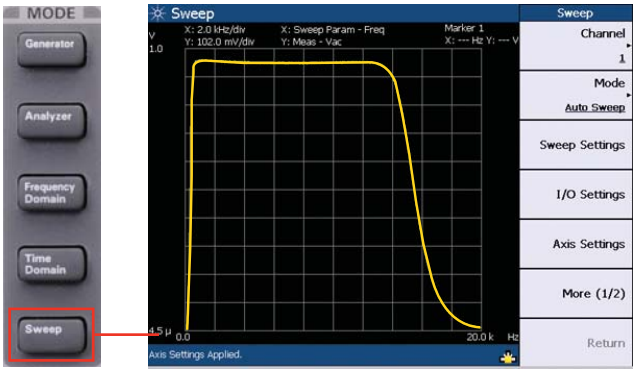


Figure 9. Use a single button to access the swept measurement mode

Advance Measurement Testing (continued)

SINAD and THD+N measurement

U8903A gives you the flexibility to lock down the generator frequency under the Frequency Lock features. With this feature, users can set the generator frequency in order to tell the location of the fundamental signal. In this case, users have the flexibility to lock the external source's fundamental frequency to make SINAD and THD+N measurements more accurately because the measurements are based on the actual source fundamental signal rather than the detected fundamental signal. Sometimes the other order signal and noise is stronger than the actual source fundamental signal which will impact the measurement reading.

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 on next page).

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.

Reference/relative measurements

This features allows users to perform measurement on level, frequency, and ratio based on the selected impedance value, frequency, or ratio reference value. This simplifies manual data measurement and data collection because the calculations are automatically generated inside the equipment in real time. This feature provides users with the flexibility to decided which signal sources to perform Signal-to-Noise (SNR) measurement without solely depending on the U8903A generator source.

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 are 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.

The U8903A provides the average point features which allows users to set the number of readings used for averaging. The display value will be the averaged value based on the number of points selected. This allows users to analyze noisy signals using an increased number of average points for greater accuracy.

Advance Measurement Testing (continued)

Transmitter and receiver testing

Receiver testing

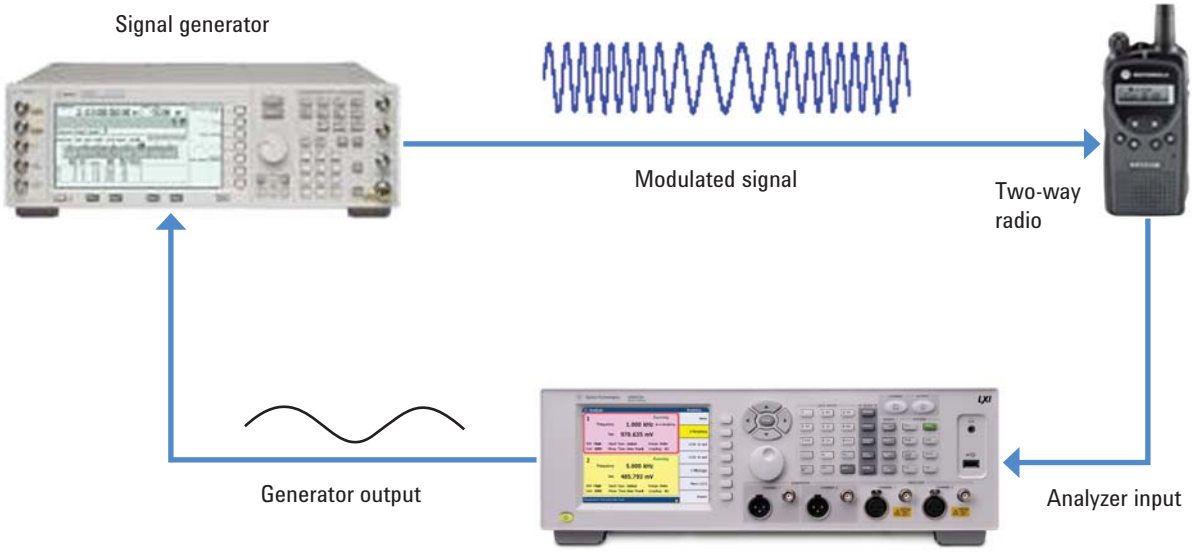


Figure 10. Receiver testing using the U8903A

Transmitter testing

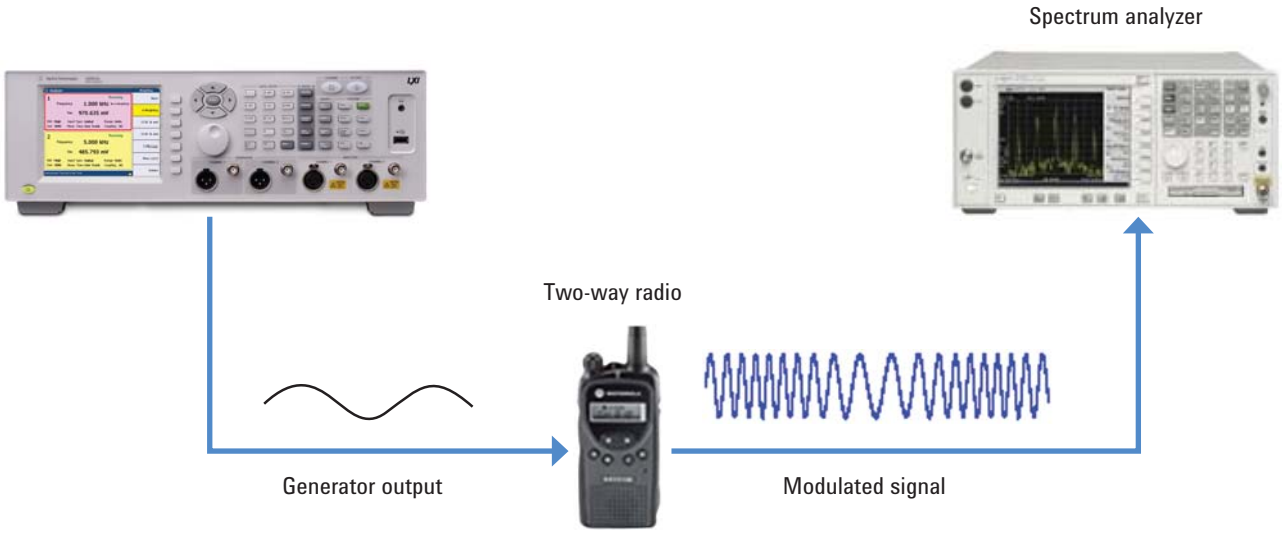


Figure 11. Transmitter testing using the U8903A and a spectrum analyzer

Characteristics

Power consumption	250 VA
Power requirements	• 100 to 240 V_{ac} • 47 to 63 Hz
Operating environment	• Operating temperature from 0 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 to 75 °C (23 to 167 °F)
Safety compliance	Certified with: • IEC 61010-1:2001/EN61010-1:2001 (2nd Edition) • Canada: CAN/CSA-C22.2 No. 61010-1-04 • USA: ANSI/UL 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 x 405.0 mm x 133.6 mm (16.76 inches x 15.94 inches x 5.25 inches)
Weight	< 8.5 kg (< 18.74 lb) (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 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)
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 to 55 °C)
Dual sine ratio range	0 to 100 dB
Phase	–180 ° to 179.99 °
Sweep	Frequency, amplitude, phase

Specifications (continued)

Audio generator (continued)	
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 1 kHz)	2%
Rise time	< 2 µs
SMPTE IMD (1:¼ :1/10:1)	
Frequency	
Low frequency (LF) tone	40 to 500 Hz
High frequency (HF) tone	2 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 to 80 kHz
Center frequency	3 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 32,768 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 to 22.6 V
Range (unbalanced/common)	–11.3 to 11.3 V
Amplitude accuracy	± 1.5%
DC offset	
Applicable for all waveform types except variable phase, DC, and square	
Output level	
Range	–11.3 to 11.3 V
Amplitude accuracy	± 1.5%

Specifications (continued)

Audio generator (continued)

Output characteristic

Connection type	
Balanced	XLR
Unbalanced	BNC
Common mode	XLR
Impedance	
Balanced	100, 600 Ω
Unbalanced	50, 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 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 3,000 m (1.86 miles)
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 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

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)

Audio analyzer (continued)	
THD + N and SINAD	
Fundamental frequency range	10 Hz to 100 kHz
Display range	–999.999 to 0 dB
Accuracy < 20 kHz < 100 kHz	 ± 0.5 dB ± 0.7 dB
Input voltage range	< 1 µV to 140 V_{rms}
Residual distortion (at 1 kHz, 1 V_{rms}, 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 to 0 dB
Accuracy < 20 kHz < 100 kHz	 ± 0.5 dB ± 0.7 dB
Input voltage range	< 1 µV to 140 V_{rms}
Residual distortion (at 1 kHz, 1 V_{rms}, 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

Specifications (continued)

Audio analyzer (continued)

Phase

Accuracy	
< 20 kHz	± 2 °
< 100 kHz	± 4 °
Minimum input	1 mV (S/N > 40 dB)
Resolution	0.01 °

SMPTE IMD

Residual IMD	≤ 0.0025% (–92 dB)

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

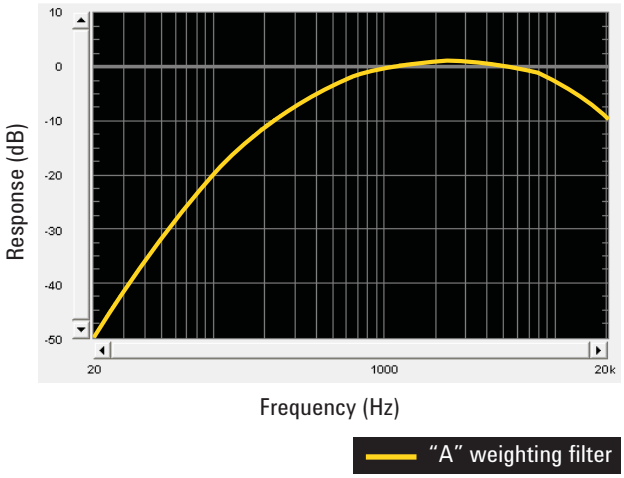
Audio filters

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)

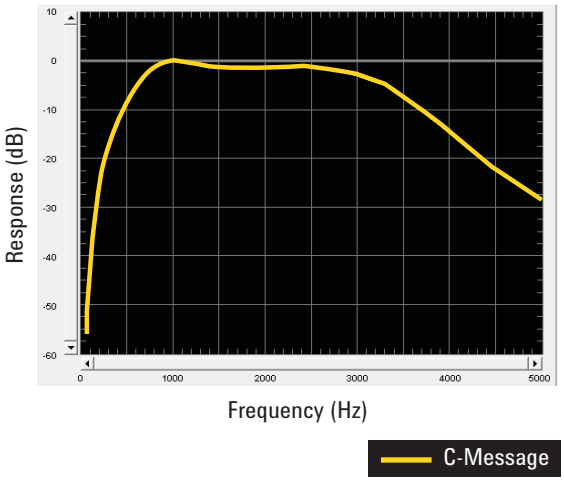
"A" weighting filter frequency response



"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
- ±1.0 dB, at 10 to 20 kHz

Figure 12. "A" weighting filter frequency response

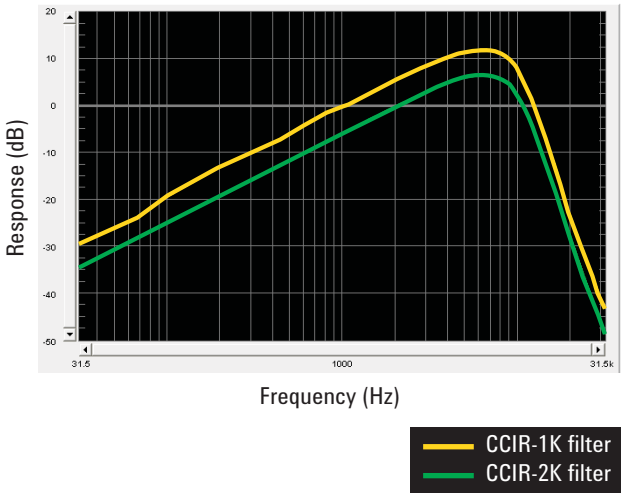
CCIR-2K weighting filter (Dolby 2K)
Deviation from ideal response: same as listed previously under CCIR-1K weighting filter



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 13. CCIR-2K weighting filter

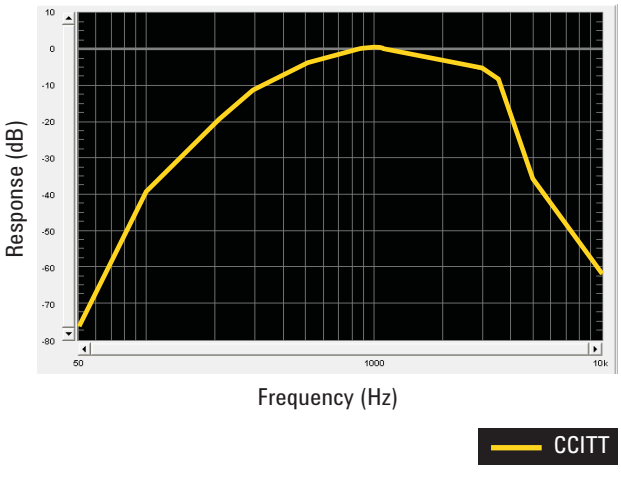
CCIR-1K filter and CCIR-2K filter frequency response



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

Figure 14. 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 to 5 kHz

Figure 15. 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 to 60 kHz
Start point (lower frequency)	40 to 500 Hz
Stop point (upper frequency)	2 to 60 kHz
Stop point (lower frequency)	40 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 to 80 kHz
Start point (center frequency)	3 to 79 kHz
Stop point (upper frequency)	3 to 80 kHz
Stop point (center frequency)	3 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 to 500 Hz (lower frequency), 2 to 60 kHz (upper frequency)
Frequency spot value (DFD IEC 60118/IEC 60268 waveform)	3 to 80 kHz (upper frequency), 3 to 79 kHz (center frequency), 80 Hz to 2 kHz (difference frequency)
DC sweep	
Start point (balanced)	–22.6 to 22.6 V
Start point (unbalanced/common)	–11.3 to 11.3 V
Stop point (balanced)	–22.6 to 22.6 V
Stop point (unbalanced/common)	–11.3 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*) • 1 GB USB flash memory device • Certificate of calibration	
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)
Warranty and Service	
U8903-1A7	ISO17025 Compliant Calibration Test Data
U8903A-A6J	ANSI Z540 Compliant Calibration Test Data
R-50C-011-3	Agilent Calibration - 3 years
R-50C-011-5	Agilent Calibration - 5 years
R-51B-001-3C	Return to Agilent Warranty - 3 years
R-51B-001-5C	Return to Agilent Warranty - 5 years

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