

MT8855A *Bluetooth* Audio Test Set

20 Hz to 20 kHz

Anritsu MT8855A Bluetooth Audio Test Set

LEFT CHANNEL (Mono) | **RIGHT CHANNEL**

Measurement	Left Channel	Right Channel
Level (dB)	-40.96 dB	-40.94 dB
SINAD	33.78 dB	33.78 dB
PESQ	3.99 Pass	3.99 Pass
MOS	4.15	4.15

Measurement Mode: Sequential | Show Numerics

Status: Connected | Audio Path: Active | MT8855A Role: HFP Audio Gateway | Active Test Set: MT8855A:0906010 | Phantom Power OFF

The MT8855A *Bluetooth* Audio Test Set

The MT8855A is the world's first test set designed specifically to perform high-quality audio measurements on products using the *Bluetooth* Advanced Audio Distribution Profile (A2DP), the Headset profile, or the Hands-Free profile.

The MT8855A is the ideal instrument for both design validation and manufacturing test. Typical *Bluetooth* products that can be tested with the MT8855A include stereo and mono headsets, mobile phones, digital music players, integrated and accessory car kits, and desktop speakers. Accessory microphones and speakers connect directly to the MT8855A's audio inputs and outputs to enable the development of a complete test system. Module testing is also facilitated using direct connection to the RF and audio connectors.

After establishing a *Bluetooth* connection with the DUT, the MT8855A's integrated audio generators and analyzers are used to perform measurements including level, frequency response, and THD+N.

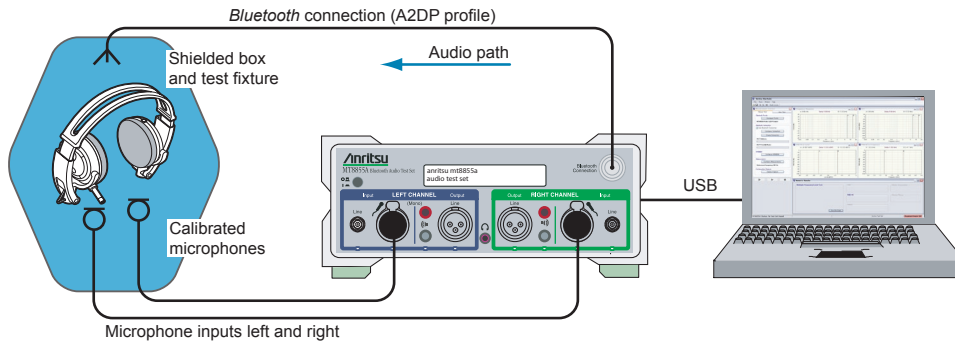


Key Features:

- 20 Hz to 20 kHz frequency coverage
- THD, THD+N, SINAD distortion measurements
- Stereo phase and stereo separation
- Graphical measurements of frequency response, plus THD+N vs level and frequency
- A2DP profile support for stereo headset testing
- Headset and Hands-Free profile support for mono headsets
- PC-installed user interface: BlueAudio
- Manual mode for R&D applications
- Auto mode runs user defined test plans for production testing
- Audio FFT analyzer aides fault finding
- Audio generator: common stereo tone frequency, or mono
- Two audio analyzers: stereo left / right or mono
- Direct connection of accessory microphones and speakers
- View Golden Traces for DUT tuning
- Built-in speakers
- Under 10 seconds test time for typical headset
- Independent audio generator and analyzer for non *Bluetooth* applications
- Included documentation and programming examples show how to use the MT8855A Class Library to create user test programs.
- Pass Through mode: supports use of external audio sources and analyzers.
- SCO/eSCO connections for testing modules without profile support
- PESQ/MOS measurement option

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Stereo Headset Testing



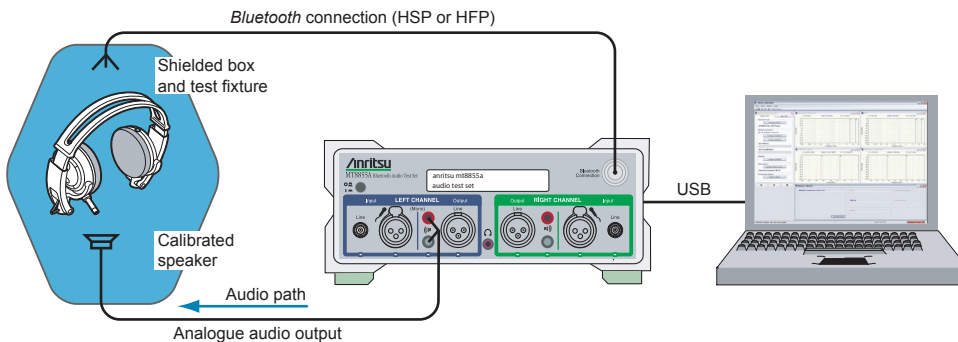
Stereo headsets running the A2DP or Hands-Free profile are now a common wireless device for use with mobile phones and digital music players. Ensuring the HiFi-quality audio that users have come to expect from these headsets places demands on the manufacturer for performance and reliability. The MT8855A is the ideal test solution to meet these demands by allowing rapid characterization of the audio performance of the fully assembled product.

For headset speaker testing, a test fixture that couples the headset speakers to the test system's microphones is integrated into a shielded enclosure. The MT8855A's built-in microphone power supply allows for direct connection of the accessory microphone without the need for additional amplifiers or power supplies. A frequency response curve supplied with the microphone, corrects headset speaker measurements, specifically to provide accurate audio level measurements. The response of the DUT can also be compared with a stored "Golden Trace" for comparative measurements. These tests validate the performance of headset DAC, amplifiers, and speaker cones.

The BlueAudio software displays the left and/or right channel frequency response as detected by the microphones. Additional measurements of THD+N, stereo separation and stereo phase can be displayed simultaneously. Typically these measurements are performed on a 997 Hz tone.

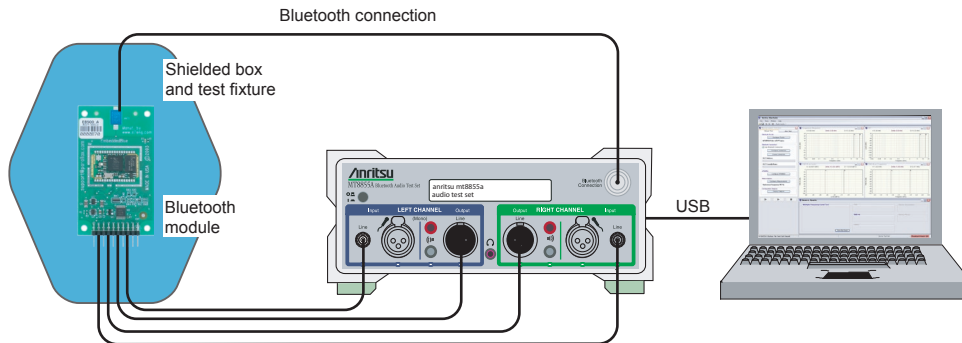
The total test time for a 5 point frequency response plus 997 Hz THD+N, stereo separation, and stereo phase (including inquiry and connection time but excluding handling time) is typically less than 15 seconds.

To test the headset microphone and audio input stages, the MT8855A plays an audio test signal through the accessory speaker coupled to the target microphone. Speaker frequency correction curves can again be applied to eliminate the response of the speaker from the results of measurements.



The MT8855A decodes the audio tone received over the Bluetooth connection and processes it to generate the audio measurement results. The recovered tone can be routed to the integrated speakers or to a headphone jack plug for use in rapid functional testing.

Module Testing

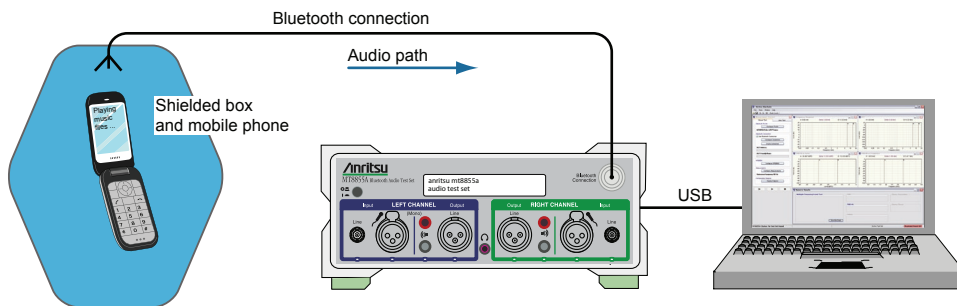


The MT8855A is ideal for use in evaluation and validation of new product designs and reference modules. During design evaluation, audio measurements are made with direct cable connections between the MT8855A and the DUT. When using cables to connect directly to the MT8855A Line Input and Output, transducers, such as microphones and speakers, are excluded from the test configuration. This set up offers the greatest dynamic range for distortion and frequency response measurements.

A built-in audio FFT is available to help diagnose sources of distortion. Graphical displays of THD+N against input level and frequency enable comprehensive characterization of the performance of the module under all expected operating conditions.

For modules that do not support audio profiles, measurements can be performed using a SCO/eSCO connection only.

Music Player or Phone Test



An audio signal is streamed from a music player in a shielded box to the MT8855A that has been configured as an A2DP sink. The shielded box is required if unwanted RF interferers are present in the test environment.

For simple functionality testing, the MT8855A decodes the audio file transmitted from the music player and outputs it to the built-in speakers or headset socket.

For true audio measurements, the MT8855A decodes fixed frequency audio tones that are played from test files on the player and received over the *Bluetooth* connection. The decoded tones are routed directly to the audio analyzer in digital format. A number of such fixed frequency MP3 files are provided with the MT8855A for loading onto music players.

The analogue audio output from a music player headset connector can also be tested without establishing a *Bluetooth* connection. This is achieved by routing the audio signal from the analogue headset connector directly into the Line input of MT8855A. All audio inputs, outputs, and measurements are fully functional even when a *Bluetooth* connection to a DUT has not been established. As such, the MT8855A functions as a standard audio test set for non-*Bluetooth* products.

The BlueAudio software, supplied with each MT8855A, is installed on a PC that connects to the MT8855A using a standard USB cable. BlueAudio serves as the MT8855A's front panel and is used to configure the instrument and display graphical and numeric measurement results. It communicates with the MT8855A by means of the class library dll file.

Configuring the MT8855A for testing is a simple, four-step process.

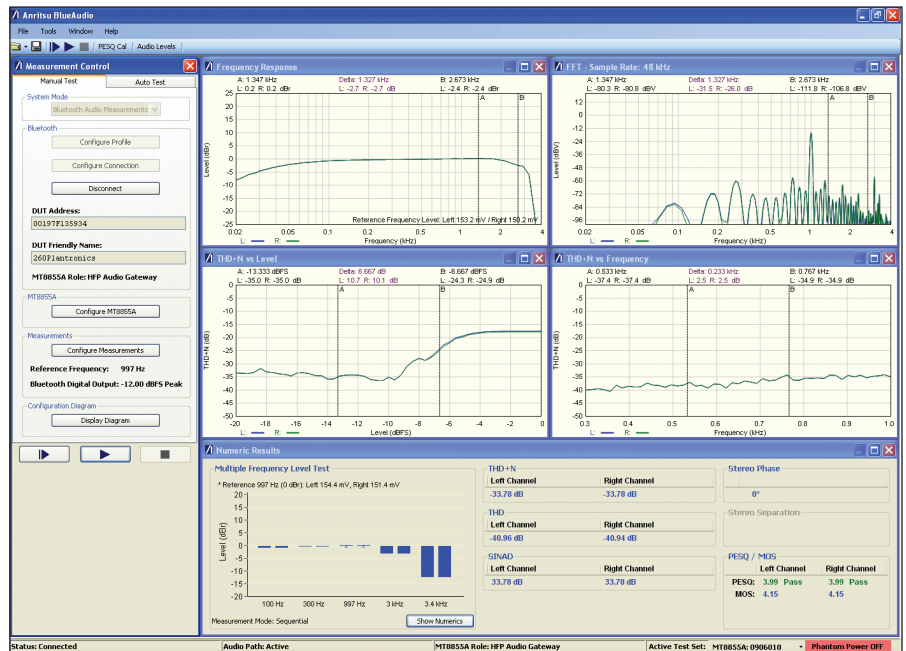
1. Define the *Bluetooth* profile and the role of the MT8855A, e.g., A2DP Source.
2. Define the *Bluetooth* connection process, e.g., Inquiry with Authentication.
3. Select the audio inputs and outputs, e.g., microphone input and speaker output.
4. Select the measurements to be performed, e.g., THD+N and frequency response.

BlueAudio displays both numeric and graphical results. For high volume production testing, the numeric results provide a comprehensive overview of the device's performance. A 5 frequency level test can be defined, in addition to distortion (THD+N, THD, SINAD), stereo phase and separation results.

During design validation, the graphical traces provide addition detail and device characterisation to assist with fault diagnostics. An audio FFT analyzer displays the full spectrum of the audio signal being analyzed. Harmonics and spurious are easily identified and the presence of any audio warping can be seen by monitoring the fundamental frequency tone.

A frequency response curve with up to 201 data points can be configured to get a true representation of the test device's characteristics. Resonances are clearly displayed and switching to a logarithmic frequency scale reveals detail in the critical low frequency region. Complex limit lines can be generated for automated Pass/Fail judgement, or alternatively the live trace can be compared with a stored "Golden Trace".

THD+N can be viewed as a function of frequency and level. This provides, in clear graphical format, a comprehensive view of the characteristics of a DUT under a full range of operating conditions.



Anritsu BlueAudio

Test Report **PASSED**

Test Plan: Stereo headset test Date: 17 December 2009
 Start Time: 16:31:51 BlueAudio Version: 1.20.0.0
 Stop Time: 16:32:13
 Elapsed Time: 22 Seconds

DUT: MT8855A
 Bluetooth Address: 00197F1325FC Bluetooth Address: 00066E1929B7
 Friendly Name: 260Phonotronics Serial Number: 0906010
 Firmware Version: 1.20

Test Case: A2DP test
 Test Result: PASSED

Multiple Frequency Level Test
 Measurement Mode: Sequential

Reference	Frequency (Hz)	Left Result (V)	Status	Right Result (V)	Status	Limits (V)
	997	0.6210	Pass	0.6430	Pass	0.2450 ≤ Val ≤ 0.7500

Result	Frequency (Hz)	Left Result (dB)	Status	Right Result (dB)	Status	Limits (dB)
	100	-0.52	Pass	-0.60	Pass	-10.00 ≤ Val ≤ 3.00
	300	-0.09	Pass	-0.08	Pass	-3.00 ≤ Val ≤ 3.00
	3000	0.04	Pass	0.00	Pass	-10.00 ≤ Val ≤ 3.00
	15000	-0.27	Pass	-0.35	Pass	-20.00 ≤ Val ≤ 3.00

THD+N	Left Result (dB)	Status	Right Result (dB)	Status	Limits (dB)
	-61.32	Pass	-61.23	Pass	≤ -40.00

Buttons: Setup Printer, Print, Save

The BlueAudio software also includes an “Auto Test” mode that enables the user to define a sequence of tests and run these automatically as a “Test Plan”. Each Test Plan may include multiple profiles and measurements, and the results of measurement are saved in a database for analysis and review. The Auto Test mode has been developed to offer high-volume manufacturers a fully-functional production test program that runs a test plan and saves results in the shortest possible time.

It is also possible to integrate the MT8855A into an automated test system. A production test system may include other instruments, all controlled by a custom test program. For these applications, it is not necessary to control the MT8855A from the BlueAudio application. An API for the MT8855A class library DLL is clearly defined. This enables customers to write customized test programs in for example, Visual Basic or C programming languages. An example test program “BlueStart” written in Visual Basic 2005 is supplied.

PESQ / MOS

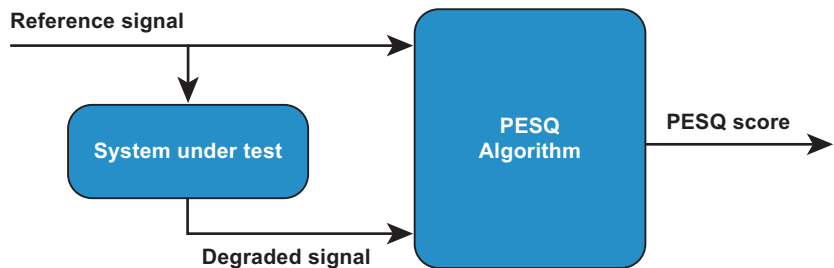
	Left Channel	Right Channel
PESQ:	3.67 Pass	3.71 Pass
MOS:	3.78	3.83

PESQ/MOS measurement option.

PESQ (Perceptual Evaluation of Speech Quality) provides an objective measure that predicts the results of subjective listening tests on narrow band audio signals. PESQ compares the original test signal with the degraded signal that has passed through the system under test. The reference test signal can be a user created signal, an ITU supplied signal or the Anritsu recommended Artificial Speech-like Test Stimulus (ASTS) test signals.

Anritsu licences PESQ from Psytechnics Limited. The PESQ implementation is fully conformant with ITU-T P.862. MOS (Mean Opinion Scores) are also displayed and are calculated from the ITU universal PESQ to MOS mapping formulae.

See Product Information Sheet (13000-00319) for full details on the PESQ/MOS and ASTS options.



Ordering Information

Part number	Description
MT8855A	Bluetooth Audio Test Set
MT8855A-032	PESQ/MOS measurement option
MT8855A-033	Artificial Speech-like Test Stimulus (ASTS) files
Included Accessories	
13000-00280	Operation manual (Printed)
2300-295	CD with BlueAudio software and PDF operation manual
2000-1611-R	USB cable for connection of MT8855A to PC
553-525-R	XLR (f) to BNC (f) adaptor (qty 2) for Line out socket
553-526-R	BNC (m) to phono (f) (qty 4)
Optional Accessories	
MT8855A-001	Rack mount kit (single)
MT8855A-003	Rack mount kit (side-by-side)
2000-1607-R	Standard microphone (including interface cable) (typical frequency response calibration data)
2000-1608-R	Calibrated microphone (including interface cable) (individually calibrated frequency response data)
2000-1612-R	Test speaker
2000-1613-R	2.4 GHz antenna and adaptor
MT8855A-098	Standard calibration to ANSI/NCSLI Z540-1 (Certificate of calibration only)
MT8855A-099	Premium calibration to ANSI/NCSLI Z540-1 (Certificate of calibration with test report and uncertainty data included)
D41310	Soft carry case



MT8855A Bluetooth Audio Test Set shown with accessory 2.4 GHz antenna, test speaker and microphone.

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