OPERATING MANUAL

NTi Audio TalkBox

Contact NTi Audio at

Headquarter	+423 239 6060	info@nti-audio.com
Americas	+1 503 684 7050	americas@nti-audio.com
China	+86 512 6802 0075	china@nti-audio.com
Czech	+420 2209 99992	czech@nti-audio.com
Germany	+49 201 6470 1900	de@nti-audio.com
Japan	+81 3 3634 6110	japan@nti-audio.com
South Korea	+82 2 6404 4978	korea@nti-audio.com
United Kingdom	+44 1438 870632	uk@nti-audio.com

www.nti-audio.com

NTi Audio AG
Im alten Riet 102, 9494 Schaan
Liechtenstein, Europe
is an ISO 9001:2008 certified company.

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Made in Switzerland

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1. Introduction

Congratulations and thank you for buying NTi Audio's TalkBox, a product specially suited as test signal source for speech intelligibility measurements. This product provides, in combination with an NTi Audio Acoustic Analyzer, the all-in-one solution for fast and comprehensive STIPA testing of a complete public announcement system. Additionally, various other test signals are supported for further test applications. We are convinced you will enjoy using it!

This manual describes the NTi Audio TalkBox operation and functions in detail. Further application information can be found on the web site.

The NTi Audio TalkBox product package includes the following items:

- NTi Audio TalkBox
- Protection Cover mounted with NTi Audio lanyard
- CF-Card with test signals & individual calibration data
- Mains Power Supply & Power Cord
- Carrying Pouch
- User Manual

2. Overview

NTi Audio TalkBox greatly simplifies the acoustical feed of the STIPA intelligibility test source signal into closed sound reinforcement systems. It presents the standardized voice-like acoustical signal emission simulating a human talker according to IEC 60268-16 at standardized levels.

NTi Audio TalkBox

General

NTi Audio TalkBox features human head-like dimensions. A build-in combination of solid state generator and DSP ensures highest playback accuracy and lowest sample frequency deviations with minimized jitter effects. The internal precision loudspeaker is individually calibrated to achieve a very flat frequency response in the typical frequency range of the human voice. Each TalkBox is individually equalized and calibrated and has an excellent frequency response accuracy of +/- 1 dB over the relevant frequency range. The radiation characteristic complies with the ITU-T P.51 in wide ranges.

The perfect frequency response and the precisely correct playback sampling rate are specifically important to minimize systematic errors when performing STIPA measurements.

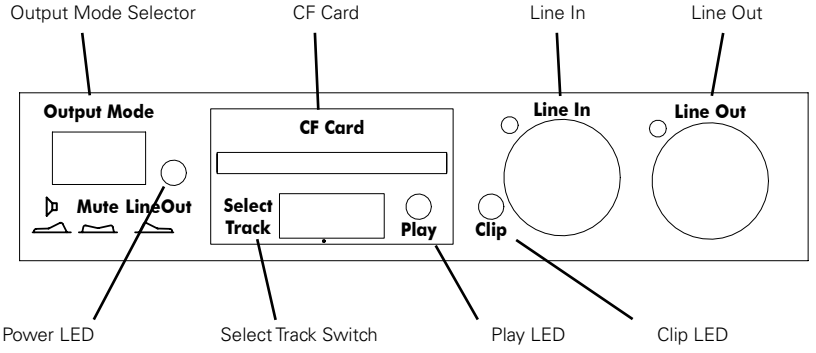
Speaker

The IEC60268-16 standard specifies a sound pressure level for a speaker simulator of 60 dBA in 1 meter distance. The NTi Audio TalkBox levels are calibrated to comply with this standard. To avoid operating failures the TalkBox has no volume control.

Mic Stand Mount

The exact positioning the NTi Audio TalkBox in front of a microphone (at the place where a real human speaker would be) is easy using a conventional mic stand. A universal mic stand mount is available at the bottom of the box.

NTi Audio TalkBox Controls



NTI Audio TalkBox Controls

Output Mode Selector

The output selector switch offers the following three modes:

	The audio signal is available at the speaker and the Line Out.
Mute	The audio signal is muted (no signal at Line Out and speaker).
LineOut	The audio signal is available at the Line Out. The speaker amplifier is muted.

Power LED

The red Power LED indicates the following:

fast flashing	The power up sequence is in process (about 10 seconds)
continuously on	The TalkBox is powered on and ready for operation.
slow flashing	The outputs are muted by • the Output Mode Selector or • the External Mute Input

CF-Card

The supplied CF-Card needs to be pushed into the provided slot. Up to 15 test signals can be stored on the CF-Card. The size of the test signals is as big as required for the looped operation. The selected signal is further processed and seamlessly looped by the built in DSP. The CF-Card is FAT32 formatted and can be read/written by any PC/MAC with CF-Card reader. The TalkBox repeats the selected audio track as long as mains power is connected. Besides the STIPA test signal the CF-Card contains the following additional wave forms:

CF-Card Track List:

1	STIPA (Standard)	60dBASPL @ 1m
2	Pink Noise	60dBASPL @ 1m
3	White Noise	60dBASPL @ 1m
4	Sine 1 kHz	60dBASPL @ 1m
5	Male Speaker (German)	60dBASPL @ 1m
6	Male Speaker (English)	60dBASPL @ 1m
7	Delay Test Chirp	
8	-	
9	-	
A	STIPA (Lombard)	70dBASPL @ 1m
B	Pink Noise	70dBASPL @ 1m
C	White Noise	70dBASPL @ 1m
D	Sine 1 kHz	70dBASPL @ 1m
E	Male Speaker (German)	70dBASPL @ 1m
F	Male Speaker (English)	70dBASPL @ 1m

	Any hot swap of the CF-Card is not supported. In case the CF-Card has been removed during operation it shall be returned and the mains power shortly disconnected to initiate the operation again.

File format of audio signals

- *.wav file
- Sample rate: 44100 Hz
- Mono
- 16 Bit
- PCM linear quantization

File name format

The first character of wav-file name matches the output selector switch position. So the audio files names are e.g. "1anyName.wav" or "8anyName.wav", whereby "anyName" may describe the content of the wav-file for example "1_STIPA.wav". The maximum length of the filename is 8 digits, e.g. "xxxxxxxx.wav".

Calibration data

The CF-Card keeps additionally the individual calibration data of the NTi Audio TalkBox. The file is named "xxx.cal". The CF-Card is labeled with the serial number of the corresponding TalkBox, so the CF-Card and the NTi Audio TalkBox do have the same serial number, guaranteeing accurate and calibrated operation.

	The serial number on the CF-Card must match with the serial number of the NTi Audio TalkBox, otherwise the acoustical parameters of the TalkBox are out of specifications.

Play LED

The green Play LED indicates the following:

continuously on	• The audio signal is replayed • At Line In mode (= Select Track switch set to "0") and input signal > -30 dBu
flashing	Error indication, which might be caused by • The CF-Card is not plugged in or damaged • The file "serialnumber_xxx.cal" is not found on the card • The selected audio file is not available, damaged or of wrong format

Select Track Switch

This switch allows the following selections:

"0"	This position selects the input signal from the input connector "Line In" to the speaker.
"1" - "F"	These positions select the individually stored audio tracks from the CF-Card in hex-order form (1, ... , 9, A, B, C, D, E, F).

Clip LED

The red Clip LED is activated when the Line In mode is selected (= Select Track switch set to "0"). Reduce the input level when the Clip LED flashes.

Line In

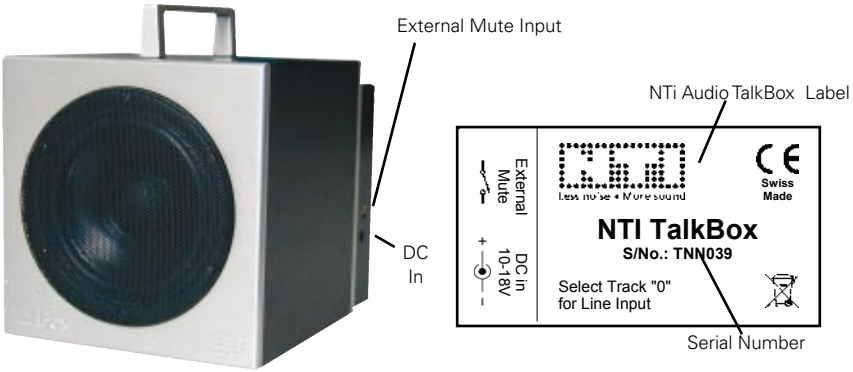
XLR input connector for external audio signals.
The Line In mode (Select Track switch = "0") enables to play an external audio signal with the NTi Audio TalkBox. In the Line In mode the Play LED indicates an input signal > -30 dBu and the Clip LED is activated at input signals > +15 dBu.

The DSP based equalization introduces a signal propagation delay of 59 ms between the Line-In and the acoustical output. Consequently and in order to guarantee synchronicity between the acoustical output and the line-output for delay time measurements the latter is also delayed by 59 ms.

Line Out

Using the balanced line out, the TalkBox operates as a signal generator. The stored signal of the CF-Card or any connected signal from the Line In connector is directly send to the Line Out connector (not equalized).

Side & Rear Panel



NTi Audio TalkBox Side & Rear Panel

External Mute Input

The External Mute Input provides the possibility to mute the NTi Audio TalkBox from a remote position, such as by using a mobile phone or radio control devices. Closing an external switch connected with this 3.5mm jack connector (connecting tip & ring) will mute the audio signal equally to the output selector switch in mute position. This feature is of great help e.g. at STIPA measurements in large buildings.

3. How to use the NTi Audio TalkBox

Using the NTi Audio TalkBox as acoustical test source for STIPA measurements provides two major advantages:

- Extended test coverage
- Easy to handle test signal injection

The human head sized NTi Audio TalkBox replaces and simulates a real speaker when measuring speech intelligibility. Such a setup considers the entire signal path including the used microphone, the acoustical characteristics of the speaker's cabin and existing background noise.

Procedure

- Position the NTi Audio TalkBox at the typical speaker position in front of the speaker's microphone.
- Connect the external power supply. After approx. 10 seconds the startup process is completed and the NTi Audio TalkBox is ready for operation.
- Selected the required track number with the Track Selection Switch.
- Output Mode: Set the selector switch to
  - Speaker for acoustical output
  - LineOut for electrical output signal or
  - Stop the signal using the Mute position.

Output Level

The output level of the provided standard STIPA test signals is 60 dBA @ 1 m distance to the speaker. Additionally further test signals at other levels are provided, please see the CF-Card Track List for details.

Lombard Effect

At increasing environmental noise the human persons speaking into the microphone at PA systems gradually increase the sound pressure level of their speech. The standardized speaking level is 60 dBA. Our ears recognize a speaking level increase of 10 dBA as subjective double sound pressure level. To verify the PA system operating in good order at this physical effect, the following shall be carried out:

- Follow the prior described measurement procedure, using the STIPA test signal with 60 dBA @ 1m.
- Select the STIPA test signal with 70 dBA @ 1m and verify the operation of the PA system; no clipping shall occur.

CF-Card

We recommend to use original CF-Cards, NTi Audio # 600 000 087, only. Other CF-Cards may not be compatible with the NTi Audio TalkBox, thus e.g. wav-files are not replayed. For operation the calibration file xxx.cal has to be copied on a new CF-Card. You may format the CF-Card as follows:

- Connect the CF-Card to the PC, the card is recognized e.g. as letter "z".
- Select "Run…" from the Windows Start menu, see picture below.
- Insert the term: format z: /fs:FAT32 /a:512 /x
- The CF-Card is formatted to FAT32 with 512 byte cluster size and can now be used with the NTi Audio TalkBox.

Format CF-Card

My Own Files

You can load your own audio files onto the CF-Card and replay with the NTi Audio TalkBox. Kindly observe the following details:

Do not delete the calibration data file labeled "xxx.cal"!
The NTi Audio TalkBox requires the calibration data to meet the product specifications.

File format of audio signals

- *.wav file
- Sample rate: 44100 Hz
- Mono
- 16 Bit
- PCM linear quantization

File name format
The first character of the wav-file name matches the output selector switch position. So the audio files names are e.g. "nr_anyName.wav", whereby "nr" is the TalkBox selection switch position and "anyName" describes the content of the wav-file for example "9_myfile1.wav" or "A_myfile2.wav" - "F_myfile3.wav". The maximum length of the filename (=anyName) are 8 digits.

Level
The test signal level shall be physically tested by using an NTi Audio Acoustic Analyzer and the source data adjusted to requirements.

Length
The minimum length of your wave file is 100ms.

4. Battery Operation

The TalkBox may be operated with a battery pack (non NTi Audio product) for mains power independent operation.

Use of a battery pack

Connect the DC output of the battery pack with the DC input of the TalkBox. As soon as the connection is established, the NTi Audio TalkBox starts running. For storage or when not used for a longer period of time, please disconnect the battery cable preventing the complete discharging of the battery.

Recommended battery packs

The following in Europe available battery pack has been verified and approved:

- XTPower XT-16000QC2 PowerBank

Example

A battery with 39 Watt hours offers the following typical running time

Idle mode:	Standby, Electrical output:	15 hours
STIPA:	Output on (60dB$_{SPL}$)	12 hours
STIPA Lombard:	Output on (70dB$_{SPL}$)	7 hours

5. Related Products

XL2 Audio and Acoustic Analyzer

The XL2 analyzer forms the unique combination of a state-of-the-art Sound Level Meter, a comprehensive Acoustical Analyzer as well as a powerful Audio Analyzer. The wide range of functionalities are tailored for challenging applications in Installations, Live Sound, Studio, Broadcast and Environmental Noise measurements.

Measurement microphones are available for acoustical measurements. The microphones are 48V phantom powered and include an electronic data sheet. The Automated Sensor Detection (ASD) of the XL2 Analyzer automatically reads this data, i.e. the microphone model and calibration data. This promotes faster setup and ensures accurate measurements.

STIPA Measurement Option for XL2

The STIPA analyzer option allows the reliable measurement of the speech transmission index according to the latest IEC standards within 15 seconds. Besides the single value STI or CIS test result, a detailed view of the modulation indices and individual band level results is provided.

6. Further Information

Registration

Register your instruments at My NTi Audio and benefit from the following possibilities:

- Free updates for your instruments
- Activation of optional product functions
- Premium access to downloads
- Receive application and product news
- Faster worldwide support
- Tracing support in case of loss or theft
- Calibration support

How to Register

- Open the web page "https://my.nti-audio.com".
- You are prompted to login or create your My NTi Audio account.
- The web page "My NTi Audio Products" opens.
- Select the product type and enter the serial number.
- Confirm with "Register".
- Now your product is listed in the table "My Products".

Warranty Conditions

International warranty

NTi Audio guarantees the function of its products and the individual components for a period of one year from the date of sale. During this period, defective products will either be repaired free of charge or replaced.

Limitations

These guarantee provisions do not cover damage caused by accidents, transportation, incorrect use, carelessness, non-original accessories, the loss of parts, operation with non-specified input voltages, adapter types or incorrectly inserted batteries. NTi Audio accepts no responsibility for subsequent damage of any kind. The warranty will be voided by carrying out repairs or services by third parties who are not part of an approved NTi Audio Service Centre.

Statutory Rights

Consumers may have legal (statutory) rights under applicable national laws relating to the sale of consumer products. This warranty does not affect your statutory rights. You may assert any legal rights you have at your sole discretion.

Service and Repairs

If your product is not functioning correctly or is damaged, please contact the local NTi Audio partner for assistance. If the product needs to be returned for service, kindly follow the service guidelines at www.nti-audio.com/service.

Warnings

In order to avoid any problems during the operation of the instrument, follow the notes listed below:

- Remove the transport protection cover prior using the TalkBox.
- The NTi Audio TalkBox includes a high precision electromechanical transducer with open air gap. Dust could degrade the function of this transducer. Please take care to use and store the NTi Audio TalkBox only in clean environments.
- Read this manual thoroughly prior using this product.
- Use the product for the intended purpose only.
- Do not disassemble the product.
- Never use the product in a damp environment.

Calibration Certificate

Your NTi Audio instrument has been carefully tested during production and corresponds to the specifications listed in "Technical Data". Calibration certificates for new products are optional.

NTi Audio recommends annual calibration of the products after the purchase. The calibration provides documented and traceable measurement accuracy and confirms that your NTi Audio product meets or exceeds the published specifications. The calibration and adjustment procedures follow the documentation and traceability requirements of the standard EN ISO / IEC 17025.

For calibrations kindly follow the service guidelines at www.nti-audio.com/service.

CE Declaration of Conformity

CE / FCC Compliance Statement

We, the manufacturer NTi Audio AG, Im alten Riet 102, 9494 Schaan, Liechtenstein, do hereby declare that the product "NTi Audio TalkBox", released in 2005, conforms to the following standards:

- EMC: 2014/30/EU
- Harmonized standards: EN 61326-1
- Explosive atmospheres (ATEX): 2014/34/EU
- Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).
- Directive 2012/19/EU on waste electrical and electronic equipment (WEEE).

This declaration becomes void in case of any changes on the product without written authorization by NTi Audio.

Date: 25. July 2019

Signature: 

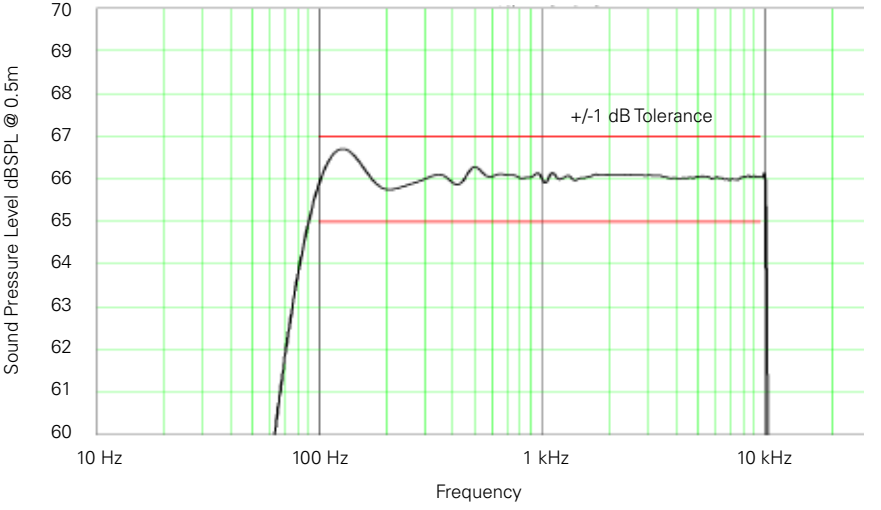
Position of signatory: COO

7. Technical Data TalkBox

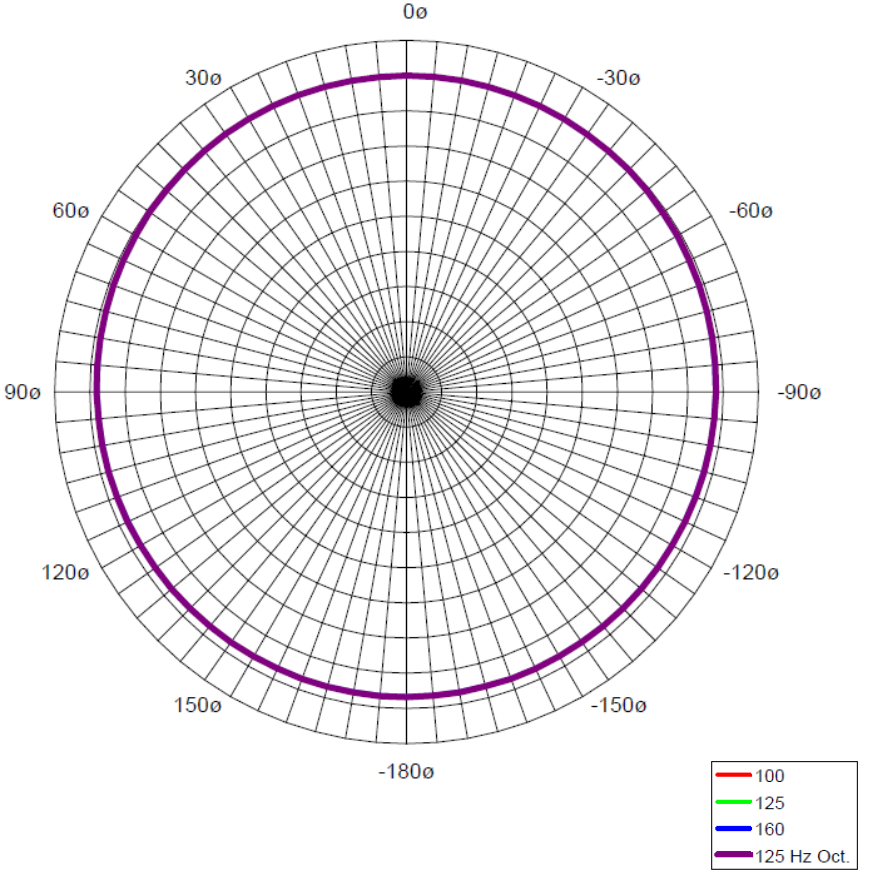
Standards	• IEC 60268-16 (Objective Rating of Speech Inteligibility) • ASTM E1179-13 (Sound Sources for Testing Open Office)
Waveforms	• Up to 15 different signals • Waveforms can be added / changed by the user • Factory signal set NTi Audio STIPA Test Signal, Reference Speech Signal, White Noise, Pink Noise, Delay Test Signal, Sine 1 kHz
Line Out	• XLR, balanced 100 Ohm, unbalanced 50 Ohm • Maximum output level: +18 dBu, 1 kHz file with 60 dB @ 1 meter: typically -11 dBu
Line Input	• XLR, balanced 38 kOhm • Max. input level: +18 dBu (acc. to EBU R68, ITU-R rec. 645) • Internal delay from XLR input to speaker: 59 ms
CF-Card	• 256 MB included, FAT32 formatted, NTi Audio # 600 000 087 • Wav-file format: 16 Bit, 44.1 kHz mono
Acoustical Flatness	STIPA band levels (in axis): • typ < +/- 0.5 dB @ 24°C • typ < +/- 1.0 dB @ 10°C - 30°C
Acoustical Output Level	• STIPA: 60 dBA_{SPL} @ 1 m +/- 0.5 dB, acc. to IEC60268-16 • STIPA band sensitivity gradient: - 0.07dB / °C (average) • Others see track list in user manual
Power Supply	• 9 - 17 VDC, 10 Watt • External switching power supply included (110 V .. 240 V)
External Mute	• Jack 3.5 mm (1/8"), tip & ring • Floating switch required
Mounting	Mic Stand 5/8" with Adapter to 3/8"
Dimensions (LxWxH)	150 x 150 x 175 mm (5.9 x 5.9 x 6.9 inch)
Weight	3.5 kg
Operating Temperature	0° to +45° C (32° to 113° F)
Protection Rating	IP51
Included Accessories	Mains Power Adapter, 256 MB CF Card and Soft Carrying Case

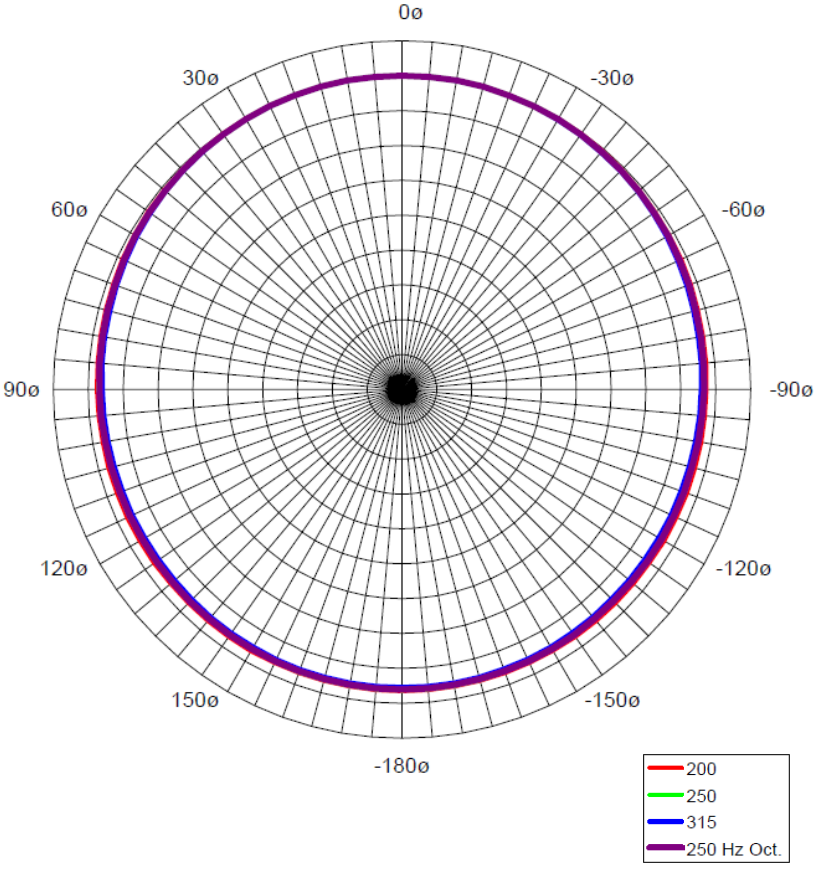
Typical Frequency Response Chart NTi Audio TalkBox:

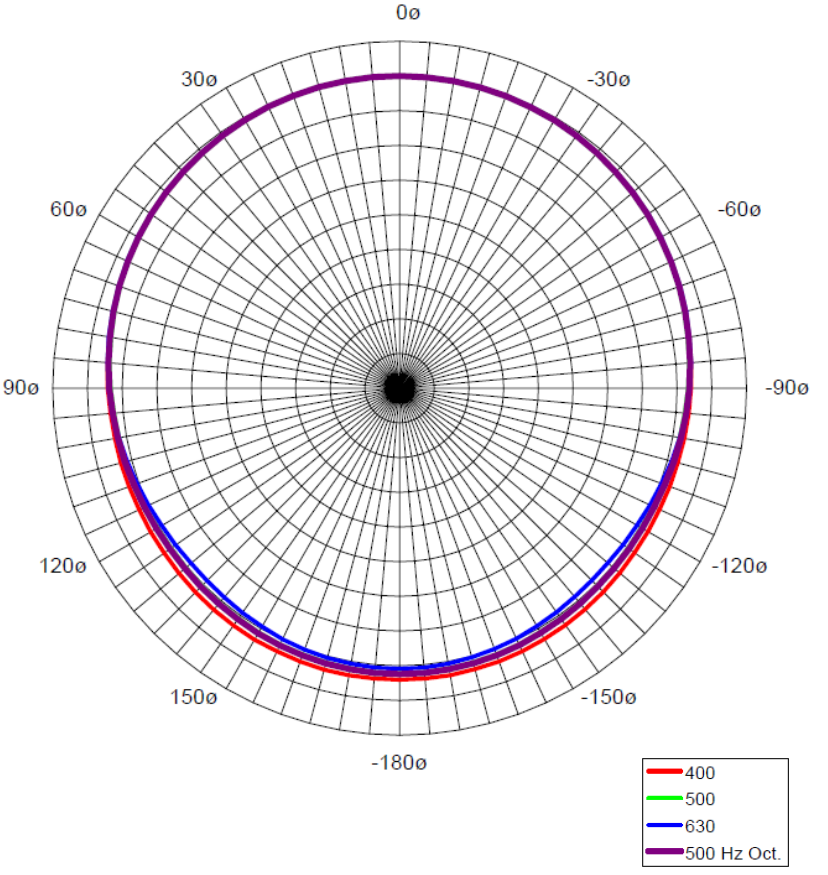
• 60 dBSPL @ 1 m = 66 dBSPL @ 0.5 m



Polar Plots (6 dB/div)




0ø
30ø
-30ø
60ø
-60ø
90ø
-90ø
120ø
-120ø
150ø
-150ø
-180ø
200
250
315
250 Hz Oct.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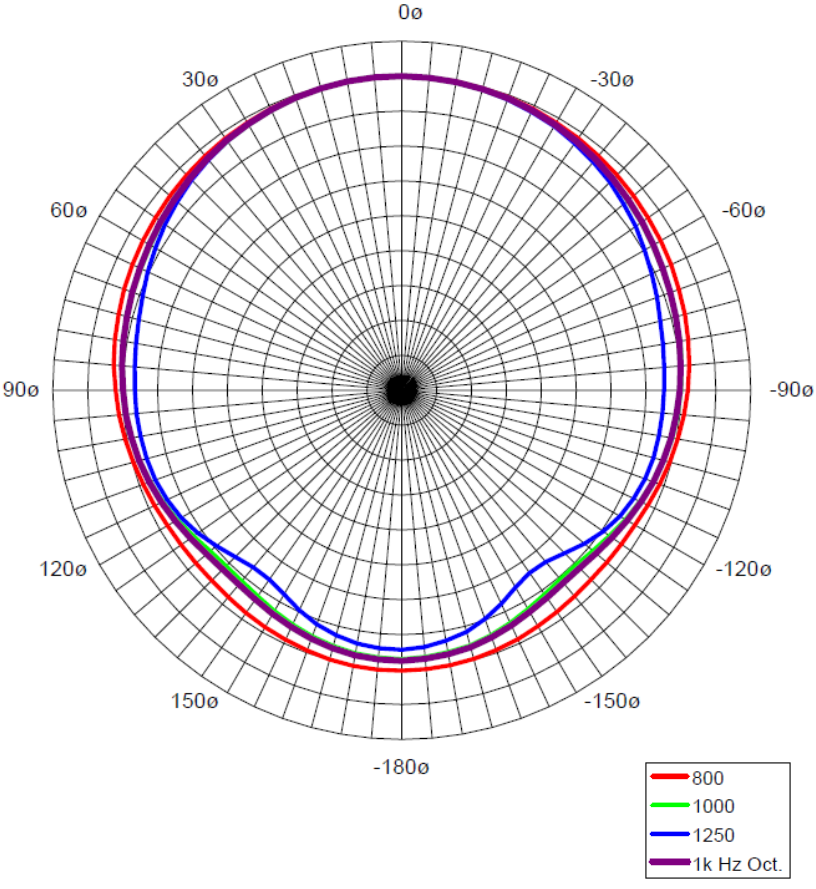
630
500 Hz Oct.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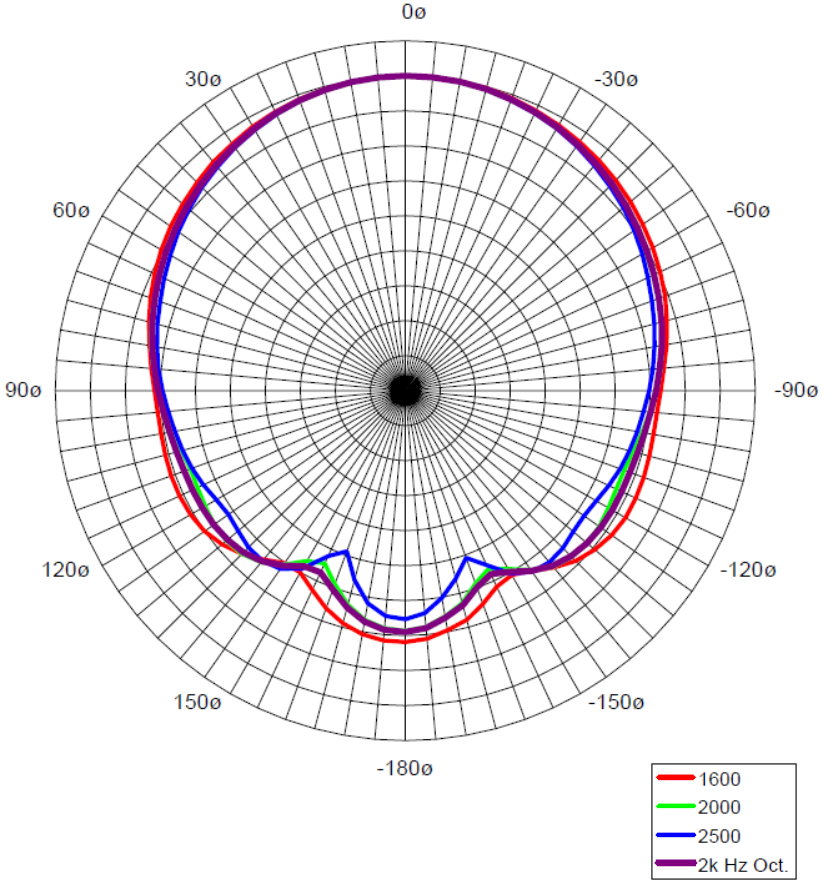
1250
1k Hz Oct.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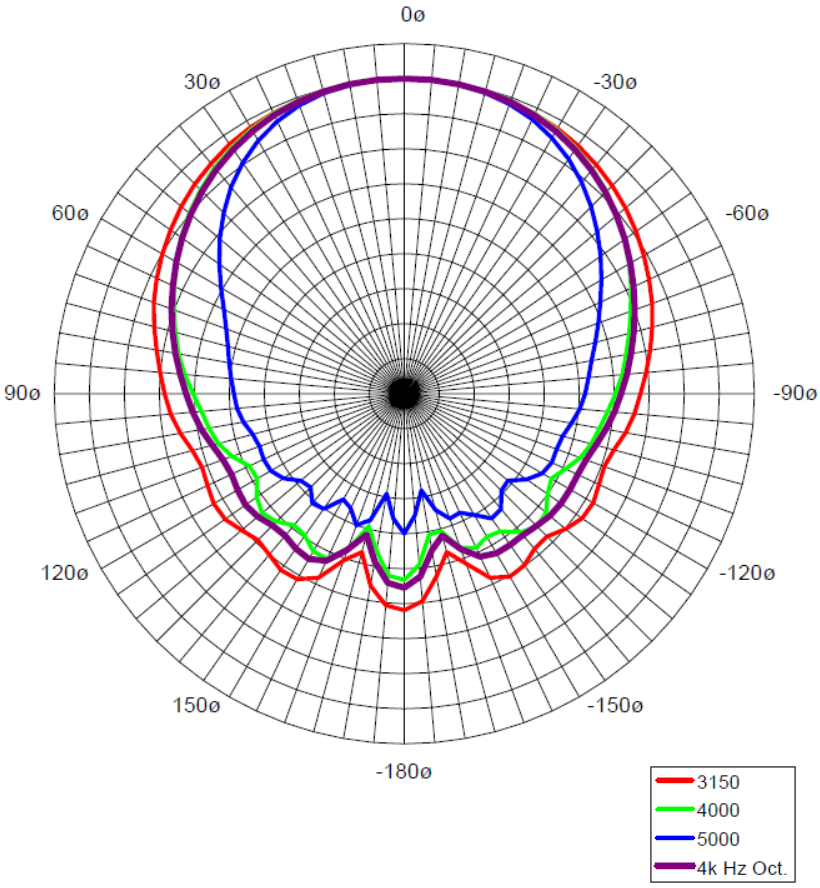
1600
2000
2500
2k Hz Oct.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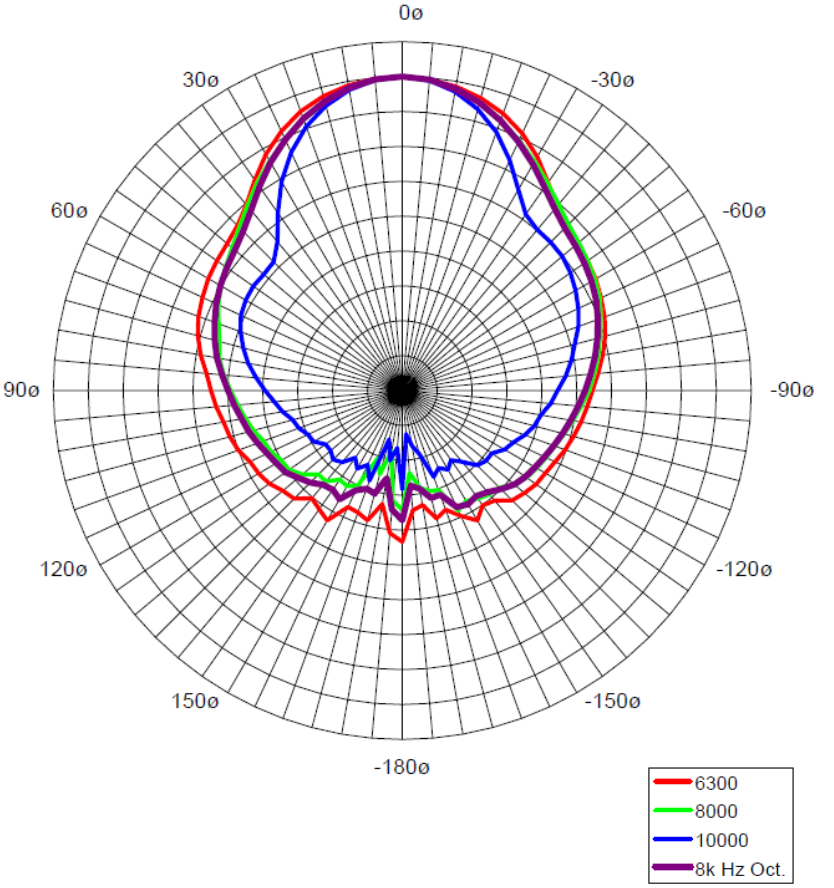
150ø
-150ø
-180ø
3150
4000
5000
4k Hz Oct.


0ø
30ø
-30ø
60ø
-60ø
90ø
-90ø
120ø
-120ø
150ø
-150ø
-180ø
6300
8000
10000
8k Hz Oct.

You may stick this table onto your NTi Audio TalkBox:

1	STIPA (Standard)	60dBASPL @ 1m
2	Pink Noise	60dBASPL @ 1m
3	White Noise	60dBASPL @ 1m
4	Sine 1 kHz	60dBASPL @ 1m
5	Male Speaker (German)	60dBASPL @ 1m
6	Male Speaker (English)	60dBASPL @ 1m
7	Delay Test Chirp	
8		
9		
A	STIPA (Lombard)	70dBASPL @ 1m
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C	White Noise	70dBASPL @ 1m
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F	Male Speaker (English)	70dBASPL @ 1m