



# Cello

PC & iPad CONTROLLED DIAGNOSTIC AUDIOMETER

### CLASSIFICATION

IEC 60645-1: Type 2 Class A/AE  
ANSI S3.6: Type 2A/2AE  
IEC 60645-1 / ANSI S3.6: EHF (Extended High Frequency) Compliant (with HF option)

### AVAILABLE SIGNALS

Stimulus: pure tone, warble tone  
2 external inputs and USB audio for speech audiometry  
MIC input for live speech audiometry  
Masking: NBN, WN, SN

### SIGNALS SPECIFICATION

Attenuator step: 1, 2 and 5 dB  
Presentation: Continuous, Pulsed (0.5, 1 and 2 Hz)  
Warble: 5 Hz sin wave modulating signal

### AVAILABLE OUTPUTS AND TRANSDUCERS

AC: Headphones (TDH-39 / DD45)  
HF headphones (HDA-300)  
Insert earphones (ER-3)  
BC: B-71 bone vibrator  
Free field  
Insert masking earphone: IME-100

### AVAILABLE TESTS

- Pure Tone audiometry (HL and UCL)
- Auto threshold (modified Hughson-Westlake)
- HF audiometry: from 8 to 20 kHz (optional)
- Speech audiometry (SRT, WRS, MCL, and UCL)
- SISI test
- Stenger, with pure tone or speech stimulation
- 2 independent channels Master Hearing Aid
- QuickSIN® test (optional)
- Visual Reinforcement Audiometry (VRA) and Conditioned Play Audiometry (CPA) test (optional) with video reinforces

### PURE TONE: FREQUENCIES AND MAXIMUM LEVELS (dB HL)

Freq. (Hz)	AC	AC HDA-300	AC ER-3	AC ER-5	BC	FF (*)
125	80	85	90	90	-	75
250	100	100	105	100	45	85
500	110	120	110	110	65	95
750	115	120	115	120	70	95
1.000	120	120	120	120	75	95
1.500	120	110	120	120	80	95
2.000	120	110	120	115	80	95
3.000	120	110	120	115	75	95
4.000	120	110	110	110	75	95
6.000	105	100	100	100	55	90
8.000	95	100	90	90	50	85
9.000	-	90	-	-	-	80

10.000	-	90	-	-	-	80
11.200	-	90	-	-	-	80
12.500	-	80	-	-	-	80
14.000	-	70	-	-	-	80
16.000	-	60	-	-	-	50
18.000	-	100 dB SPL	-	-	-	-
20.000	-	90 dB SPL	-	-	-	-

(\*) The values refer to "normal" range; add 10 dB to each value in case of "extended range" option selected

### SPEECH AUDIOMETRY: MAXIMUM LEVELS (dB HL)

AC(*)	AC HDA-300	AC ER-3	AC ER-5	BC	FF
100	100	100	100	60	Normal: 75 Extended: 85

(\*) Reduce by 20dB in case of free field equivalent filter activation.

### PATIENT – OPERATOR COMMUNICATION

Talk over: external microphone included  
Talk back: through monitor headset (included); patient microphone included  
Patient response trigger

### MONITOR SIGNAL

Both channels monitored through the monitor headset (included)

### CALIBRATION

Validity: 12 months  
Separated calibration tables for each type of transducer (AC, AC-INS, AC-HF, INS-MASK, BC, FF)  
All the parameters stored in the device through a dedicated software

### COMPUTER INTERFACE

Connection: USB (driverless)  
Compatible software: Inventis Maestro

### MINIMUM COMPUTER REQUIREMENTS

Processor: Intel® Core 2 Duo, 1.6 GHz  
RAM: 4 GB  
Operative system: Windows 7-8-10, 32 or 64 bits

### INTERFACING WITH THE iPad

Through Bluetooth 4 connection (needs *Aero* option).  
Requires iPad 3 or successive  
Dedicated app freely downloadable from the Apple App Store  
Only Pure Tone and Speech tests available

### POWER SUPPLY

Maximum consumption: 10 Watts  
Power supply: 6V, 2A cont., through an external medical grade 100-240 Vac 50/60 Hz power supply



### MECHANICS

Size (WxDxH): 30.8 x 21.7 x 6.7 cm / 12.1 x 8.5 x 2.5 in  
Weight: 1.3 kg / 2.9 lbs

### APPLICABLE STANDARDS

Pure tone audiometry: IEC 60645-1, ANSI S3.6  
Speech audiometry: IEC 60645-1, ANSI S3.6  
High Frequency audiometry: IEC 60645-1, ANSI S3.6  
Calibration: ISO 389-1 (TDH 39 and DD45), ISO 389-2 (ER-3 and ER-5), ISO 389-3 (B71), ISO 389-5 (HF), ISO 389-7 (FF), data from the manufacturer (HDA-300 headphones)  
Electrical safety: IEC 60601-1, Class I type BF  
EMC: IEC 60601-1-2

### CE CERTIFICATE

93/42/EEC classification : Class IIa  
Classification rule (Annex IX, 93/42/EEC): 10  
Notified body: TÜV SÜD Product Service GmbH [0123]

### PRODUCT CODES

10558: Cello – Computer controlled diagnostic audiometer  
10559: Cello Aero – Computer /iPad controlled diagnostic audiometer

### INCLUDED PARTS

- DD45 or TDH-39 supra-aural headphones
- B71 bone vibrator
- Patient response switch
- Monitor headset with boom microphone
- Clip-on microphone for patient-to-operator communication
- Medical grade power supply
- USB connection cable
- User manual
- Inventis Software Suite
- Four magnetic covers

### OPTIONAL ACCESSORIES (with order code)

- 10833: ER-3C insert earphones
- 10177: IME-100 insert masking earphone
- 10179: Amplivox Audiocups noise excluding enclosures for TDH-39 and DD45 headphones
- 10181: Desktop microphone for live speech tests
- 10180: Cable set for sound booths with jack sockets
- 10557: Cable set for sound booths with RCA sockets
- 10266: One active speaker FBT J 5A (230V model)
- 10544: One active speaker FBT J 5A (120V model)
- 10560: High-Frequency extension package for Cello
- 10533: QuickSIN<sup>®</sup> test license
- 10562: Video-VRA extension package for Cello. Includes the license code and the desktop switch.

Cello is developed by:

#### INVENTIS s.r.l.

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