Science **made** smarter

Service manual

Lyra

Interacoustics

Item No. 8514918 - D-0121487 C – 2023/10

Table of Contents

1. Introduction

1.1 About this manual

This manual is for Lyra, an instrument in our range of diagnostic devices for recording DPOAE and TEOAE. The contents of the manual cover device related data, such as disassembly and calibration. Technical specifications and the parts & accessories list can be found as appendices in the back of the manual.

1.2 About warnings and cautions

The below warnings, cautions and notices are applied throughout the manual, indicating the level of attention required for a given action:

 WARNING	The **WARNING** label identifies conditions or practices that may present danger to the patient and/or user.
 CAUTION	The **CAUTION** label identifies conditions or practices that could result in damage to the equipment.
NOTICE	**NOTICE** is used to address practices not related to personal injury.

1.3 General information

We continuously strive to improve our products and their performance, hence the specifications in this service manual are subject to change without further notice.

The performance and specifications of our products can only be guaranteed if technical maintenance is conducted routinely every year. Technical maintenance should be carried out by qualified personnel authorized by Interacoustics.

We are happy to receive any inquiries about our products. Our contact details are:

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2. Maintenance and disassembly

Make sure that Lyra is disconnected from the power supply before starting this procedure.

This chapter contains information about how to conduct probe maintenance and a description and guide to disassembling Lyra when replacing one or more parts.

Disassembly should always be conducted by a technician authorized by Interacoustics.

TOOLS

Screwdriver Torx 6

2.1 Cleaning the probe tip

For top functionality, it is important to keep the probe system clean at all times. Therefore, follow the below illustrated instructions on how to remove cerumen from the small acoustic channels of the probe tip.

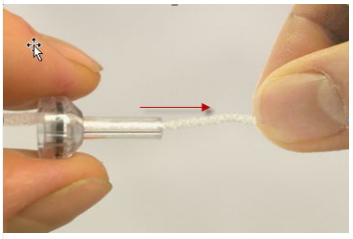
Unscrew the probe cap.

Remove the probe tip.

Thread the stiff end of the floss into one of the tubes.

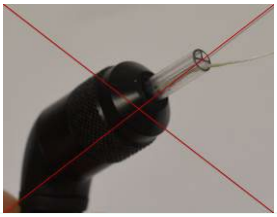
Pull the cleaning floss completely through the probe tip tube. Clean each of the tubes as required. Discard floss after use.

Remove the gasket from the probe tip to enable proper cleaning of both (refer to 2.1.1).



To clean the larger channel, remove the gasket from inside the probe tip. Use a fine pin to push the gasket back into place after cleaning.

Assemble the probe again.



NOTICE

Never use the cleaning tool to clean the probe base. This will destroy the filters.

2.1.1 Replacing the acoustic filters

When the acoustic filters inside the probe require replacement, please refer to the Quick Guide included in the replacement kit (D-0119757). In order to perform a correct replacement, it is advised to follow the guide meticulously when conducting this action.

2.1.2 Removing and replacing the gasket

To enable proper cleaning of the probe tip and the gasket, the gasket must first be removed from the probe tip:

To enable access to the gasket, the probe cap must first be screwed off.

With the probe cap off, the probe tip with the gasket is easy to pop out.

Use a pair of tweezers to carefully maneuver the gasket out of the probe tip.

NOTICE

The Quick Guide, D-0119757, includes a movie showing this action.

TIP

The better the probe tip is kept free of cerumen, the longer the acoustics filters will last without having to be replaced.

2.2 Opening the cabinet

This paragraph describes how the cabinet is opened and which parts belong where.

To open the cabinet, the front overlay must first be removed. This is done easily by peeling off the overlay from one of either corner.

This enables access to the 4 screws keeping the cabinet parts together.

Figure 1

The screws are placed, as indicated below. After removing the screws with the Torx screwdriver, the upper cabinet is ready to be dismantled.

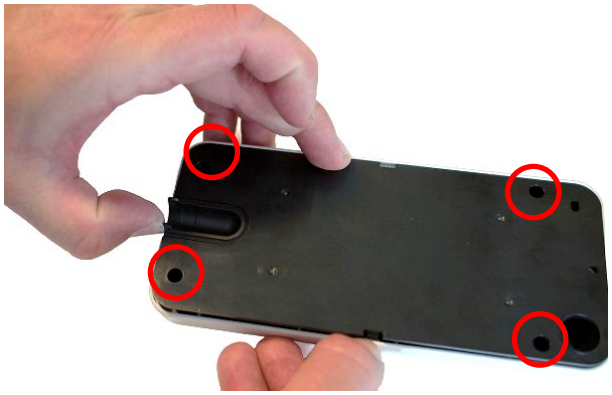


Figure 2

Figure 3

When the upper cabinet has been dismantled, the 3 types of part replacement for Lyra are enabled:

- Lyra probe replacement
- Lyra mainboard replacement
- Lyra cabinet parts replacement

2.3 Replacing the probe and the mainboard

Carefully, dismantle the probe holder.

Figure 4

This enables access to the probe PCA.

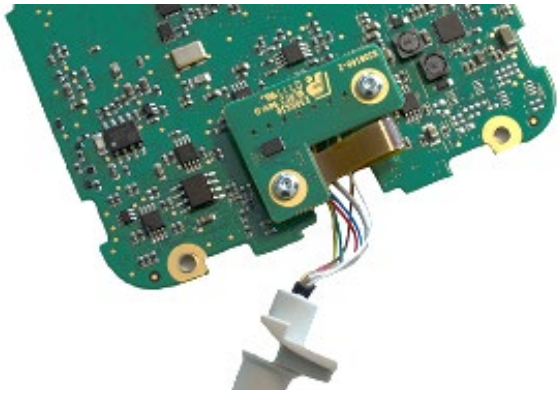


Figure 5

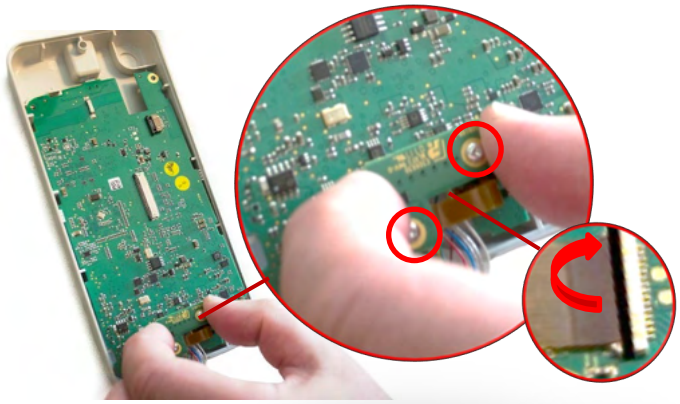


Figure 6

Use the Torx screwdriver to remove the 2 screws visible in the zoomed photo.

The probe PCA can now be removed.

To release the probe from the PCA, carefully flip the lock open, and release the cable keeping the probe PCA in place.

Now, both probe and mainboard replacement is possible.

2.4 Replacing the top cabinet

When replacing the top cabinet, the LED overlay must be placed on the backside of the top cabinet. Otherwise, the Lyra LED indicator is not going to work.

First, peel off the protective paper.

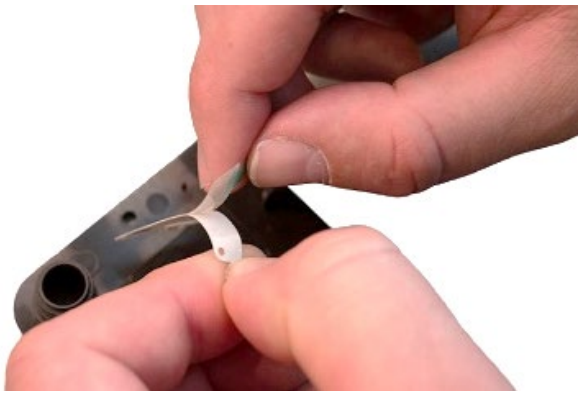


Figure 7

Then, place the LED overlay on the top cabinet, and the top cabinet is now ready for replacement.

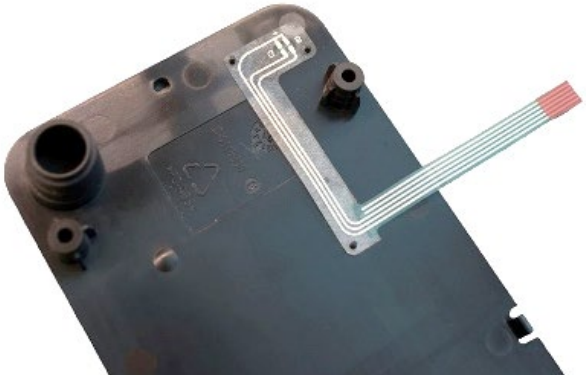


Figure 8

3. Installation of software

3.1 Equipment requirements for hardware and software

MINIMUM REQUIREMENTS FOR PC
Core i3 CPU or better (Intel recommended).
8GB RAM or more.
Hard drive with min 10 GB free space (Solid State Drive (SSD) recommended).
Minimum display resolution of 1280x1024 pixels (higher recommended).
DirectX 11.x compatible graphics (Intel/NVidia recommended).
One USB ports, version 1.1 or higher.

SUPPORTED OPERATING SYSTEMS[1]
Microsoft Windows® 10 32-bit and 64-bit
Microsoft Windows® 11 64-bit

3.2 IA OAE Suite software installation

NOTICE

Make sure to obtain administrative rights to the computer having the IA OAE Suite software installed.

Never connect Lyra to the computer before the software has been installed.

Make sure the latest service packs and critical updates are installed for the Windows® version in use.

Important note on the use of Normative Data
The software contains normative data for display and comparison with the record history. It is possible to create new normative data well as editing the current data.
Interacoustics claims no diagnostic consequence of degree of fit between the recorded results and whatever normative data examples the operator chooses to bring forward for comparison.

Further information about normative data can be obtained from the Lyra Additional Information Manual and by contacting Interacoustics.

To use the software in conjunction with a database (e.g. Noah 4 or the OtoAccess® Database), make sure the database is installed prior to the IA OAE Suite software installation.

Follow the manufacturer's installation instructions provided to install the relevant database.

EQUIPMENT

IA OAE Suite software installation media
USB cable
Lyra hardware

When using AuditBase System 5, you must ensure to launch this office system prior to this installation of the IA OAE Suite software.

[1] Windows® is a registered trademark of Microsoft Corporation in the United States and other countries.

3.3 Software installation

Insert the installation media and follow the below steps to install the IA OAE Suite software. If the installation procedure does not start automatically, click *Start*, then go to *My Computer* and double click *setup.exe* to initiate the installation:

1. Await the installation dialog box, and agree to the license terms and conditions, then click *Install*.
2. Follow the on-screen Lyra Installer instructions until the installation has been completed. Click on *Close*. The software is now installed and ready to use.

During installation, interaction may be required…	
… when asked if you want to allow changes to the computer..	.. click *Yes*.
… when asked to download and install a new Windows Feature (e.g., .NET Framework 3.5)..	.. download and install new features to ensure that the IA OAE Suite software works as intended
… when warned that Windows cannot verify the publisher of this driver software..	.. install the driver software anyway to ensure Lyra works as intended. If not installed, Lyra will not be detected by the computer when connected via USB.

3. Upon launching the software for the first time, you will be asked to choose your regional settings which activate a selection of factory protocols and the Instructions for Use (EN or US) of the IA OAE Suite software.

Figure 9

NOTICE

All regional factory protocols will be available through the *show/hide protocols* option for each separate module. Refer to Lyra Additional Information for more details.

Language settings are changed by selecting *Menu* | *Setup* | *Language* in the IA OAE Suite software.

3.4 Installation of the driver

Now that the IA OAE Suite software is installed, you must install the driver for the Lyra.

Connect the PC and Lyra with the USB cable, either directly or via the cradle.

The new hardware is automatically detected, and a pop-up appears on the task bar near the clock indicating that the driver is installed and the hardware is ready to use.

To check that the driver has been installed properly, go to *Device Manager* and verify that Lyra appears under *Medical devices*.

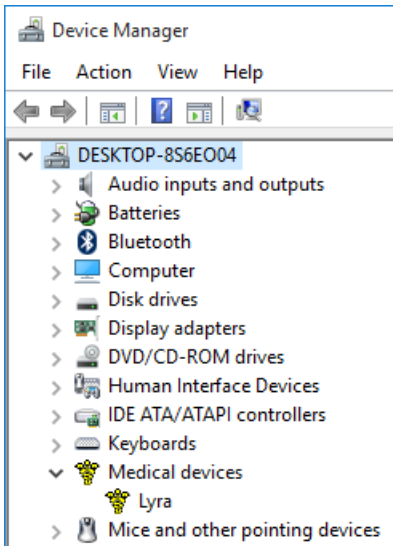


Figure 10

3.5 Standalone installation of IA OAE Suite software

It is not necessary to run the IA OAE Suite software through Noah 4 or the OtoAccess® Database each time - a shortcut on the desktop enables direct launch of the Suite as a standalone module.

To create a shortcut, simply go to:

Then, right click *IA OAE Suite* and select *Send To* | *Desktop (create shortcut)*. A shortcut to the Suite has now popped up on the desktop.

NOTICE Saving sessions in standalone mode will neither link the measurements to a specific patient nor be transferred to a patient in the database at a later point.

3.6 Managing the licenses for Lyra

Lyra comes with the license including the ordered software modules. The IA OAE Suite software offers additional modules or functions. Contact Interacoustics for further information.

4. Calibration

This chapter contains calibration standards for Lyra.

4.1 Service, adjustment and repair

This instrument can be serviced, adjusted and repaired without losing the validity of the CE marking, provided the measuring equipment fulfills the below demands, the adjustment procedures are adhered to and staff have the necessary qualifications as approved by Interacoustics.

Before any attempt is made to calibrate Lyra, it must have been powered on for 3-5 minutes in an ambient temperature that is both stable and comfortable.

4.2 Hardware calibration

The hardware calibration is typically only performed during the production of the device and therefore does not require adjustment in the field, except in certain circumstances. Refer to the Technical specifications appendix for further information.

After replacing the probe, hardware calibration is not required.

4.3 Requirements for calibration equipment

To ensure proper calibration of audiometric devices, calibration equipment must be reliable, stable and their calibration certified.

Minimum requirements for calibration equipment:
Sound level meter with input for condenser microphone or a sound level meter, fulfilling the demands of IEC60651 Type 1.
Occluded ear simulator/artificial ear fulfilling the demands of IEC60318-4 and IEC60318-1.
CAT55 calibration cavities (0.2/0.5 and 2.0/5.0ml).
We recommend an acoustic calibrator for the control of the complete measuring chain.
Oscilloscope or peak-peak voltage measurement equipment.

Additional equipment for hardware calibration:
General purpose oscilloscope to enable tracing and monitoring signals.

4.4 DPOAE and TEOAE calibration

4.4.1 Starting the calibration software

Connect Lyra to the computer with a USB cable and switch on Lyra.

From the Start Menu, select *All Programs – Interacoustics – IA OAE Suite*

Alternatively, use the path:

C:\Program Files (x86)\Interacoustics\IA OAE Suite

The startup screen should look like this, with the *Connect* button low lighted to indicate connection.

If the *Connect* button is highlighted due to missing connection to Lyra, reconnect and switch on Lyra. Then click *Connect*.

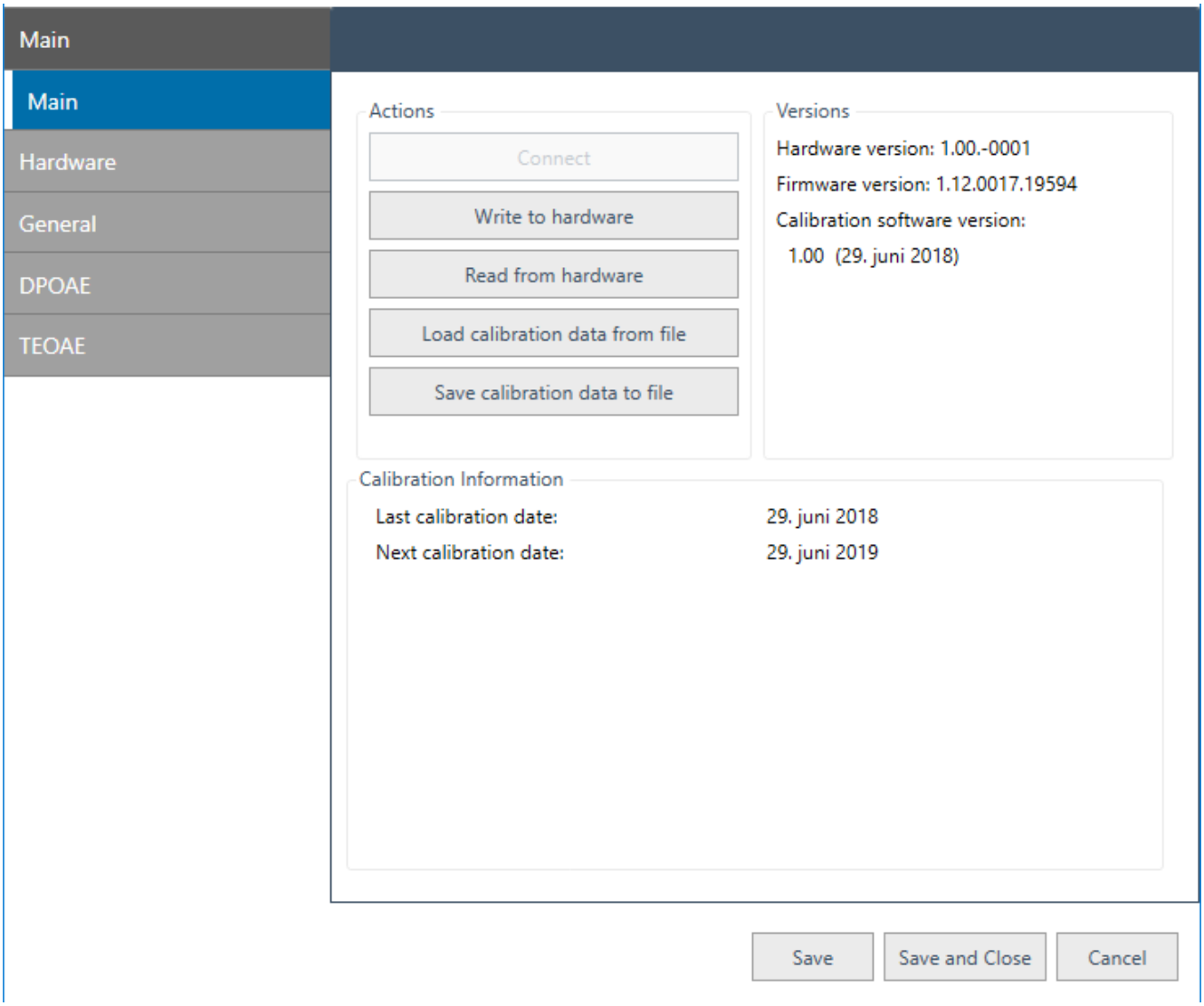
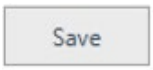


Figure 11



.. saves the present values at any point. This action saves all values in all screens.

.. saves all values in all screens and exits the calibration tool.

Calibrate the click monitor, DPOAE and TEOAE in the order described in the following paragraphs.
For this purpose, use the below mentioned calibration equipment:

- Sound level meter
- IEC711 coupler
- Oscilloscope

4.4.2 Click monitor

Via the *General* tab in the menu, select *Click Monitor Calibration.* Follow the on-screen instructions.

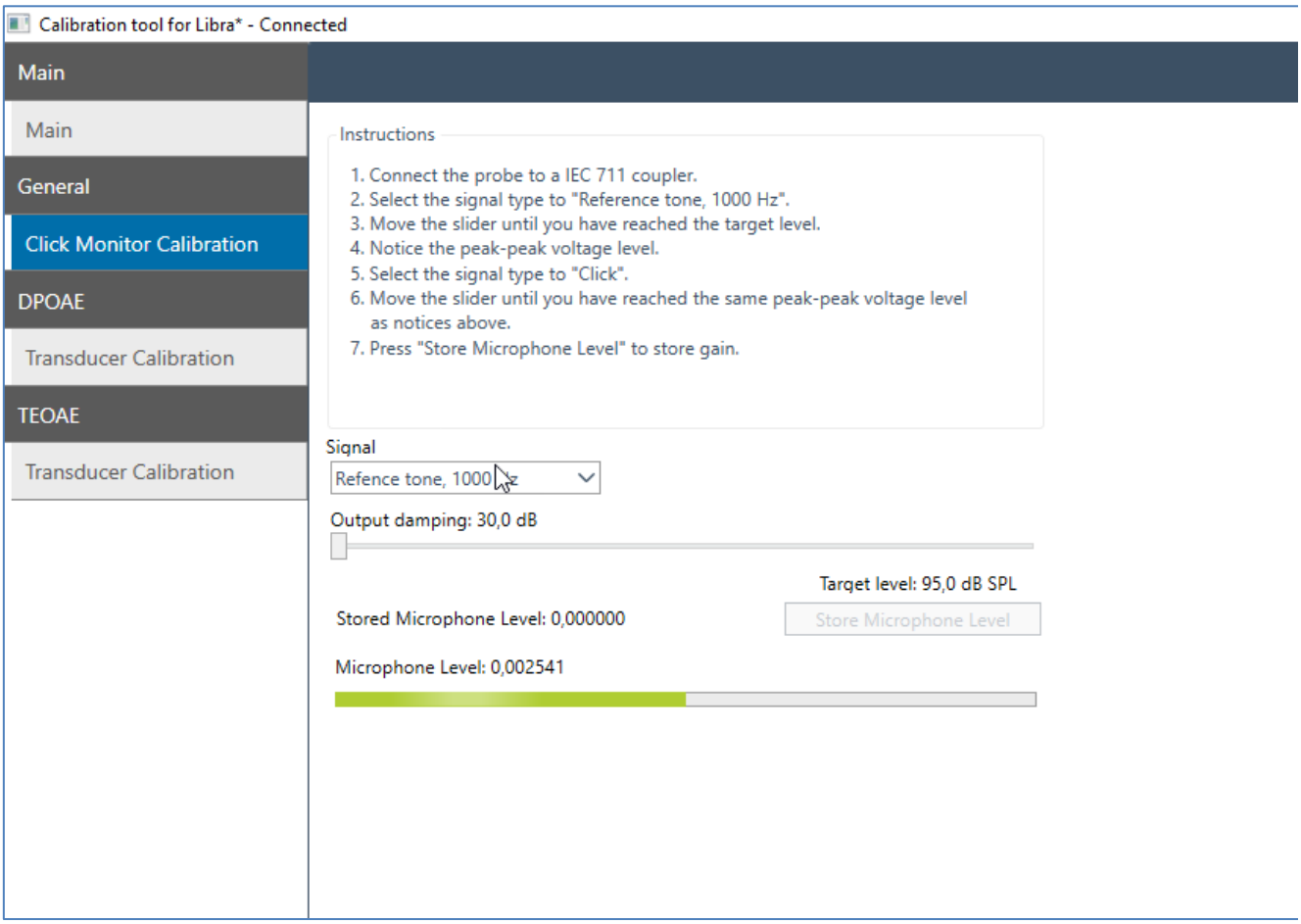


Figure 12

4.4.3 DPOAE

Via the *DPOAE* tab in the menu, select *Transducer Calibration*. Follow the on-screen instructions.

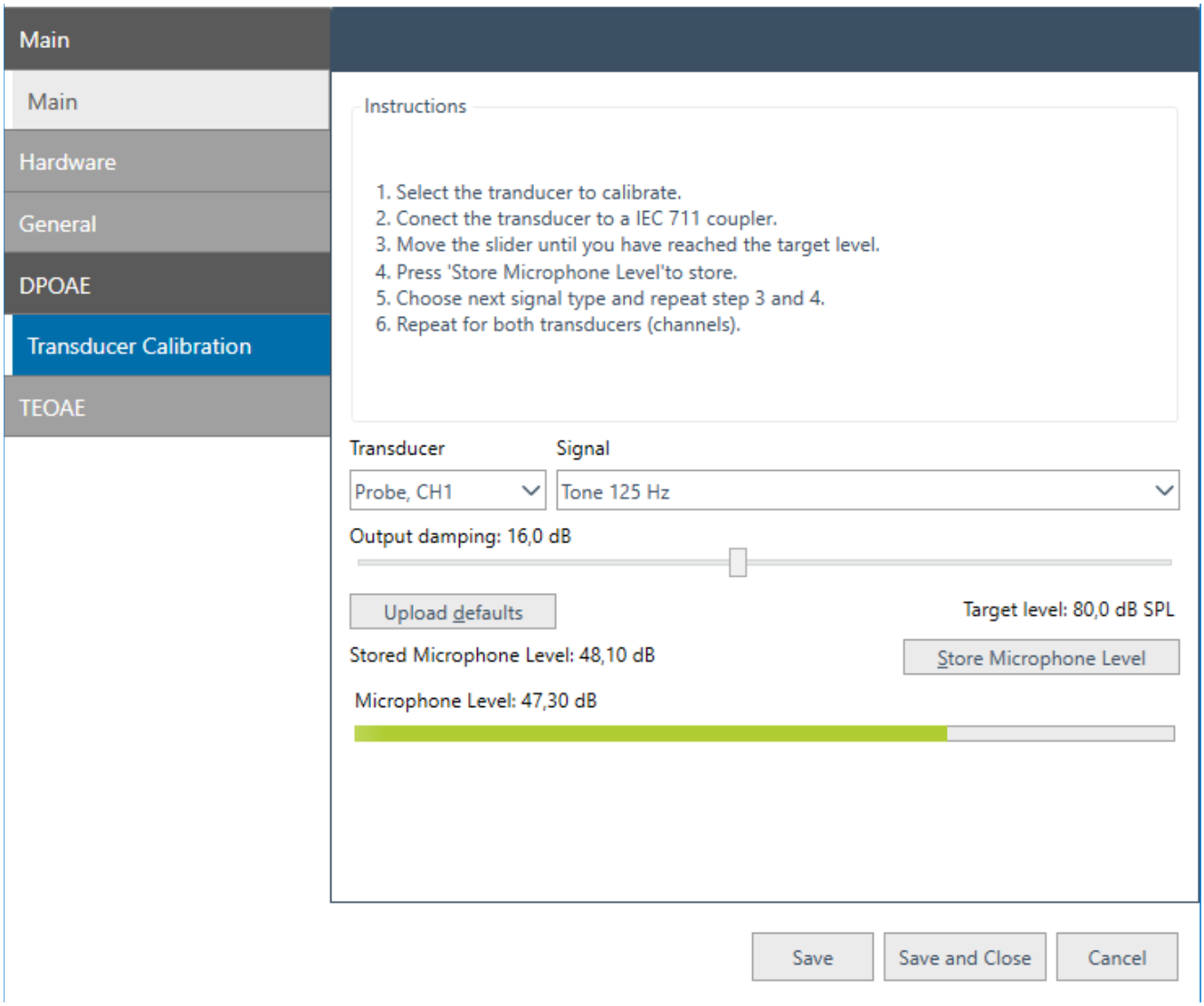


Figure 13

4.4.4 TEOAE

Via the *TEOAE* tab in the menu, select *Transducer Calibration*. Follow the on-screen instructions.

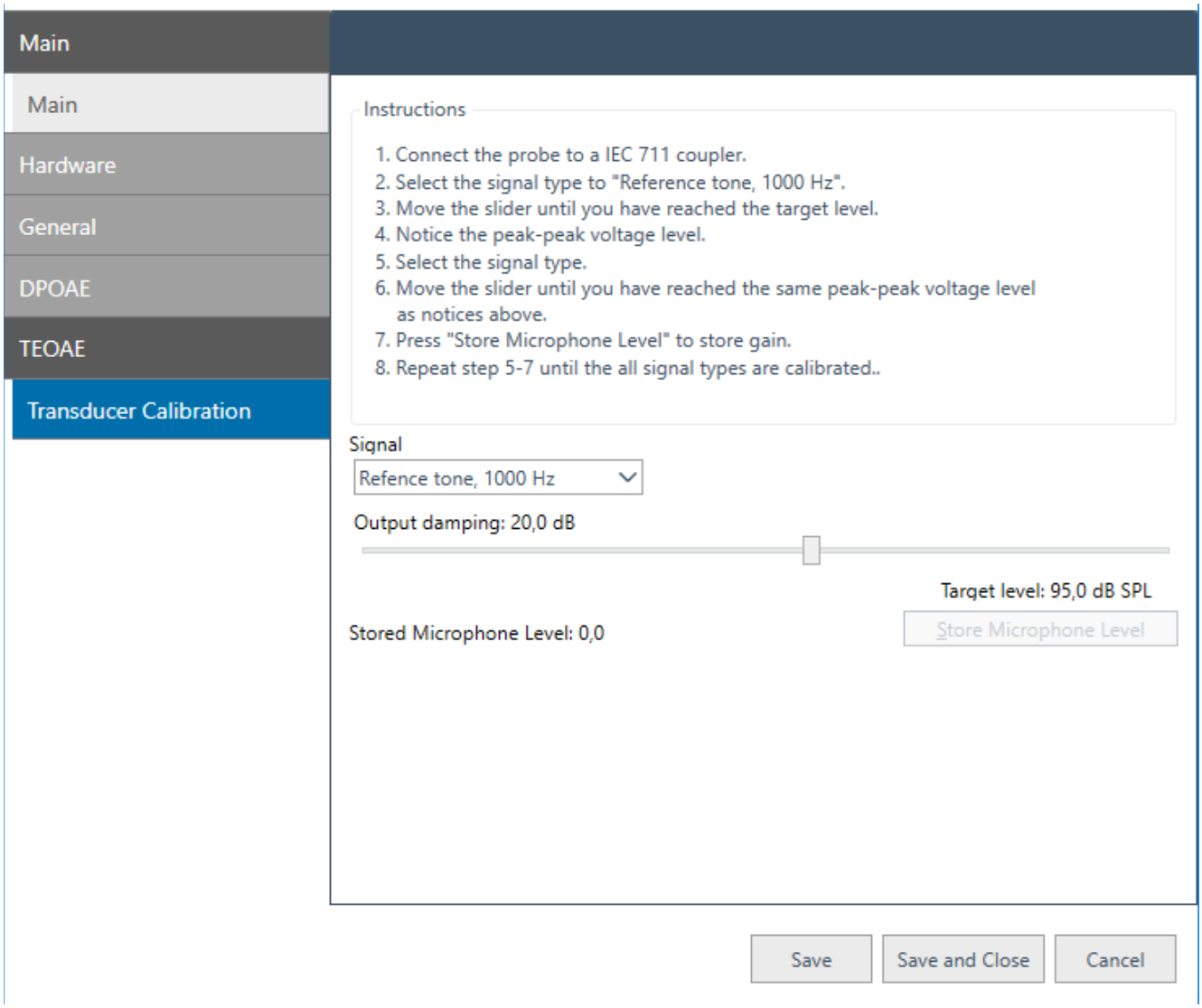
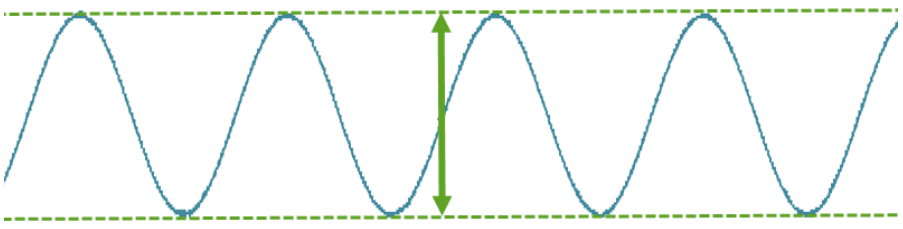


Figure 14



This is what the peak-to peak voltage level should look like.

Figure 15

This calibration continues on the next page.

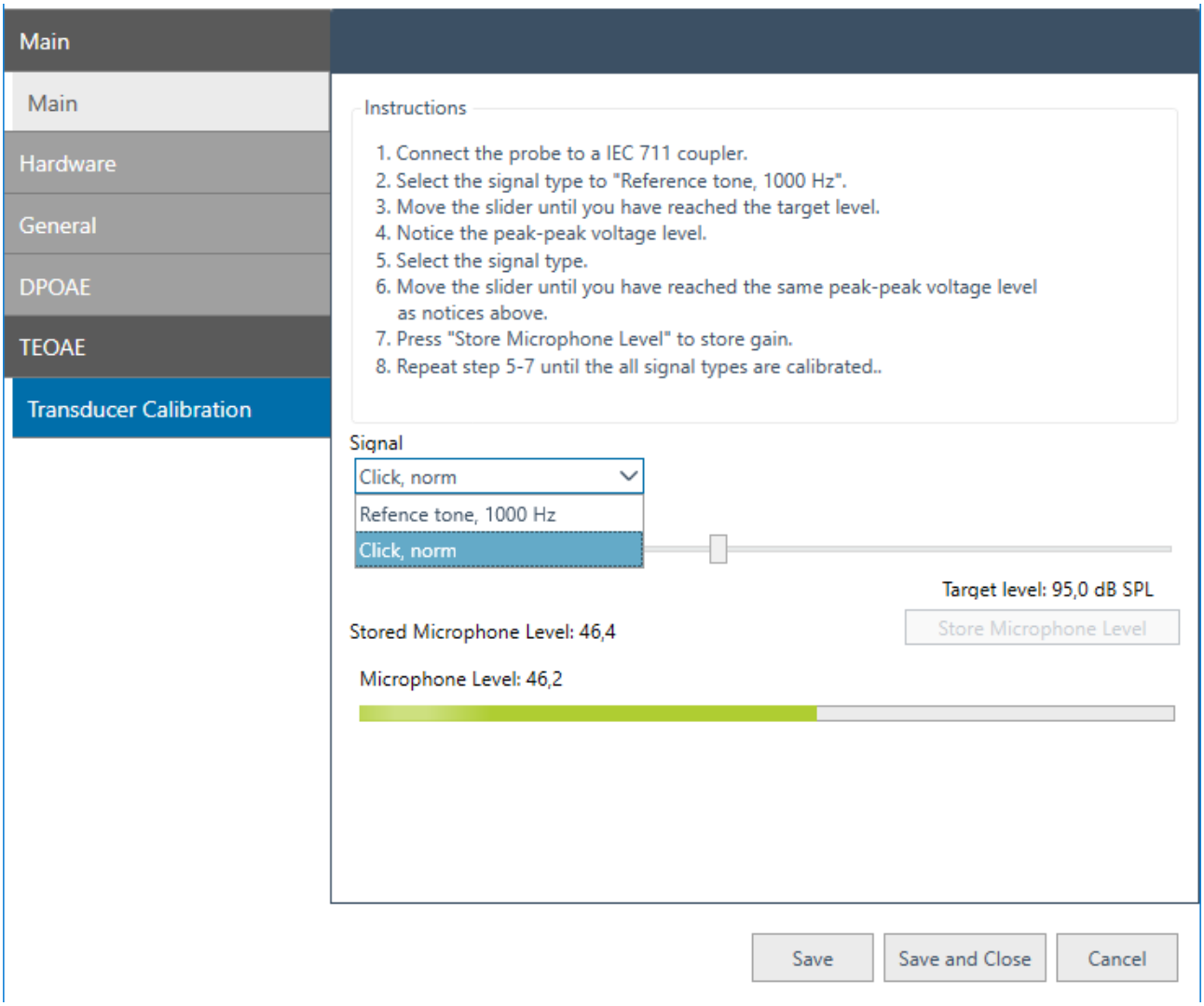
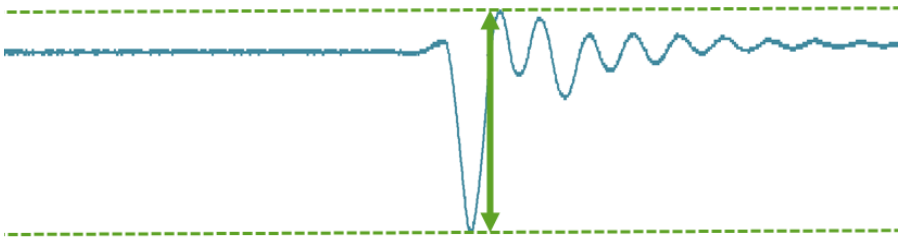


Figure 16



This is what the peak-to peak voltage level should look like.

Figure 17

Appendix A - Technical specifications and standards

Hardware – technical specifications

Medical CE marking:	The CE certification indicates that Interacoustics A/S meets the requirements of Annex II of the Medical Device Directive 93/42/EEC.	
	Approval of the quality system is conducted by TÜV - identification no. 0123.	
Standards:	Safety:	IEC 60601-1:2005, A1:2012 Type B applied parts.
	EMC:	IEC 60601-1-2:2014
	Test signal:	IEC 60645-1:2012 /ANSI S3.6, IEC 60645-3
	OAE:	TEOAE IEC 60645-6:2009, Type 1 & 2 Otoacoustic emissions.
		DPOAE IEC 60645-6:2009, Type 2 Otoacoustic emissions.
Operation environment:	Temperature:	15° - 35 °C
	Relative humidity:	30 - 90 %
	Ambient pressure:	98 kPa - 104 kPa
	Boot time	Less than 2 seconds.
	Warm-up time:	Less than 2 seconds.
Transport & storage:	Storage temperature:	0 °C - 50 °C
	Transport temperature:	-20° - 50 °C
	Relative humidity:	10 - 95 %
Power:		Powered trough USB 5V
		Minimum 330 mA
		Typical 420 mA
		Maximum 470 mA
PC control:	USB:	Input /-output for computer communication. Lyra is operated from a PC.
Dimensions:		8 x 18 x 2 cm (cable length 2 m)
Weight:		165 g incl. OAE probe.

DPOAE

Stimulus:	Frequency range:	500 to 10000 Hz
	Nominal frequency:	f2
	Frequency step:	1 Hz (custom)
	Level:	30 to 70 dB SPL and 65 dB SPL for 8 kHz to 10 kHz
	Level step:	1 dB
Recording:	Analysis time:	Minimum 2 seconds to unlimited time.
	A/D resolution:	24 bit, 5.38 Hz resolution.
	Artifact rejection system:	-30 to +30 dB SPL or off.
	Stimulus tolerance:	Adjustable between 1 and 10 dB
	SNR criteria:	Adjustable between 3 and 25 dB
	DP criteria:	SNR, Min DP level, DP tolerance, Residual noise, mandatory points, DP reliability
	Probe check window:	256 points frequency response of the ear canal due to a click stimulus.
	DP-response window:	4096 points frequency response.
	Residual noise:	A RMS average measurement in the DP-bin frequency area (26 bins at frequencies < 2500 Hz & 60 bins ≥ 2500 Hz).
Display:	Other information:	In ear status (before/after test) and noise rejection level.
		Basic or advanced view of the DP-Gram, test summary table, point summary table.
Probe specifications:	Lyra OWA probe:	Combined DPOAE and TEOAE OWA probe.
		Replaceable probe tip.

The DPOAE module uses an improved method of stimuli level control, which more accurately delivers the specified intensity in the full range of ear canals, from infants to adults. The applicability of the IEC 60645-6 standard is currently limited to adult ears. Therefore, in order to better serve a market with a product that provides more accurate stimulus levels to a wide range of ear canal volumes (specifically infants), we have chosen to utilize a more comprehensive calibration procedure for DPOAEs that is outside the scope of IEC 60645-6 for some protocols.

This improved method of stimulus control is enabled when the *Use Microphone compensation* box is checked. To use the IEC60645-6 calibration method, uncheck the *Use Microphone compensation* in the *Advanced* tab of the protocol setup.

TEOAE

Stimulus:	Frequency range:	500 to 5500 Hz
	Frequency step:	1 Hz (custom bands)
	Stimulus type:	Non-linear (according to IEC 60645-3).
	Level:	30 to 90 dB peSPL, peak to peak calibrated, AGC controlled.
	Level step:	1 dB
	Click rate:	43.5 or 80 Hz
	Stimulus tolerance:	Adjustable between 1 and 3 dB
Recording:	Analysis time:	30 seconds to 30 minutes or 300 to 30000 sweeps.
	A/D resolution:	24 bit
	Artifact rejection system:	0 to +60 dB SPL or off.
	SNR criteria:	Adjustable between 5 and 25 dB
	TE criteria:	SNR, min sweeps, min Total OAE, min TE level, mandatory bands
Display:	Stimulus time window:	128 points instant recording of first click in sequence of clicks.
	Probe check window:	256 points frequency response of the ear canal recorded click stimulus.
	Time recording window:	4-23 msec (max.). A and B buffer time-samples @ sampling rate 11025 Hz.
	Frequency response window:	256 points frequency response, bin spacing 43 Hz.
	Residual noise:	A RMS value for each octave band, based on the Bayesian weighted average for the defined OAE time window.
	Other information:	In ear status (active before, during & after test) and noise rejection level.
		Basic or advanced view, FFT view, test summary table, band summary table.
Probe specifications:	Lyra OWA probe:	Combined DPOAE and TEOAE OWA probe.
		Replaceable probe tip.

Frequencies and intensity ranges for DPOAE

LYRA MAXIMUMS DPOAE		
	IOW IPSI	IOW ch2
	Reading	Reading
Center Freq. [Hz]	Tone [dB SPL]	Tone [dB SPL]
500	80	80
750	80	80
1000	80	80
1500	80	80
2000	80	80
3000	80	80
4000	80	80
6000	75	75
8000	65	65
10000	65	65

Lyra Maximum TEOAE level

Maximum TEOAE Click Intensity: 90 dB peSPL.

Specification of input/output connections

INPUTS	CONNECTOR TYPE	ELECTRICAL PROPERTIES
Data I/O		
USB	USB type B	USB port for communication

Calibration properties

Calibrated Transducers:	Probe system:	Probe frequency transmitter and receiver and pressure transducer is integrated in the probe system.
Accuracy:	General:	Generally, the instrument is made and calibrated to be within and better than the tolerances required in the specified standards.
	DPOAE levels:	± 1.5 dB for 1000 to 4000 Hz and ± 3 dB outside range.
	TEOAE levels:	± 2 dB for click stimulus. ± 2 dB for all stimulus types.

Coupler types used for calibration

DPOAE: Probe stimuli L1 and L2 are calibrated individually in SPL values using an IEC 711 ear simulator coupler made in accordance with IEC 60318-4.

TEOAE: Probe stimuli are calibrated in peSPL values using an IEC 711 ear simulator coupler made in accordance with IEC 60318-4.

Electromagnetic compatibility (EMC)

Lyra is suitable in hospital environments except for near active HF surgical equipment and RF shielded rooms of systems for magnetic resonance imaging, where the intensity of electromagnetic disturbance is high.

Use of Lyra adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, Lyra and the other equipment should be observed to verify that they are operating normally.

Use of accessories, transducers and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation. The list of accessories, transducers and cables is found amongst the appendices.

Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of this instrument, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result in improper operation.

NOTICE: ESSENTIAL PERFORMANCE for Lyra is defined by the manufacturer as:
This instrument does not have an ESSENTIAL PERFORMANCE. Absence or loss of ESSENTIAL PERFORMANCE cannot lead to any unacceptable immediate risk.

Final diagnosis shall always be based on clinical knowledge. There are no deviations from the collateral standard and allowances uses.

Lyra is in compliance with IEC60601-1-2:2014, emission class B group 1.

NOTICE: There are no deviations from the collateral standard and allowances uses.
NOTICE: All necessary instructions for maintaining compliance with regard to EMC can be found in the general maintenance section in this manual. No further steps required.

Portable and mobile RF communications equipment could affect Lyra's functionality. Always install and operate Lyra according to the EMC information presented in this appendix.
Lyra has been tested for EMC emissions and immunity as a standalone Lyra. Avoid using Lyra adjacent to or stacked with other electronic equipment. Whenever adjacent or stacked use is necessary, the user should verify normal operation in the configuration.
The use of accessories, transducers and cables other than those specified - with the exception of Interacoustics service parts replacing internal components - may result in increased EMISSIONS or decreased IMMUNITY of the device.
Anyone connecting additional equipment is responsible for making sure the system complies with the IEC 60601-1-2 standard.

Guidance and manufacturer's declaration – electromagnetic emissions		
The *Instrument* **(Lyra)** is intended for use in the electromagnetic environment specified below. The customer or the user of the *Instrument* should assure that it is used in such an environment.		
Emissions Test	**Compliance**	**Electromagnetic environment - guidance**
RF emissions CISPR 11	Group 1	The ***Instrument*** uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The ***Instrument*** is suitable for use in all commercial, industrial, business, and residential environments.
Harmonic emissions IEC 61000-3-2	Not Applicable	
Voltage fluctuations / flicker emissions IEC 61000-3-3	Not applicable	

Recommended separation distances between portable and mobile RF communications equipment and the ***Instrument***.			
The ***Instrument*** **(Lyra)** is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the ***Instrument*** can help prevent electromagnetic interferences by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the ***Instrument*** as recommended below, according to the maximum output power of the communications equipment.			
Rated Maximum output power of transmitter [W]	**Separation distance according to frequency of transmitter [m]**		
	150 kHz to 80 MHz $d = 1.17\sqrt{P}$	**80 MHz to 800 MHz** $d = 1.17\sqrt{P}$	**800 MHz to 2.7 GHz** $d = 2.23\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.37	0.37	0.74
1	1.17	1.17	2.33
10	3.70	3.70	7.37
100	11.70	11.70	23.30
For transmitters rated at a maximum output power not listed above, the recommended separation distance *d* in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer. **Note 1** At 80 MHz and 800 MHZ, the higher frequency range applies. **Note 2** These guidelines may not apply to all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			

Guidance and Manufacturer's Declaration - Electromagnetic Immunity			
The ***Instrument*** **(Lyra)** is intended for use in the electromagnetic environment specified below. The customer or the user of the ***Instrument*** should assure that it is used in such an environment.			
Immunity Test	**IEC 60601 Test level**	**Compliance**	**Electromagnetic environment - guidance**
Electrostatic Discharge (ESD) IEC 61000-4-2	+8 kV contact +15 kV air	+8 kV contact +15 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be greater than 30%.
Immunity to proximity fields from RF wireless communications equipment IEC 61000-4-3	Spot freq. 385-5.785 MHz Levels and modulation defined in table 9	As defined in table 9	RF wireless communications equipment should not be used close to any parts of the ***Instrument***.
Electrical fast transient/burst IEC61000-4-4	+2 kV for power supply lines +1 kV for input/output lines	Not applicable +1 kV for input/output lines	Mains power quality should be that of a typical commercial or residential environment.
Surge IEC 61000-4-5	+1 kV Line to line +2 kV Line to earth	Not applicable	Mains power quality should be that of a typical commercial or residential environment.
Voltage dips, short interruptions and voltage variations on power supply lines IEC 61000-4-11	0% *U*T (100% dip in *U*T) for 0.5 cycle, @ 0, 45, 90, 135, 180, 225, 270 and 315° 0% *U*T (100% dip in *U*T) for 1 cycle 40% *U*T (60% dip in *U*T) for 5 cycles 70% *U*T (30% dip in *U*T) for 25 cycles 0% *U*T (100% dip in *U*T) for 250 cycles	Not applicable	Mains power quality should be that of a typical commercial or residential environment. If the user of the ***Instrument*** requires continued operation during power mains interruptions, it is recommended that the ***Instrument*** be powered from an uninterruptable power supply or its battery.
Power frequency (50/60 Hz) IEC 61000-4-8	30 A/m	30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or residential environment.
Radiated fields in close proximity — Immunity test IEC 61000-4-39	9 kHz to 13.56 MHz. Frequency, level and modulation defined in AMD 1: 2020, table 11	As defined in table 11 of AMD 1: 2020	If the I***nstrument*** contains magnetically sensitive components or circuits, the proximity magnetic fields should be no higher than the test levels specified in Table 11
Note: *U*T is the A.C. mains voltage prior to application of the test level.			

Guidance and manufacturer's declaration — electromagnetic immunity			
The ***Instrument*** **(Lyra)** is intended for use in the electromagnetic environment specified below. The customer or the user of the ***Instrument*** should assure that it is used in such an environment,			
Immunity test	**IEC / EN 60601 test level**	**Compliance level**	**Electromagnetic environment – guidance**
			Portable and mobile RF communications equipment should be used no closer to any parts of the ***Instrument,*** including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance:**
Conducted RF IEC / EN 61000-4-6	3 Vrms 150kHz to 80 MHz 6 Vrms In ISM bands (and amateur radio bands for Home Healthcare environment.)	3 Vrms 6 Vrms	$d = \frac{3,5}{Vrms}\sqrt{P}$
Radiated RF IEC / EN 61000-4-3	3 V/m 80 MHz to 2,7 GHz 10 V/m 80 MHz to 2,7 GHz Only for Home Healthcare environment	3 V/m 10 V/m (If Home Healthcare)	$d = \frac{3,5}{V/m}\sqrt{P}$ 80 MHz to 800 MHz $d = \frac{7}{V/m}\sqrt{P}$ 800 MHz to 2,7 GHz Where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and *d* is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range.[b] Interference may occur in the vicinity of equipment marked with the following symbol: 
NOTE1 At 80 MHz and 800 MHz, the higher frequency range applies NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the ***Instrument*** is used exceeds the applicable RF compliance level above, the ***Instrument*** should be observed to verify normal operation, If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the ***Instrument.*** [b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.			

EMC requirements conformity

Conformance (as specified in IEC 60601-1-2) is ensured if the cable types and cable lengths are as specified below:

DESCRIPTION	LENGTH	SCREENED
OAE cable		
USB cable	2.0 m	Screened

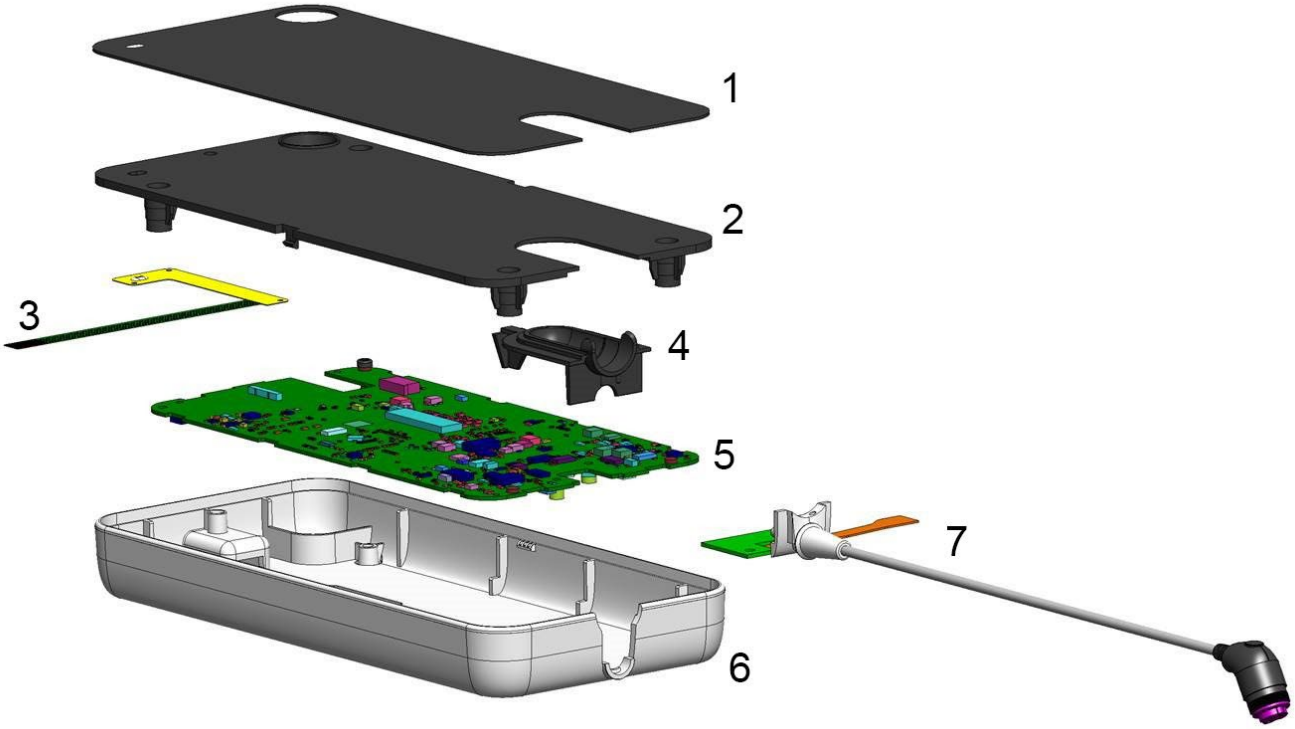
Appendix B - Parts & accessories

DISPOSABLES		
PART	PART NUMBER	DESCRIPTION
	8501570	Probe tip kit 1076/1081/1082, Sanibel™
	8012838	BET25 ear tip kit
	8501243	Probe cleaning kit 1076/1081/1082

ACCESSORIES		
PART	PART NUMBER	DESCRIPTION
	8105182	USB Type A-B Micro - 2 m
	8011356	Cavity 0.2/0.5 cc
	8513165	Ferrite core snap-on
	8513094	Lyra pouch
	8012959	Cleaning cloth

SPARE PARTS		
PART	**PART NUMBER**	**DESCRIPTION**
	8514274	Lyra probe kit
	8514273	Lyra mainboard kit
	8514275	Lyra cabinet parts kit

Appendix C - Exploded view



1. Graphic overlay
2. Upper cabinet
3. LED overlay
4. Probe holder
5. PCA mainboard
6. Lower cabinet
7. Lyra Probe

Please note the above is for illustrational purposes and may differ in shape, color and similar. For part numbers, refer to the Parts & accessories appendix.

Appendix D - Update news

The following modifications have been made to this instrument and/or service manual:

DATE	ACTION	REMARKS
2023/10	Revision of service manual	Microsoft Windows 7 and 8 removed Microsoft Windows 11 added Block diagram removed EMC table updated
2020/03	Revised to new tech specs (19.1). Changed USB cable length from 112 cm to 2 m.	Also added bit about removing the gasket to clean larger channels in probe tip.
2019/08	Release of service manual	