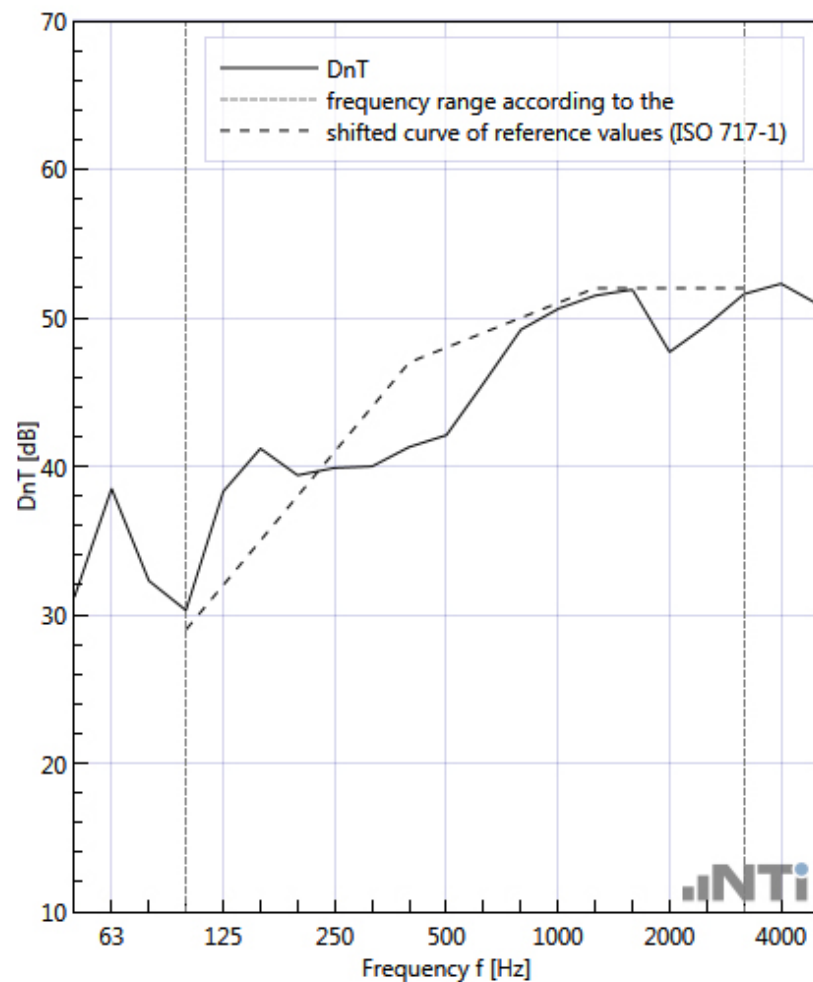


Sound Insulation Reporter

for XL2 Sound Level Meter



User Manual

V1.22.00

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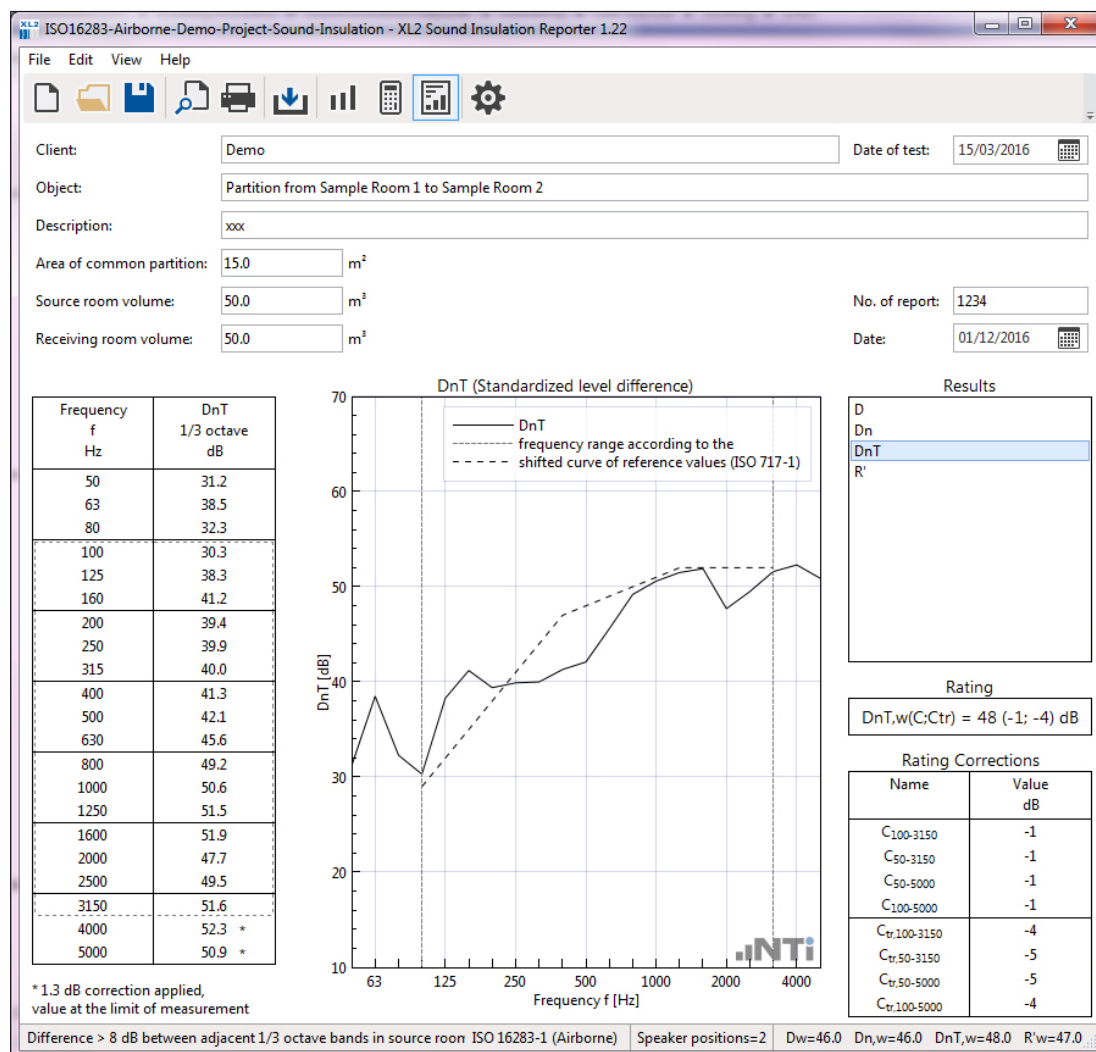
1. Introduction

Thank you for purchasing the Sound Insulation Option for the XL2 Sound Level Meter. This option enables the import of the measurement data into the Sound Insulation Reporter PC-software.

The Sound Insulation Reporter is a PC-based software application that provides all the reports for Airborne and Impact sound insulation measurements in accordance with the following standards:

- ASTM E336, ASTM E413, ASTM E1007, ASTM E989
- England/Wales: Approved Document E (2003)
- ISO 140-4:1998 (Airborne), ISO 140-7:1998 (Impact)
- ISO 16283-1:2014 (Airborne), 16283-2:2015 (Impact)

Designed for acoustic consultants, this comprehensive tool uses data gathered by the XL2 Sound Level Meter, and quickly returns graphical analysis of all measurement positions. Analyzing the measurement data and producing reports is straight-forward using the Sound Insulation Reporter software. Just drag & drop the XL2 measurement data into the software and print the report. The following tutorial provides a step-by-step instruction. The appendix provides more details on a typical onsite measurement procedure.



2. Tutorial

Sound Insulation is the measurement of the impact that a partition (usually a wall or ceiling) has on a sound produced on one side of the partition (the sending room) and heard on the other side (the receiving room). To evaluate this impact, sound insulation measurements require the recording of the noise spectrum in both the sending and the receiving room. During both measurements, the test sound source is generated within the sending room.

The XL2 with firmware V3.23 or higher simplifies these measurements by recording each data set with the dedicated location mapping, such as “L1-1” for a measurement carried out in the sending room at speaker position 1. This saves a lot of time later producing the report.

Software Installation

- Install the Sound Insulation Reporter software on your PC.

XL2 Sound Level Meter Requirements

For Firmware V3.23 or higher

- Install the firmware V3.23 or higher on the XL2.
- Install the Sound Insulation Option. This enables the data import into the Sound Insulation Reporter software.

For Firmware V3.12 or lower

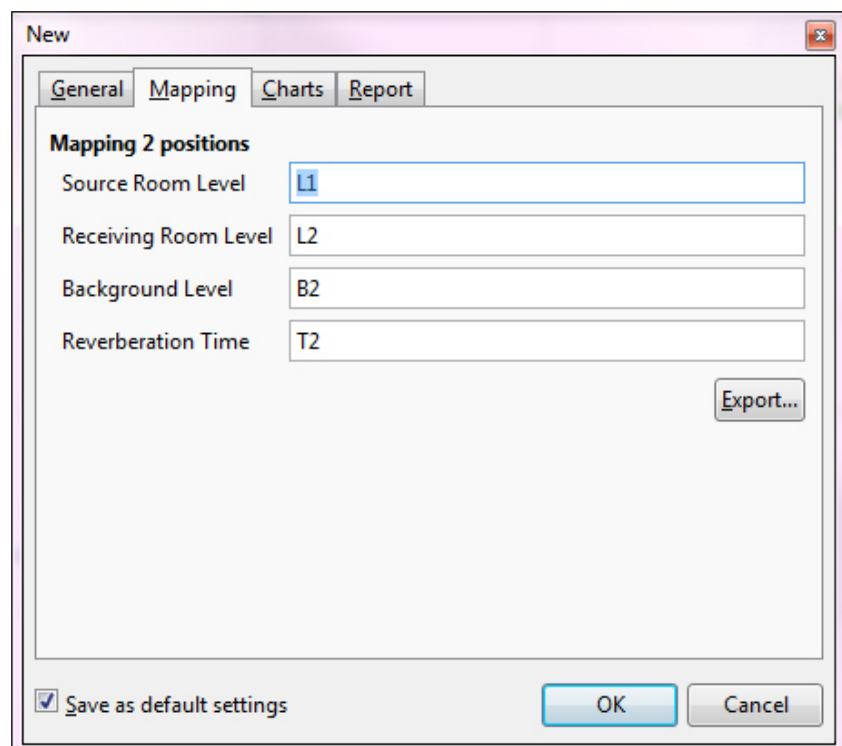
- Activate the Sound Insulation Option online at <https://my.nti-audio.com>. This enables to import the measurement data into the software. Just ensure your PC is online during the data import.

Mapping File for XL2

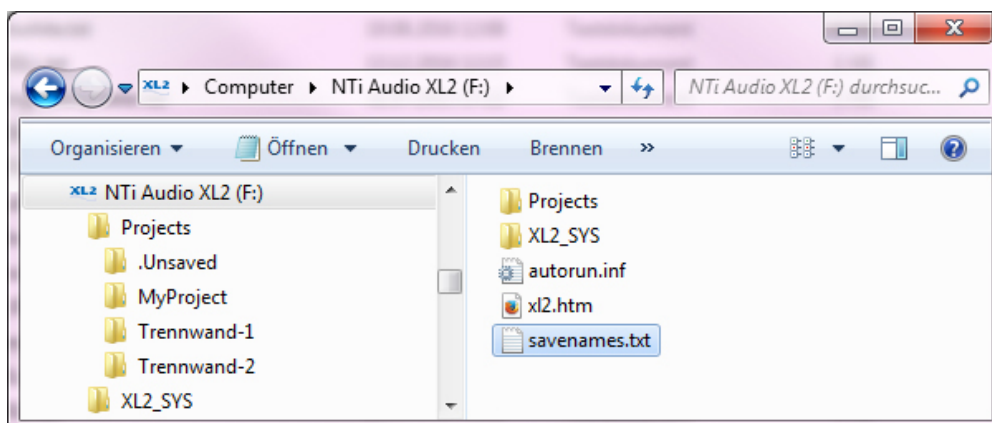
The measurement task onsite is made up of a several separate measurements. The XL2 Sound Level Meter may assign each of these measurements with a dedicated mapping, e.g. "L1-1" for the readings taken in the sending room with speaker position 1. This feature supports automated post-processing and reporting in the Sound Insulation Reporter software.

- Load the text file "savenames.txt" with the user defined mapping, such as "L1-1"; "L1-2";..., into the root directory of the XL2. The text file "savenames.txt" may be generated by the Sound Insulation Reporter software as follows:

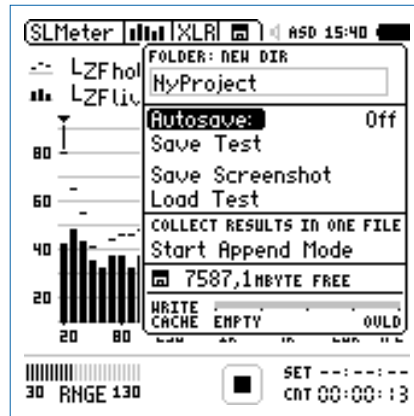
- Start the software
- Click on **Settings**
- Select the tab **Mapping**
- Click **Export**



- Load the txt-file "savenames.txt" with the various mappings onto the root directory of the XL2.



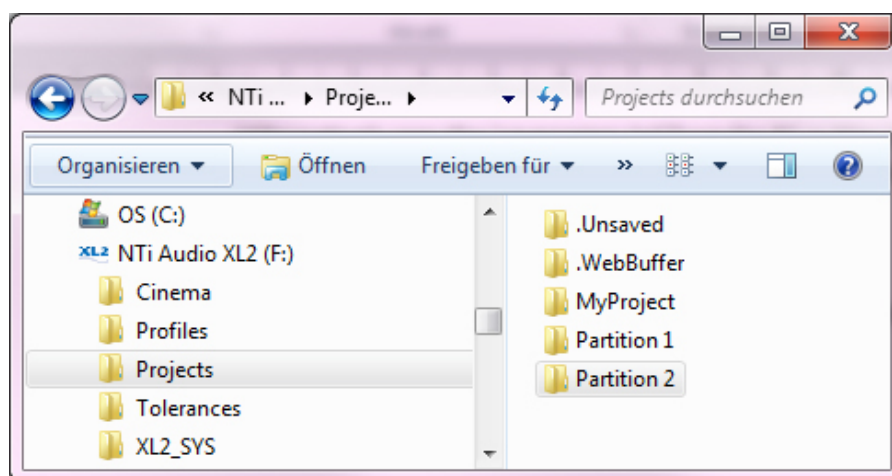
- Next select "Autosave: Off" in the XL2 memory menu. This allows you to store each individual measurement with the desired mapping. The XL2 then uses the same mapping for subsequent measurements by default.



Set XL2 Memory Structure for Multiple Partitions

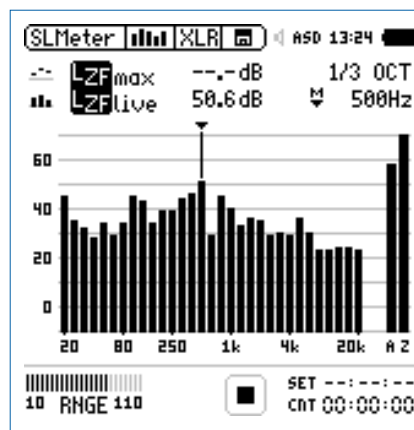
In applications with multiple partitions it is recommended to use a separate memory folder on the XL2 Sound Level Meter for each partition. All measurements belonging to a single partition are then stored in the same folder on the XL2 memory card. Measurements belonging to multiple partitions can be later copied into the individual partition folders on the computer. Each partition will be an individual project later on in the Sound Insulation Reporter software.

- Connect the XL2 to the computer and select "Mass Storage"
- Open the folder "Projects"
- Generate new subfolders for each partition, e.g. Partition 1, Partition 2, PartitionRoom 1-2, ...



Perform RTA Noise Measurements

- Select the SLMeter measurement function on the XL2.
- Select the RTA screen and 1/3 octave resolution measurements.
- Ensure the frequency weighting "Z" is selected (= no weighting).
- Start the measurement.
- Stop the measurement after 15 seconds.



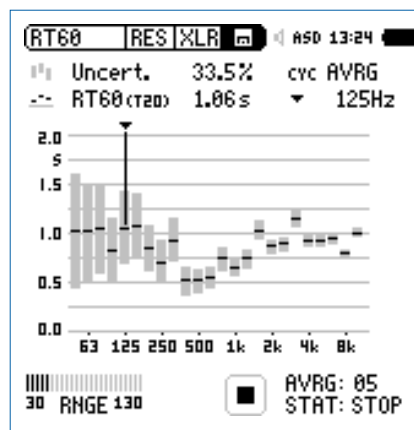
- Open the memory menu and select "Save Test"
- The XL2 displays the Save Test pop-up; select "Sound-Insul" at the right end of the first line.



- Select the applicable mapping
- Confirm your selection with the enter key and save the measurement. The XL2 saves the measurement data with a file name such as "L1-1_SLM_003_RTA_3rd_Report.txt"
- Continue with the further measurements "L1-2...", etc." in the same manner.

Perform RT60 Reverberation Time Measurements

- Select the RT60 measurement function on the XL2.
- Select 1/3 octave resolution (requires the optional Extended Acoustic Pack pre-installed in the XL2).
- Start the measurement.
- Stop the measurement.



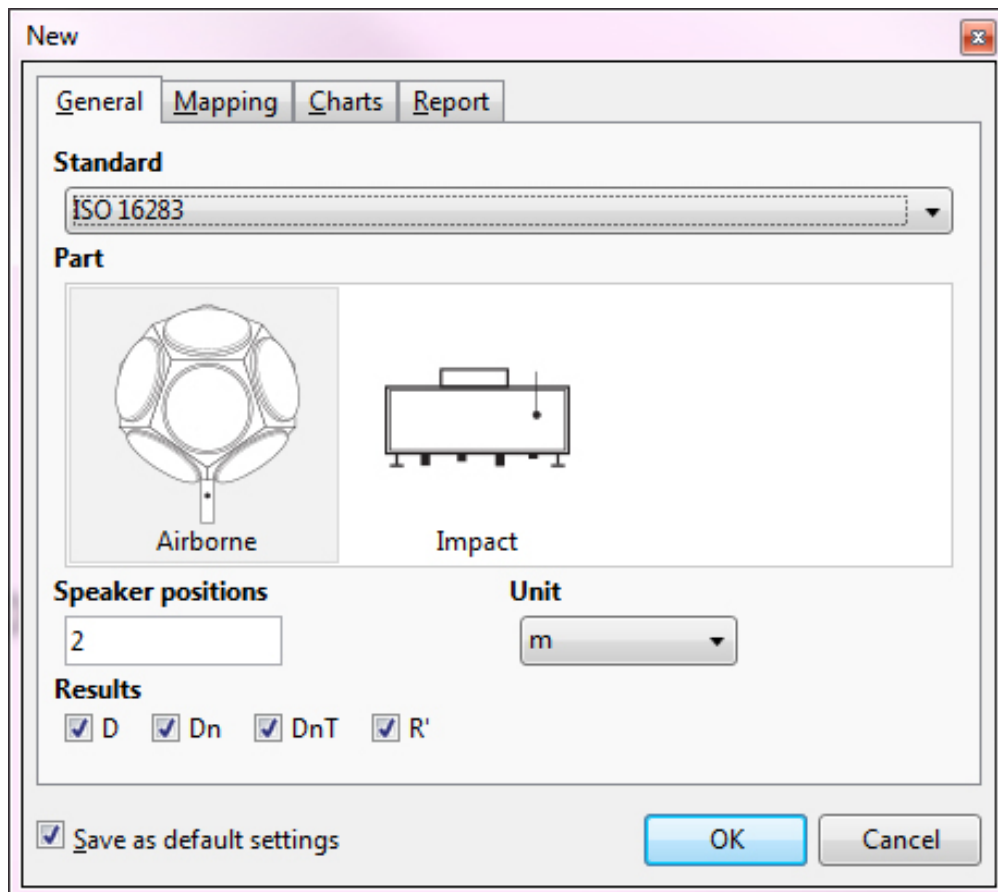
- Open the memory menu and select "Save Test"
- The XL2 displays the Save Test pop-up; select "Sound-Insul" at the right end of the first line.



- Select the applicable mapping
- Confirm your selection with the enter key and save the measurement. The XL2 saves the measurement data with a file name such as "T2_RT60_000_Report.txt"
- Continue with the further measurements in the same manner.

Import Measurement Data into the Software

- Start the Sound Insulation Reporter software.
- Click on **File** -> **New**



- Select your requested **Standard**
- Select **Airborne** or **Impact** Sound Insulation Select in **Part**.
- Select the number of **Speaker positions** used.
- Select **Unit**.
- Define the required **Results**.
- Confirm with **OK**.

XL2 Sound Insulation Reporter 1.22

File Edit View Help

Client: [Client Name] Date of test: 30/01/2017

Object:

Description:

Area of common partition: 40.0 m²


Source room volume: 50.0 m³

Receiving room volume: 50.0 m³

No. of report:

Date: Select a date

Drop measurement files or folder here

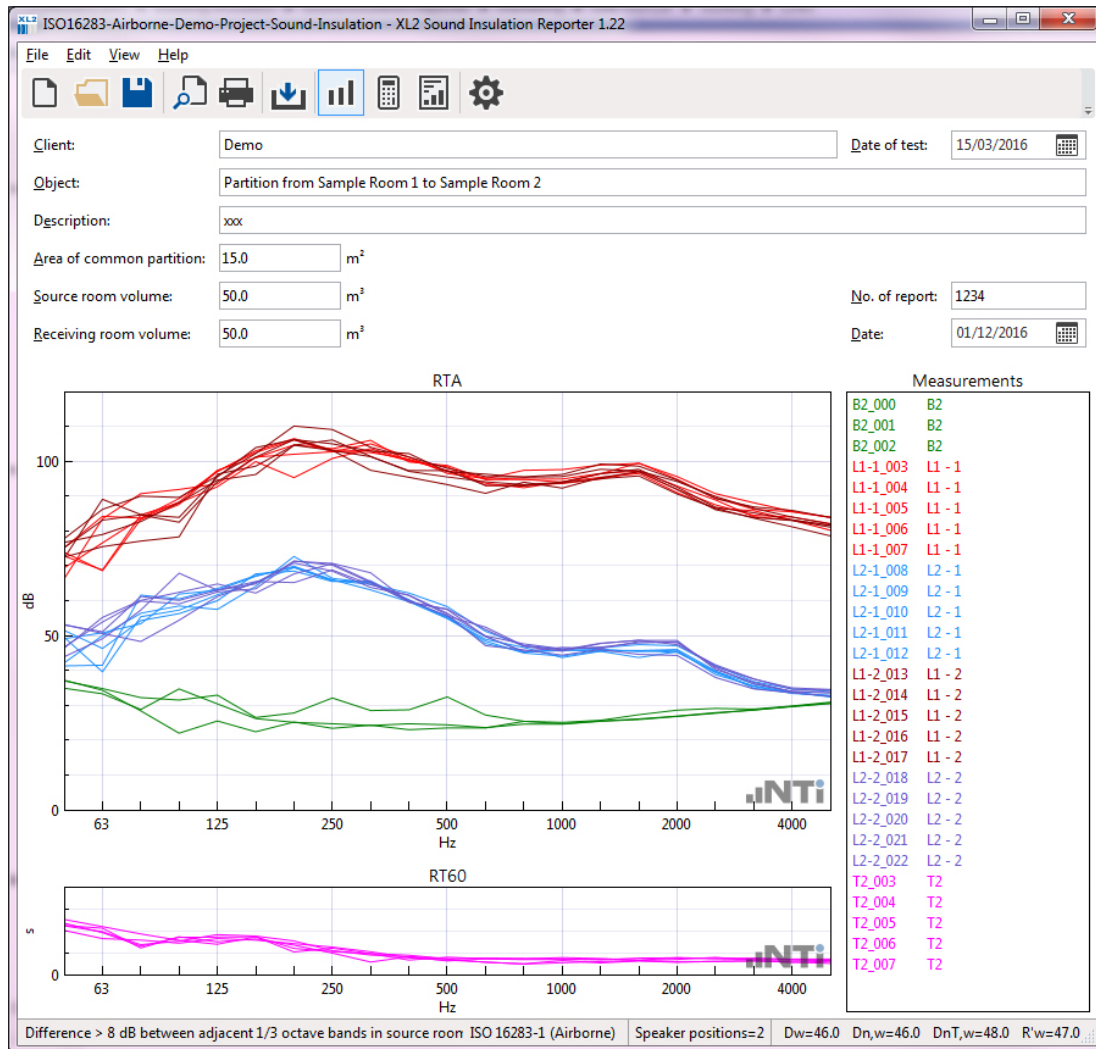

[Import...](#)

ISO 16283-1 (Airborne)

ISO 16283-1 (Airborne) Speaker positions=2 DnT,w=---

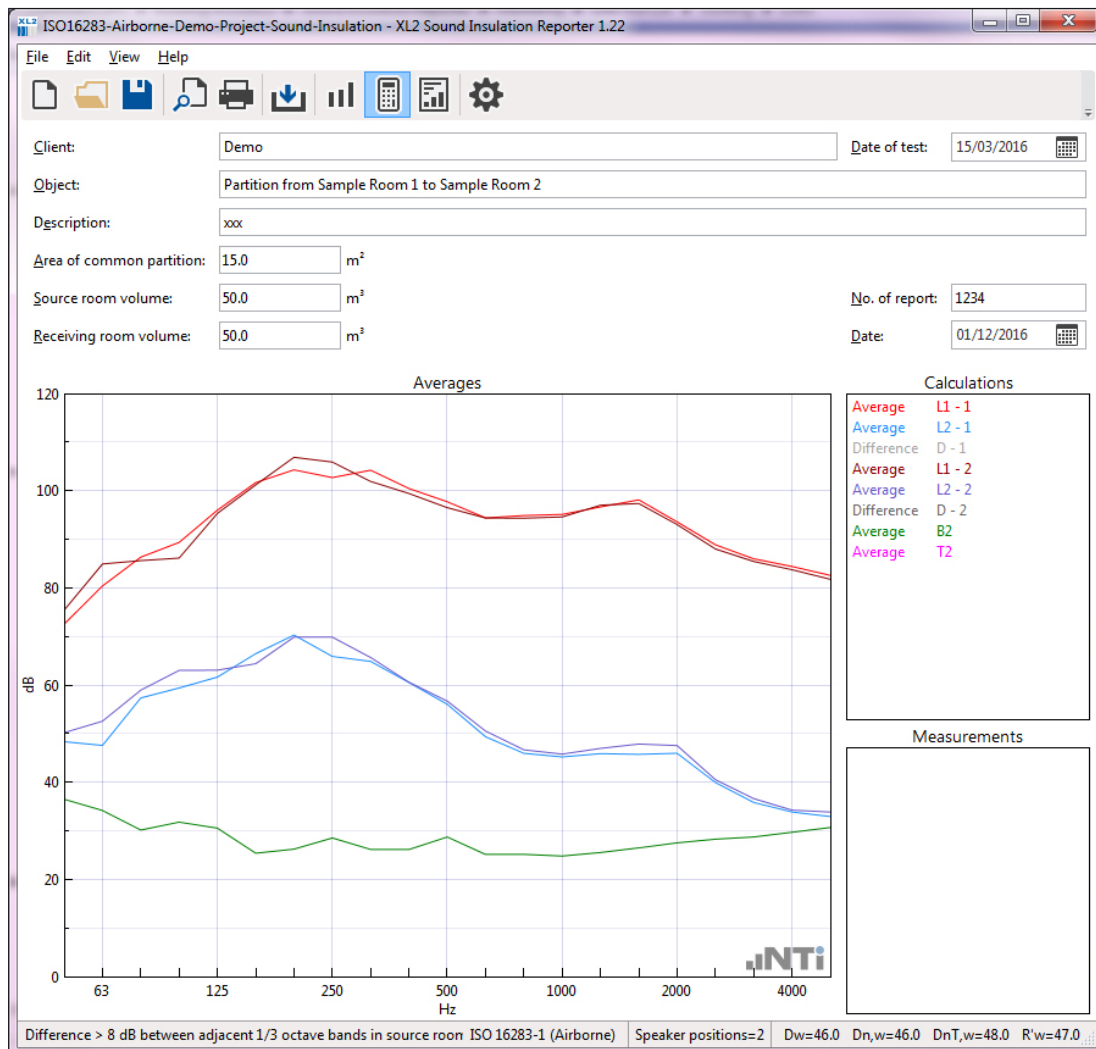
👉 The measurement view with the message “Add your measurements here ...” is displayed.

- Drag and drop the complete partition folder from the XL2 memory card into the software. The partition folder should include the RTA data, the RT60 data and the *.xl2 system files



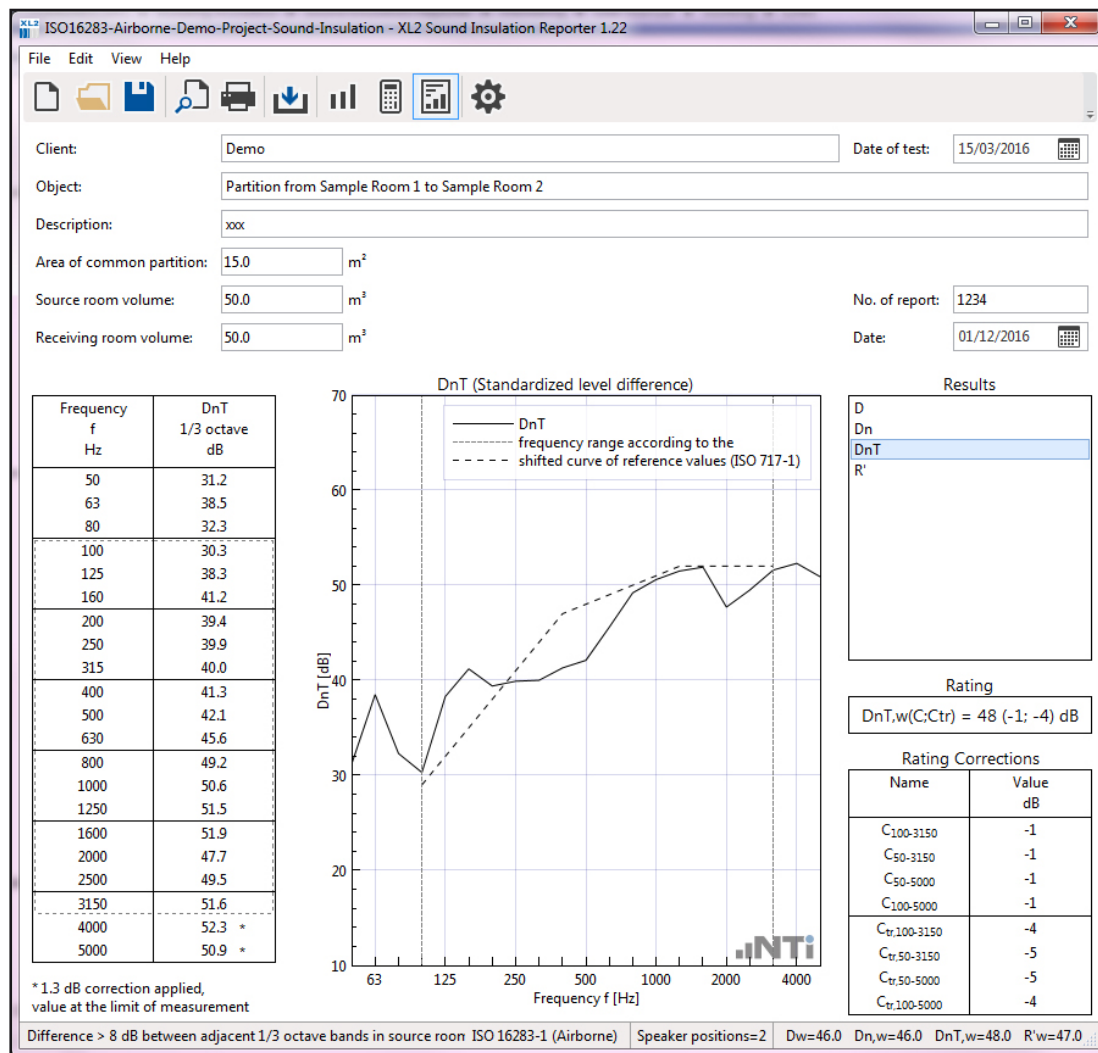
- Verify the measurement data and delete any false readings from the Measurements list on the right.

- Select **View -> Calculations** in the menu bar and verify the individual averaged results.



- Select the **View -> Results**.

👉 The sound insulation data and chart is displayed.

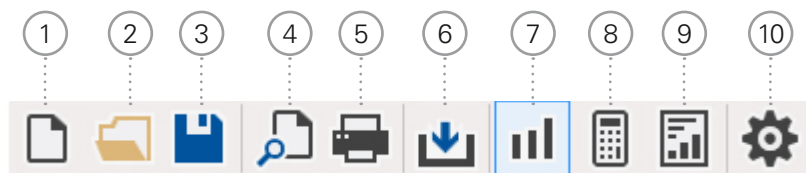


- Complete the header data with information about client, object, description, partition area and room volumes.
- Print the sound insulation report.

👉 Congratulations, your first report is completed!

3. Main Menu

Toolbar



- ① **New Project**
A project contains the measurement data of one partition. The airborne or impact sound insulation of a new project is calculated in accordance with the selected standard.

 - Select the number of **Speaker positions** used for the measurements with the XL2 Sound Level Meter.
 - Select **Unit**.
 - Select the **Results** required.
 - Confirm the settings with **OK**.
- ② **Open Project File**
Select an existing project file *.xlba.
- ③ **Save Project File**
Save the actual sound insulation data as project file *.xlba.
- ④ **Print Preview**
The sound insulation reports for the selected results are displayed.
- ⑤ **Print**
The sound insulation reports for the selected results are printed.
- ⑥ **Import**
Select the folder containing the original XL2 measurement data *.txt and *.xl2 files and confirm with "Select folder". All measurement files within the selected folder are imported into the software.
- ⑦ **Measurements View**
The original XL2 measurement data is visualized in the frequency range from 50 Hz to 5 kHz. By default all measurement data, as well as the speaker position for the sound insulation calculation, are automatically assigned to the corresponding sending or receiving room. Alternatively the data can be assigned manually.

8 **Calculations View**

Displays the average of the

- sending room level for each speaker position
- receiving room level for each speaker position
- background noise level
- reverberation time RT60

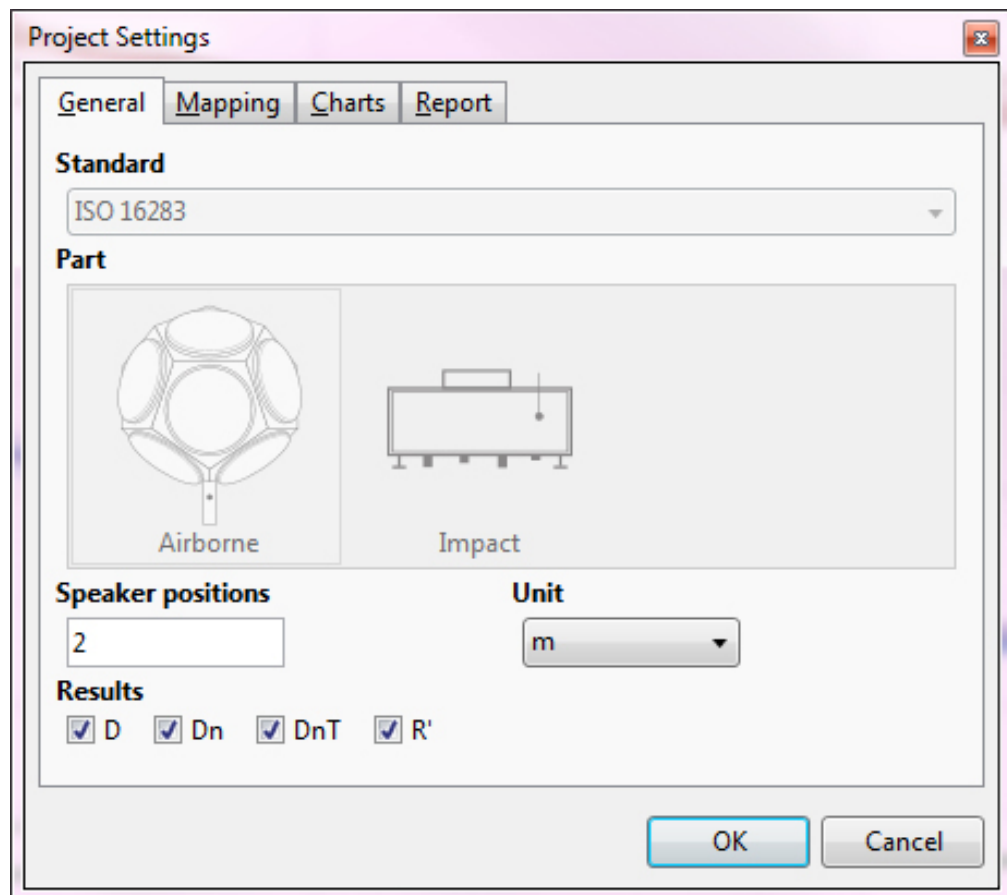
9 **Results View**

Displays the following sound insulation results based on the selected result type:

- Table from 50 Hz - 5 kHz
- Standardized chart from 50 Hz - 5 kHz
- Single number sound insulation rating
- Rating corrections Cxx

10 Settings**General**

- Select the number of **Speaker positions** used for the measurements with the XL2 Sound Level Meter.
- Select **Unit**.
- Select the **Results** required.



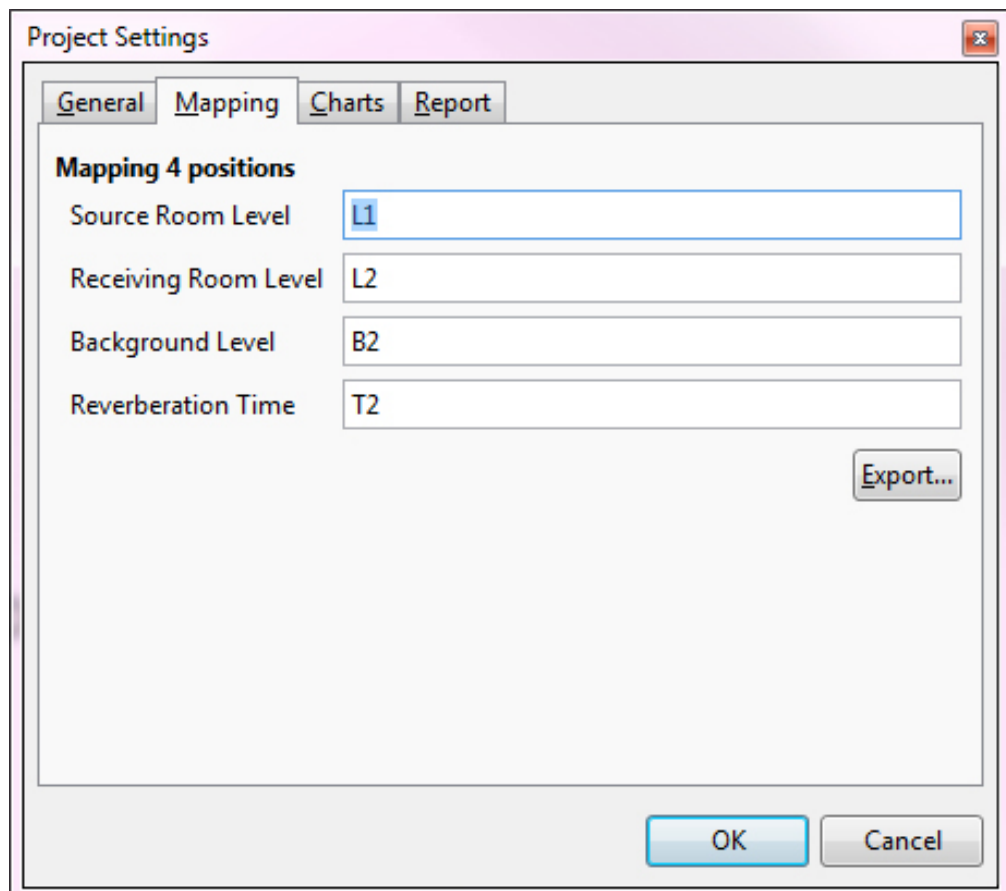
10 Settings

Mapping Sound insulation measurements require the recording of multiple noise spectras in the sending and the receiving rooms. The XL2 with firmware V3.23 or higher simplifies the data handling of these measurements by recording each data set with a dedicated location mapping, such as "L1-1" for a measurement carried out in the sending room with speaker position 1.

Storing the measurement data with this mapping on the XL2 supports the automated data assigning to the corresponding room and speaker position during the data import into the Sound Insulation Reporter software.

- Click on **Export...**; this generates the text file savenames.txt
- Load the txt-file "savenames.txt" with the various mappings, like "L1-1"; "L1-2"... onto the SD card of the XL2.
- Copy this file onto the root directory of the XL2 memory card
- Select the memory menu on the XL2 and set **Autosave: Off**

👉 Each measurement can be manually stored on the XL2 with one of the pre-defined mappings.



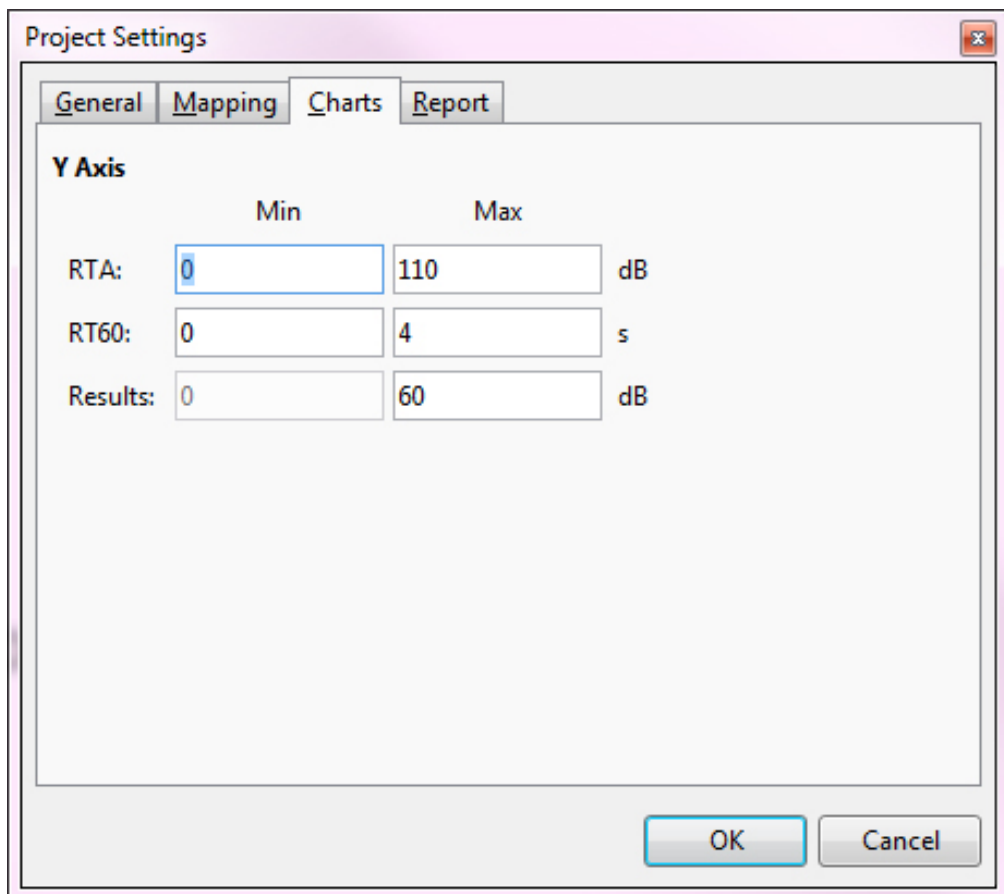
The screenshot shows the 'Project Settings' dialog box with the 'Mapping' tab selected. The 'Mapping 4 positions' section contains four text input fields: 'Source Room Level' (L1), 'Receiving Room Level' (L2), 'Background Level' (B2), and 'Reverberation Time' (T2). An 'Export...' button is located to the right of these fields. At the bottom of the dialog are 'OK' and 'Cancel' buttons.

Setting	Value
Source Room Level	L1
Receiving Room Level	L2
Background Level	B2
Reverberation Time	T2

10 Settings

Charts

- RTA** Set the Y-axis scaling for measurements and calculations view
- RT60** Set the Y-axis scaling for measurements and calculations view
- Results** Set the Y-axis scaling for the chart in results view. The default span is 60 dB.



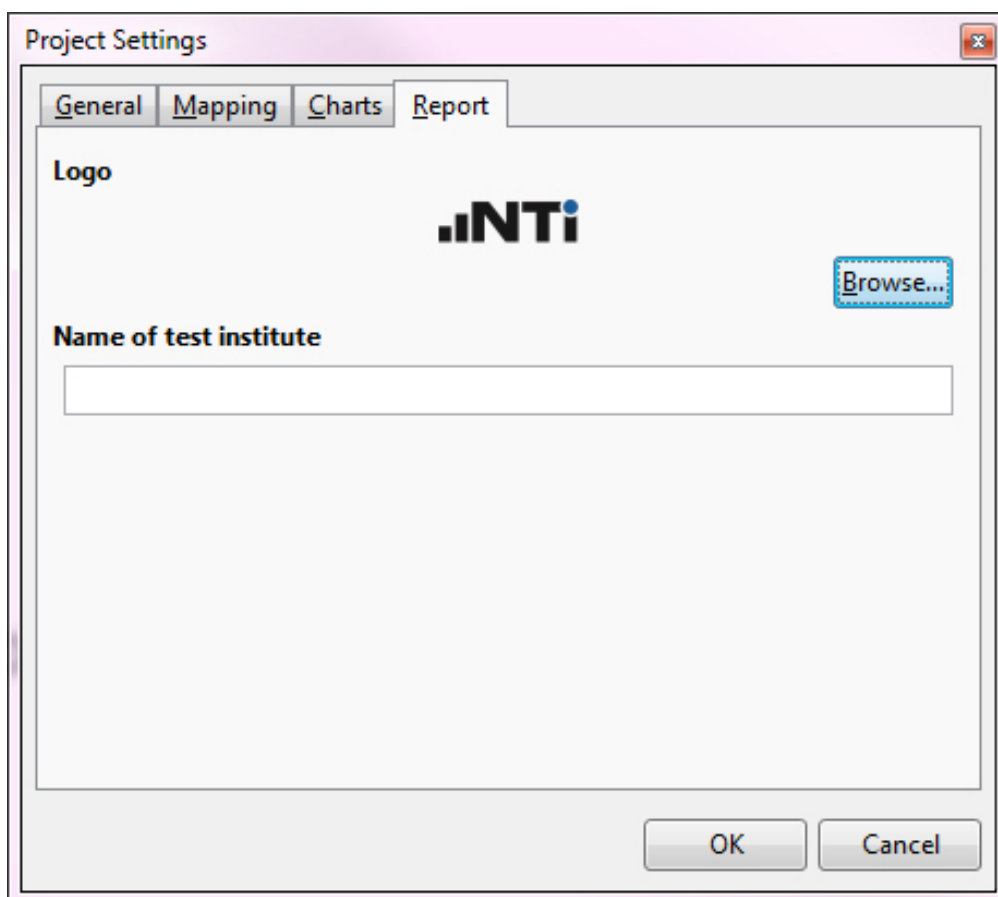
The image shows a screenshot of the 'Project Settings' dialog box, specifically the 'Charts' tab. The dialog has four tabs: 'General', 'Mapping', 'Charts', and 'Report'. The 'Charts' tab is selected. Under the 'Y Axis' section, there are three rows of settings for 'RTA', 'RT60', and 'Results'. Each row has two input fields for 'Min' and 'Max' values, followed by a unit label. The 'RTA' row shows 'Min' as 0 and 'Max' as 110, with the unit 'dB'. The 'RT60' row shows 'Min' as 0 and 'Max' as 4, with the unit 's'. The 'Results' row shows 'Min' as 0 and 'Max' as 60, with the unit 'dB'. At the bottom right of the dialog are 'OK' and 'Cancel' buttons.

	Min	Max	Unit
RTA:	0	110	dB
RT60:	0	4	s
Results:	0	60	dB

10 Settings

Report

- Load your company logo for the printed measurement reports
- Set the **Name of the test institute**, e.g. your company name



Menu

The software offers the following menu functionalities:

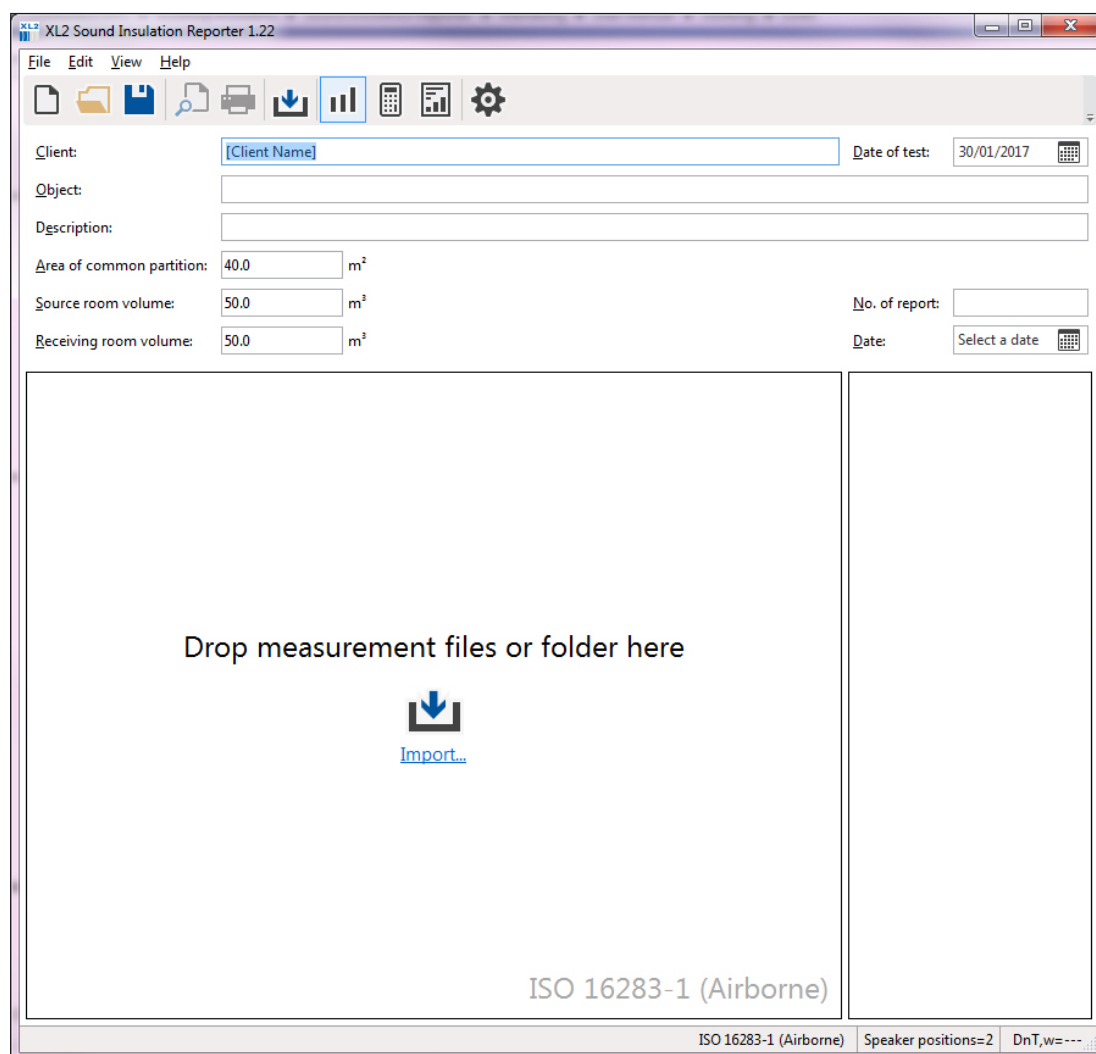
File	New...	<p>A project contains the measurement data of one partition. The airborne or impact sound insulation of a new project is calculated in accordance with the selected standard.</p> <ul style="list-style-type: none"> • Select the number of Speaker positions used for the measurements with the XL2 Sound Level Meter. • Select Unit. • Select the Results required. • Confirm the settings with OK.
	Open...	Select an existing project file *.xlba.
	Save	Save the actual sound insulation data as project file *.xlba.
	Save as...	Save the project with selectable name and path
	Print Preview	The sound insulation reports for the selected results are displayed.
	Print	The sound insulation reports for the selected results are printed.
Import	Folder...	Select a folder in order to import all measurement data stored in this folder
	File...	Select a single measurement data file *.xl2
File	Preferences...	<p>Language Selection</p> <p>The Sound Insulation Reporter software is available in English and German languages. The default setting uses the language of the operating system installed on your computer. Select the language as follows:</p> <ul style="list-style-type: none"> • Select File in the menu. • Select Preferences... • Select the language. Changing the language will require a restart of the software. • Confirm the settings with OK.

 The software closes and restarts with the selected language.

	Recent	Select a recently-opened project.
	Exit	Close the software.
Edit	Cut	Cut the text from any text box.
	Copy	Copy the data selected in the right-hand Measurements , Calculations or Results box.
	Paste	Paste the copied text into any text box.
	Delete	Delete the data selected in the right-hand selection box in Measurements .
	Select All	Select all data in the right-hand Measurements box (applicable in Measurements View only).
View	Measurements	Select the Measurements View.
	Calculations	Select the Calculations View.
	Results	Select the Results View.
Help	Online Help	Link to download the user manual in PDF form
	Check for Updates...	Checks for available updates of the XL2 Sound Insulation Reporter software.
	About	Lists version and copyright details of the software.

4. Data Import

The XL2 measurement data may be imported into the software by drag and drop. The minimum requirement for a successful data import is an XL2 with firmware V3.23 or higher and activated Sound Insulation Option. Instruments using an older firmware may benefit from the online activation of the option without installation on the device. The Sound Insulation Reporter software verifies the available option online during the data import.

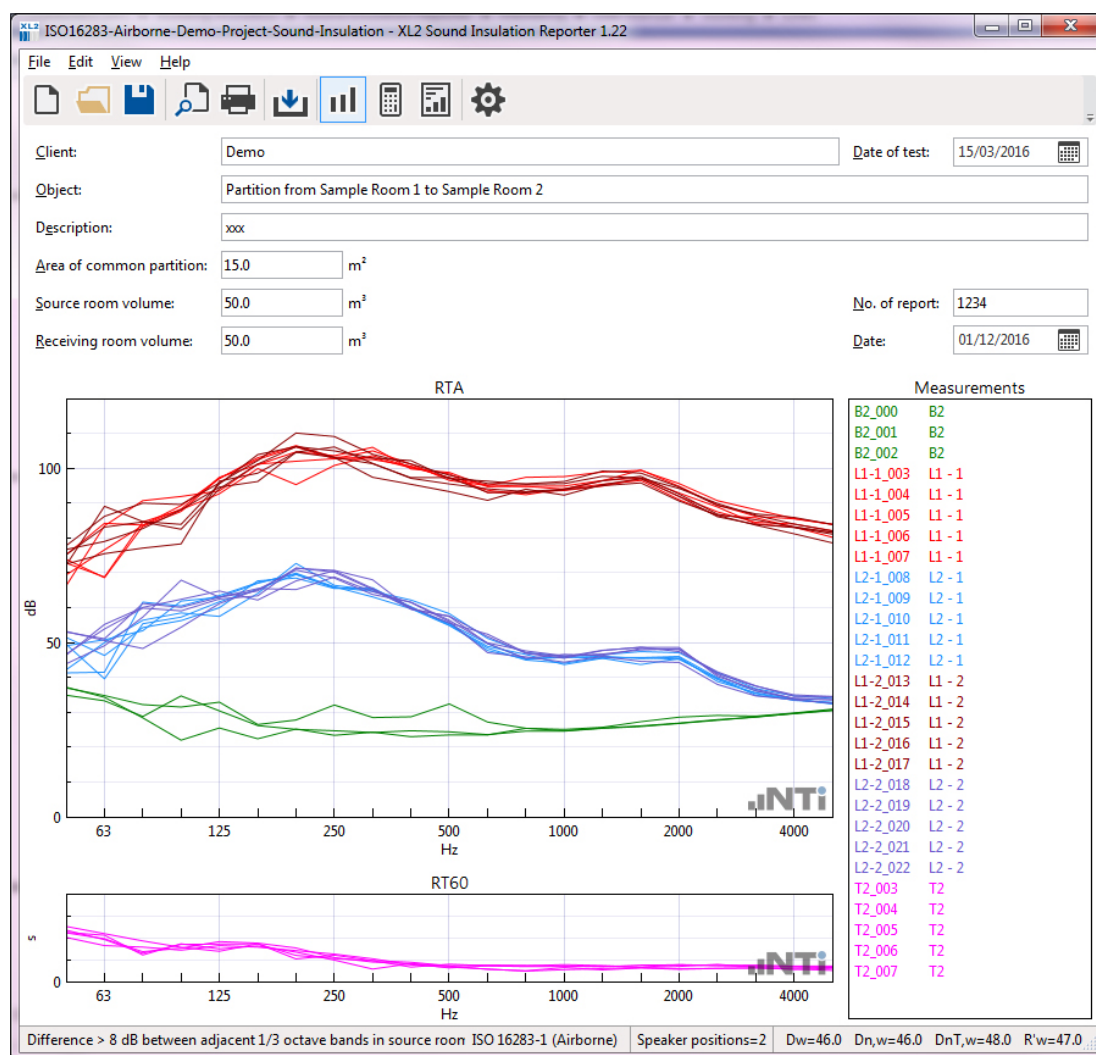


Kindly ensure, prior the data import, that the partition folder contains all required measurement data (*.txt) and *.xl2 system files of each recorded measurement.

Sound Insulation Reporter offers multiple possibilities to import measurement data:

- Select the complete partition folder with all measurement data. Drag and drop it into the “Add your measurements here” field.

- Select all *.xl2 files in the partition folder with all measurement data. Drag and drop the data into the “Add your measurements here” field.
- Click on **Import** in the menu bar and select the partition folder. Confirm the selection.
- Click on **Import** in the menu bar and open the partition folder. Confirm the selection.
- Click on **File -> Import** and select the folder, single or multiple data files. Confirm the selection.



👉 The measurement data is imported.

All measurement data with mapping information in the file name are assigned automatically by the software, e.g. “L1-1_SLM_001_RTA_3rd_Report.txt” is assigned to L1-1 (=speaker position 1 in the sending room). Alternatively the mapping may be assigned manually to sending room or receiving room and the individual speaker positions:

- Select the measurement with the mouse
- Click on the right mouse button
- Select **Assign To**
- Assign the measurement

5. Analysis and Reporting Views

The Sound Insulation Reporter software offers three views for fast data analysis and straight-forward reporting in accordance with the standard.



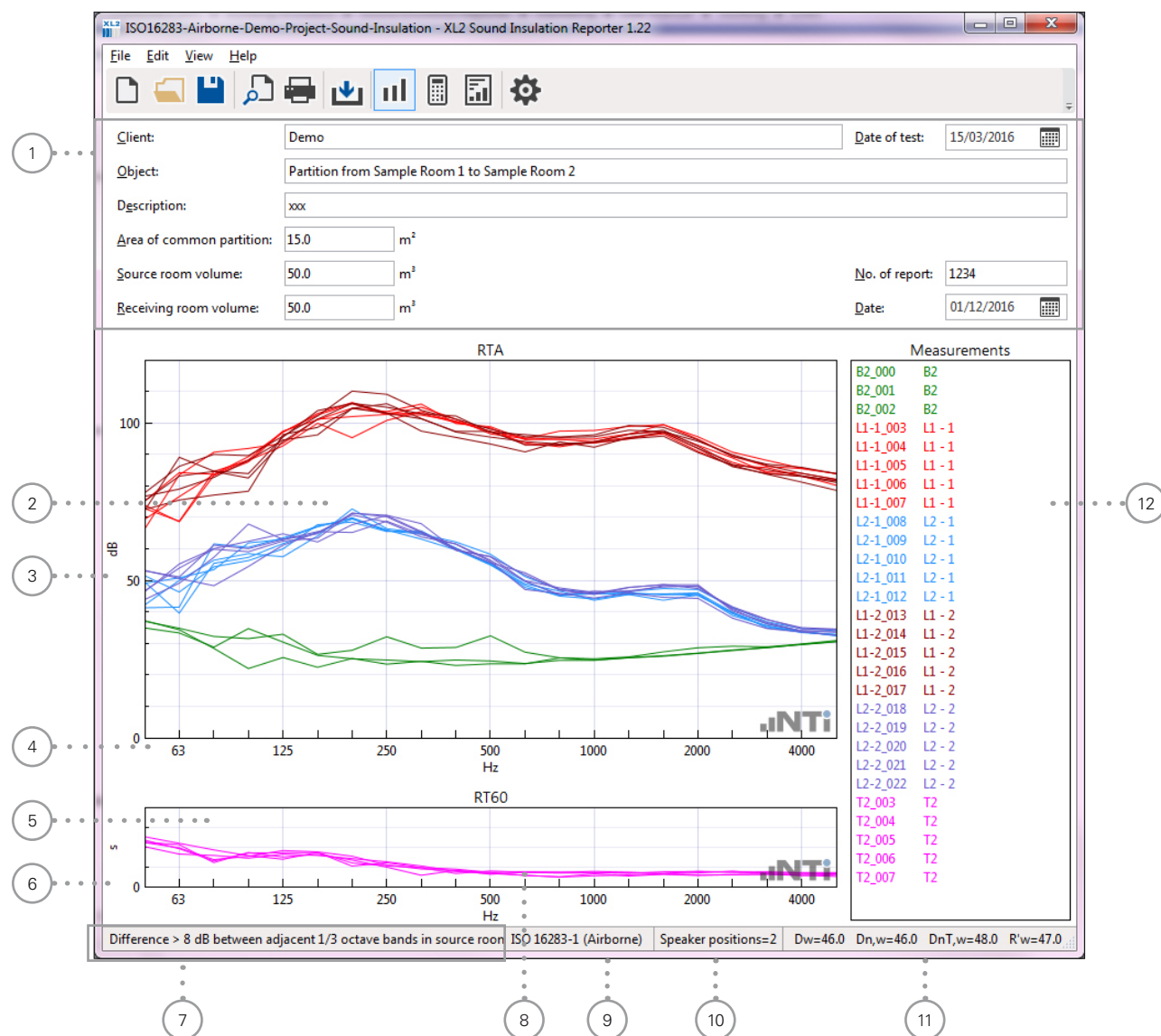
① **Measurements View**

② **Calculations View**

③ **Results View**

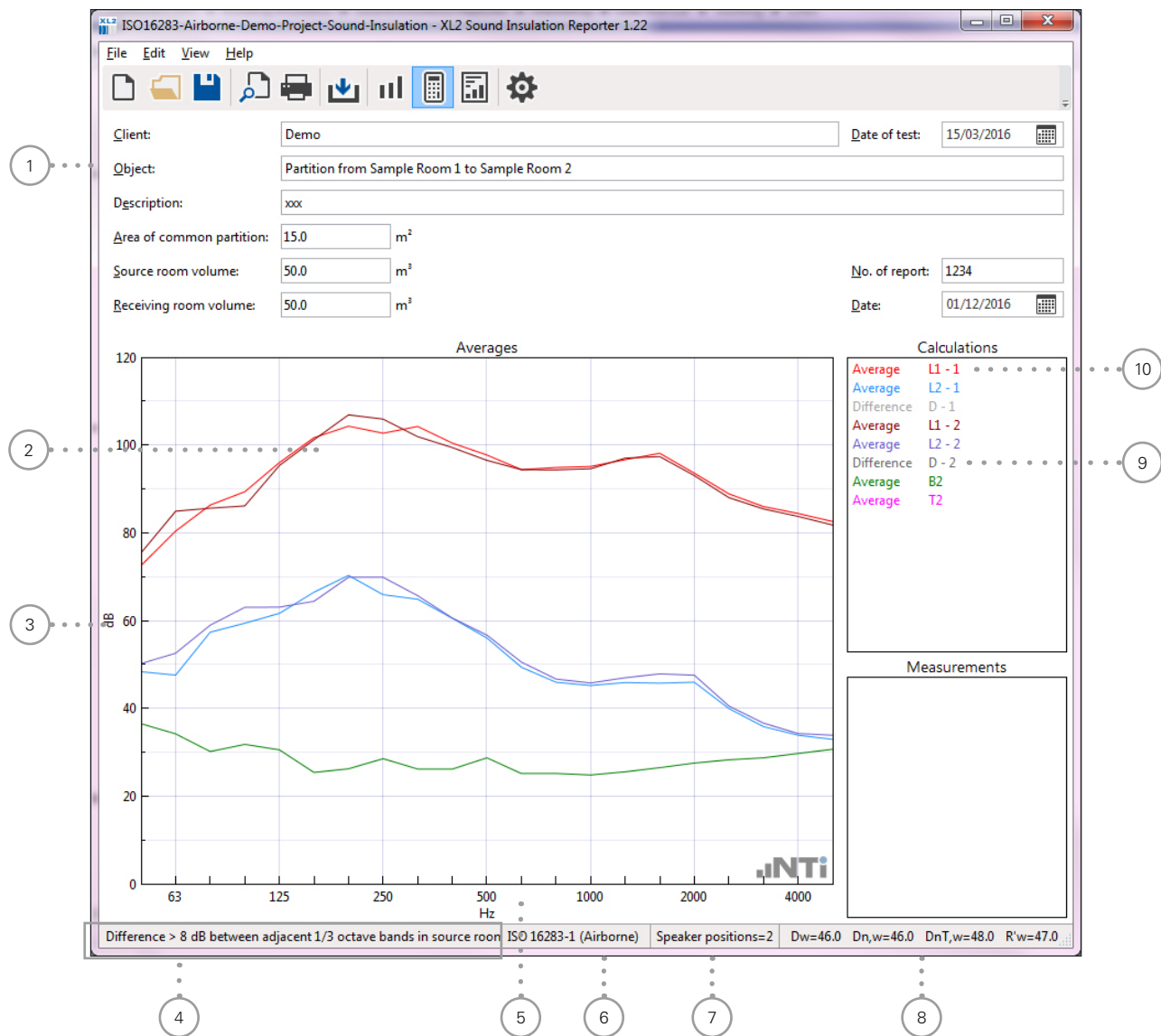
Measurements View

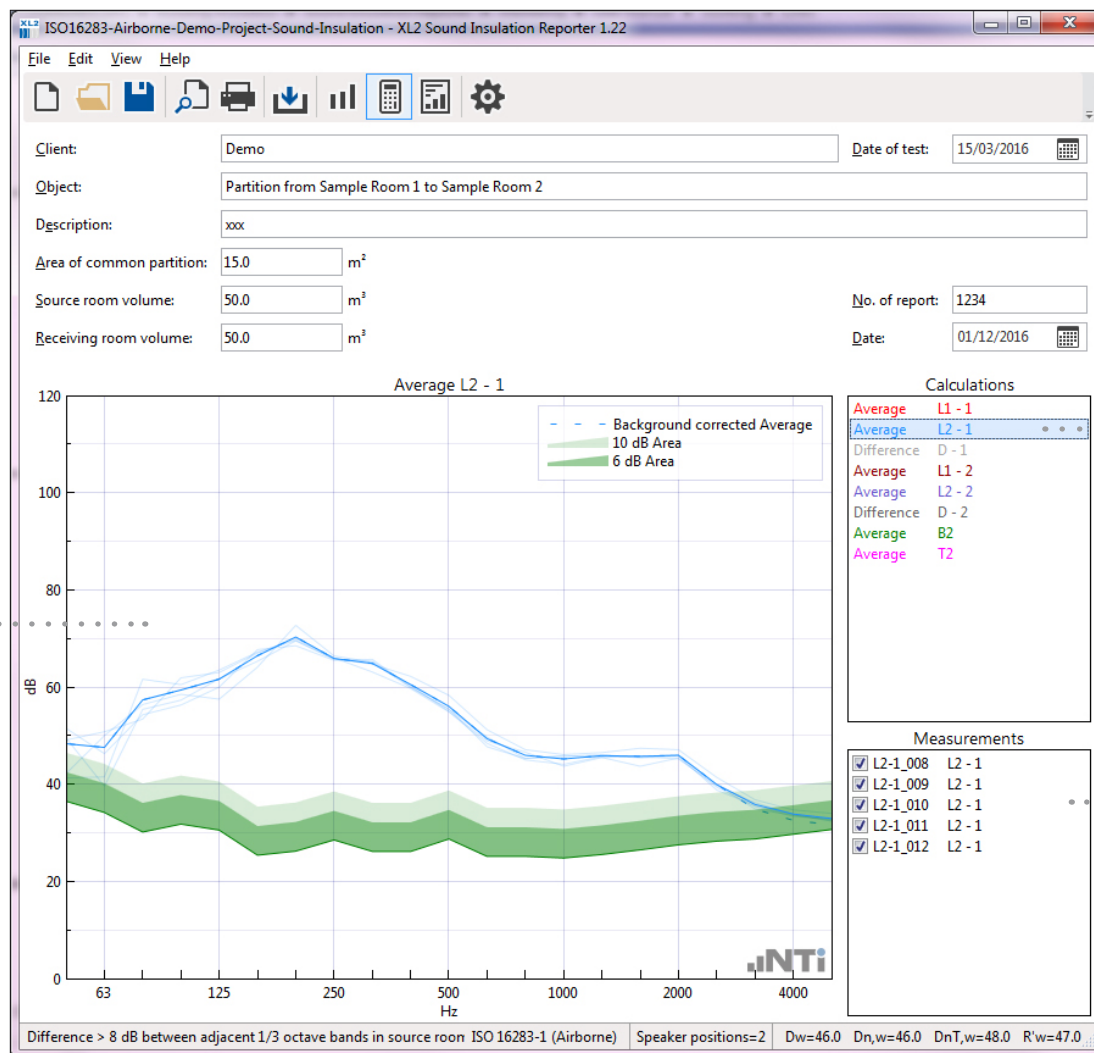
By default all measurement data are automatically assigned to the corresponding sending or receiving room, as well as the speaker position for the sound insulation calculation. Alternatively the data can be assigned manually.



- ① **Details**
These data are listed in the header of the sound insulation report. The partition area and volume parameters are used for the sound insulation calculation.
- ② **RTA Measurements Chart**
The original XL2 measurement data is visualized in the frequency range from 50 Hz to 5 kHz.
- ③ **Y-Axis of RTA Measurements Chart**
Set the Y-axis in **Settings -> Charts**
- ④ **X-Axis of RTA Measurements Chart**
The X-axis is fixed to 50 Hz - 5 kHz.
- ⑤ **RT60 Measurements Chart**
The original XL2 measurement data is visualized in the frequency range from 50 Hz to 5 kHz.
- ⑥ **Y-Axis of RT60 Measurements Chart**
Set the Y-axis in **Settings -> Charts**
- ⑦ **Guideline Bar**
Additional information about displayed measurement data is listed here.
- ⑧ **X-Axis of RT60 Measurements Chart**
The X-axis is fixed to 50 Hz - 5 kHz.
- ⑨ **Standard**
Selected standard for the sound insulation calculation and reporting.
- ⑩ **Speaker Positions**
Reads the number of set speaker positions.
- ⑪ **Single Number Sound Insulation**
Reads the single number results. Select the calculated results in **Settings -> General**
- ⑫ **Measurements List with Mappings**
List all the imported XL2 measurement data files with the automatically-assigned mapping. The mapping may be assigned manually to sending room or receiving room and the individual speaker positions:
 - Select the measurement with the mouse
 - Click on the right mouse button
 - Select **Assign To**
 - Assign the measurement

Calculations View





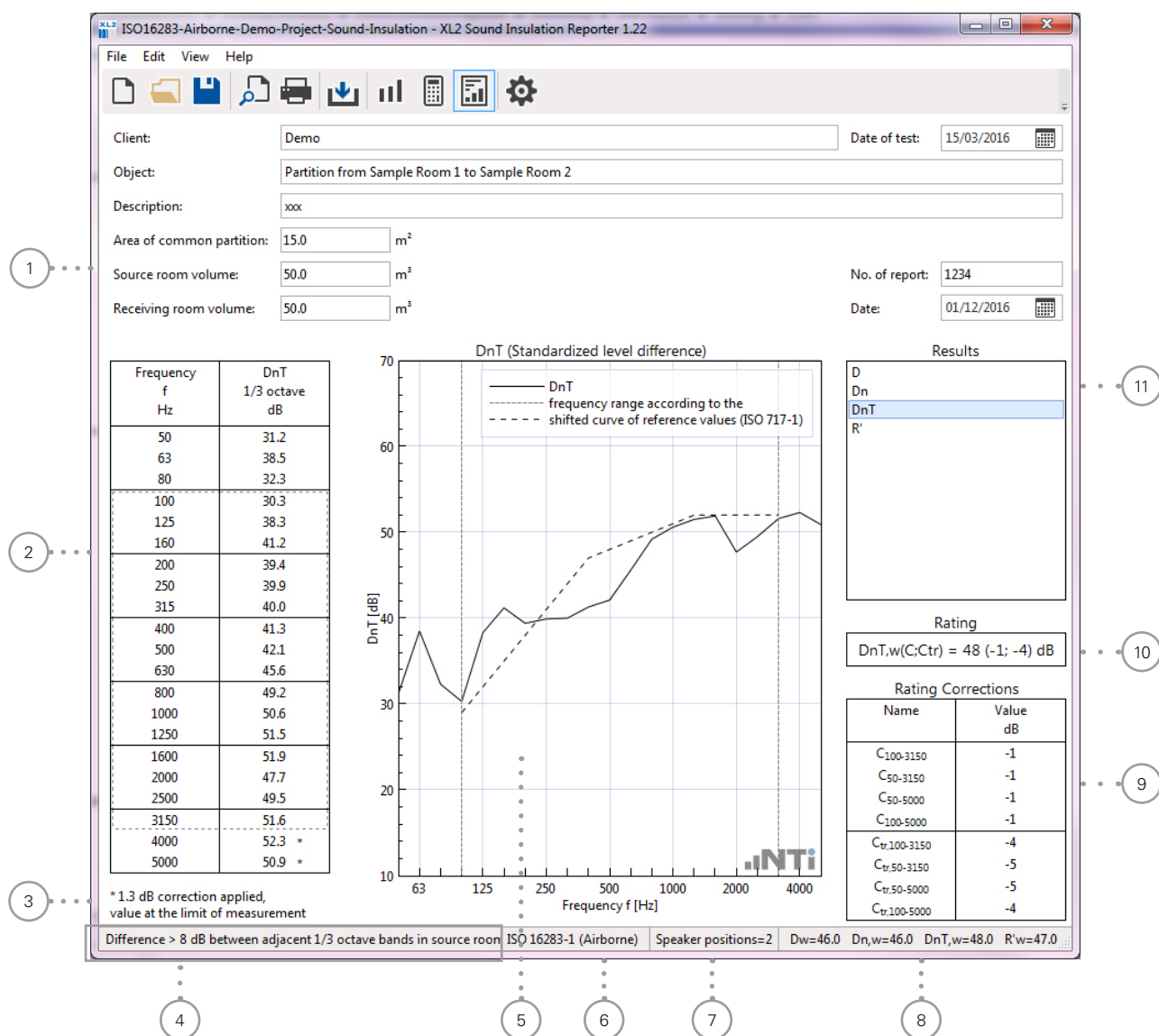
- 1 **Details**
These data are listed in the header of the sound insulation report. The partition area and volume parameters are used for the sound insulation calculation.
- 2 **Chart**
The averaged measurement data for sending room, receiving room and individual speaker position is visualized in the frequency range from 50 Hz to 5 kHz.
- 3 **Y-Axis**
Set the Y-axis in **Settings -> Charts**
- 4 **Guideline Bar**
Additional information about displayed measurement data is listed here.

- ⑤ **X-Axis**
The X-axis is fixed to 50 Hz - 5 kHz.
- ⑥ **Standard**
Selected standard for the sound insulation calculation and reporting.
- ⑦ **Speaker Positions**
Reads the number of set speaker positions.
- ⑧ **Single Number Sound Insulation**
Reads the single number results. Select the calculated results in **Settings -> General**
- ⑨ **Differences**
Select **Difference D-1** and view the averaged sending room, averaged receiving room and the calculated difference for the speaker position 1. Any applicable background noise correction is included by default.
- ⑩ **Average**
 - Averaged data sets for sound insulation calculation.
 - Select e.g. **Average L1-1** for detailed verifications of the measurement data used for the average calculation.
 - Press ESC on the keyboard to return to the default view with all averaged measurements.
- ⑪ **Detailed View**
Displays all measurement data and the averaged result for the selected parameter.
- ⑫ **Measurements Selection**
Disable any measurement data, which shall not be used for the average calculation.
- ⑬ **Selected Average Parameter**
Select the parameter for detailed analysis.

Results View

The results view displays the following sound insulation results based on the selected result type:

- Table from 50 Hz - 5 kHz
- Standardized chart from 50 Hz - 5 kHz
- Single number quantity
- Spectrum adaption terms C and Ctr



- ① **Details**
These data are listed in the header of the sound insulation report. The partition area and room volume parameters are used for the sound insulation calculation.
- ② **Results Table**
Sound insulation results in the frequency range from 50 Hz to 5 kHz. The results are corrected to the signal level of background noise. In case of a fixed correction is applied, then the applicable frequency bands are marked by a "*", see ③.
- ③ **Information about Background Noise Correction**
A fixed background noise correction applied in the table ② at frequency bands marked by "*".
- ④ **Guideline Bar**
Additional information about displayed measurement data is listed here.
- ⑤ **Results Chart**
Sound insulation results spectrum with shifted reference curve in the frequency range from 50 Hz to 5 kHz.
- ⑥ **Standard**
Selected standard for the sound insulation calculation and reporting.
- ⑦ **Speaker Positions**
Reads the number of set speaker positions.
- ⑧ **Single Number Sound Insulation**
Reads the single number results. Select the calculated results in **Settings -> General**.
- ⑨ **Spectrum Adaption Terms**
Value, in decibels, to be added to the single-number rating (e.g. R'_w) in accordance with ISO standards. These take into account different spectra of noise sources; such as pink noise (C) and road traffic noise (Ctr).

Application examples
 - C
Living Area Noise (talking, music, radio, TV), trains at middle and high speed, highway traffic @ speed > 80 km/h, jets in near distance, factories with mainly middle- and high-frequency noise
 - Ctr
traffic noise in cities, trains at low speed, jets in far distance, airplanes, factories with mainly low-frequency noise

⑩ **Single Number Quantity**

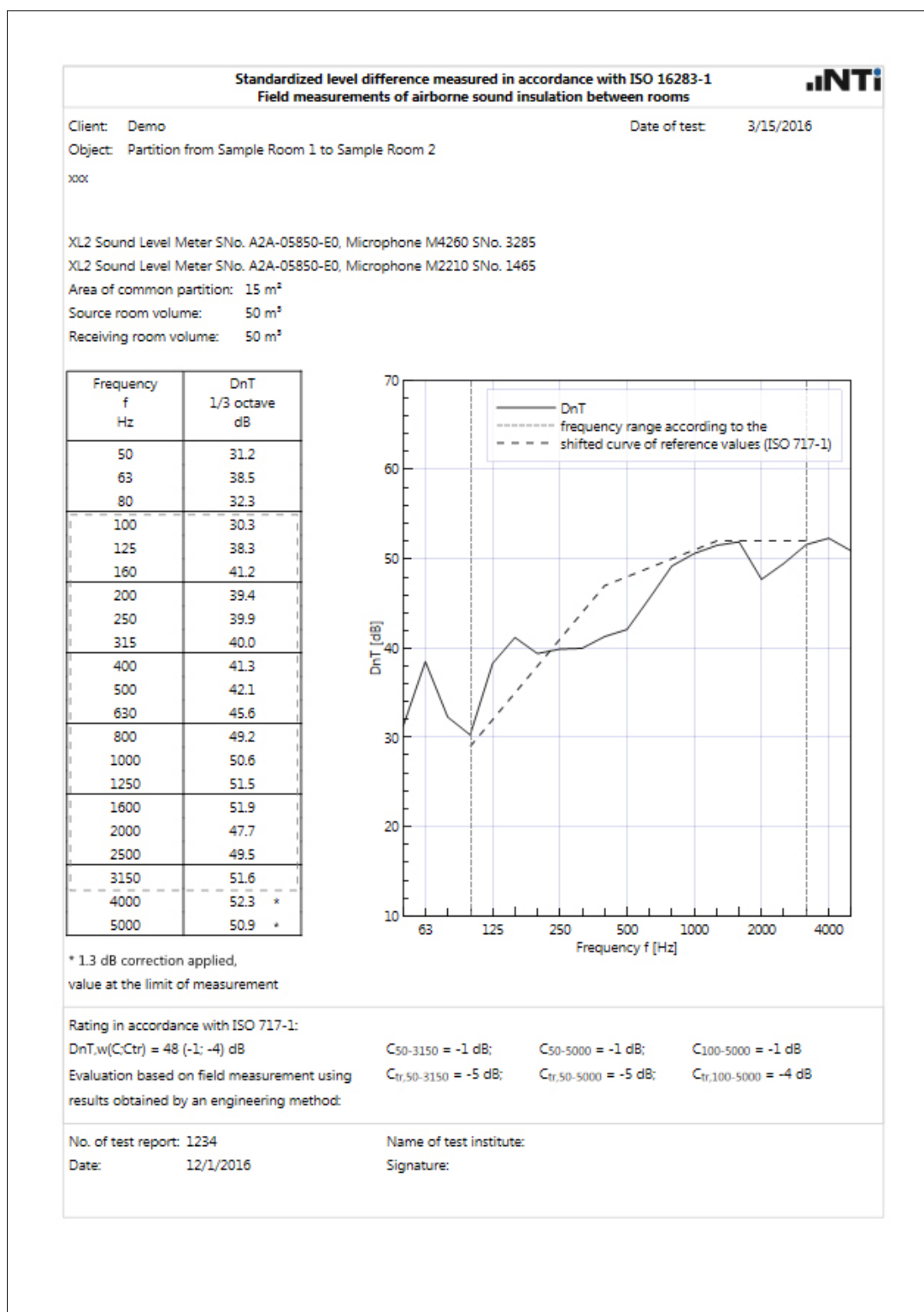
This is the single number sound insulation result. The single number result equals the level of the shifted reference curve at 500 Hz.

⑪ **Result Selector Box**

Select the required sound insulation result here. The available results are preset in **Settings** -> **General**.

6. Sound Insulation Report

The software generates automated reports in accordance with the supported standards. Print the reports for the selected results.



7. Specifications

Standards	Airborne Sound Insulation <ul style="list-style-type: none"> • ASTM E336 • ASTM E413 • England/Wales: Approved Document E (2003) • ISO 140-4:1998 • ISO 16283-1:2014 • ISO 717-1:2013 	Impact Sound Insulation <ul style="list-style-type: none"> • ASTM E1007 • ASTM E989 • England/Wales: Approved Document E (2003) • ISO 140-7:1998 • ISO 16283-2:2015 • ISO 717-2:2013
Results (ASTM)	<ul style="list-style-type: none"> • NR • NNR • ATL 	<ul style="list-style-type: none"> • ISPL • RTNISPL • ANISPL
Results (ISO)	<ul style="list-style-type: none"> • D_w • $D_{n,w}$ • $D_{nT,w}$ • R'_w • Spectrum adaption terms C, Ctr 	<ul style="list-style-type: none"> • L'_n • L'_{nT} • Spectrum adaption terms C1
Reporting	<ul style="list-style-type: none"> • PDF via PDF-printer • XPS • Data export to MS Excel 	
Licensing	<ul style="list-style-type: none"> • Install Sound Insulation Option into XL2 or activate Sound Insulation Reporter 365 online at my.nti-audio.com; this enables the import of measurement data into the Sound Insulation Reporter software • Sound Insulation Reporter can be installed on multiple computers 	
Operating System	<ul style="list-style-type: none"> • Windows Vista, 7, 8.x and 10 	
XL2 Requirements	<ul style="list-style-type: none"> • Installed optional Extended Acoustic Pack to measure the RT60 reverberation time in 1/3 octave band resolution. 	
Order Information	<ul style="list-style-type: none"> • Sound Insulation Option NTi Audio # 600 000 432 • Sound Insulation Reporter 365 (annual subscription service) NTi Audio # 600 000 433 	

All information is subject to change without notice.

8. Appendix: Airborne Sound Insulation acc. ISO16283

This appendix lists the detailed proceedings for airborne sound insulation measurements in accordance with ISO 16283-1 for rooms with a volume larger or equal than 25 m³.



Instrument Configuration

The sound level meter shall meet the requirements of a class 1 instrument in accordance with the standard IEC 61672-1. The configuration of the dedicated NTi Audio sound pressure level measurement system consists of

- XL2 or XL2-TA Sound Level Meter
- Extended Acoustic Pack Option installed (required for the RT60 measurement in 1/3 octave resolution)
- Sound Insulation Option or an enabled Sound Insulation Reporter 365 annual subscription
- M2230 Measurement Microphone
- ASD Cable
- NTi Audio Precision Calibrator
- Tripod
- Omnidirectional Loudspeaker (uniform omnidirectional radiation is required)
- Sound Insulation Reporter Software



The sound pressure level measuring system shall be calibrated at intervals not exceeding two years.

Required measurements

- Sound level in source room
- Sound level in receiving room
- Background noise level in receiving room
- Reverberation time RT60 in receiving room

At the beginning and at the end of each measurement day, the entire sound pressure level measuring system shall be checked with the precision calibrator. This shall meet the class 1 requirements in accordance with IEC 60942.



Wear hearing protection for all measurements!

Room Selection

The airborne sound insulation is measured between two rooms. One room is chosen as the source room and the other one is chosen as the receiving room. In case the volumes of the two rooms differ, then the smaller room shall be used as receiving room.

Measure Background Noise L_b in Receiving Room

Preparation

- Select the RTA page of SLMeter function on XL2-TA Sound Level Meter.
- Select third-octave resolution measurement.
- It's recommended to leave the room for this measurement thus any noise generated by the operator will not affect the measurement.

Measurement

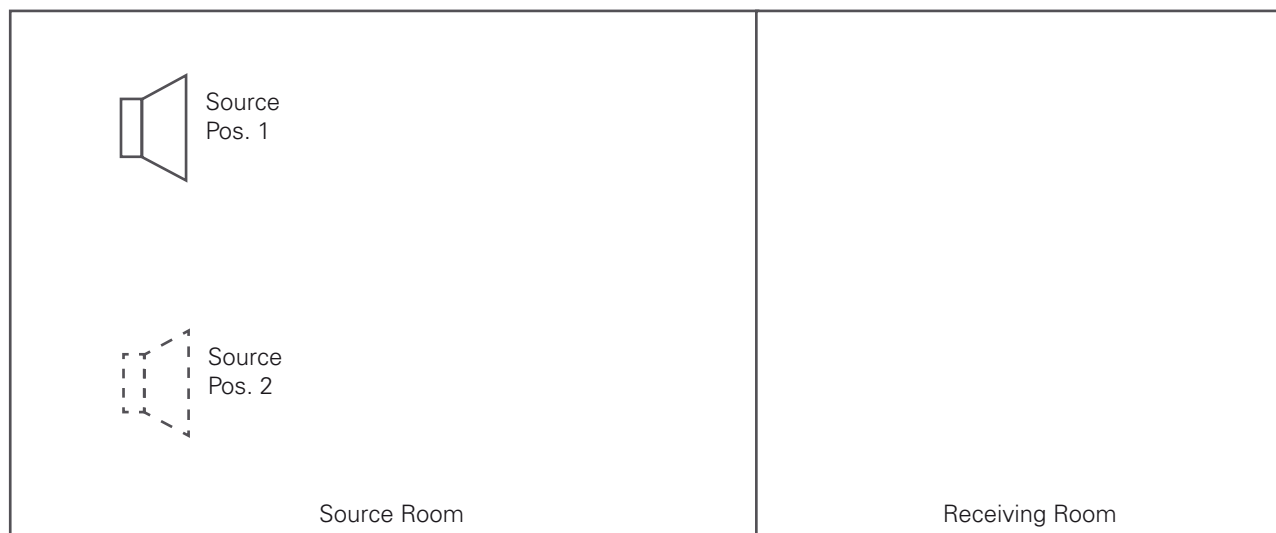
- Measure the background noise L_{Zeq} in the receiving room for 30 seconds.
- Store the reading in the XL2. This is required for post calculation of the sound insulation.
- Capture the reading as a reference for the next step. This is required to adjust the speaker output level accordingly.



Measure background noise level L_b

Test Signal for Sound Level Measurement

- Position the speaker in the source room.
- The measurements have to be carried out at least at two different speaker positions thus define the both positions.
- Choose position 1 at least 0.5 m from any room boundary and at least 1.0 m from the separating partition. Position 2 shall be in a different plane relative to the room boundaries with a minimum 1.4 m distance to position 1. The distances are measured from the center of the loudspeaker. In case the separation partition is a floor and the speaker is in the upper room, then the loudspeaker has to be at least 1 m above the floor.
- Start the pink noise test signal at a low level.
- Increase the level until it is minimum 10 dB higher in each frequency band from 50 Hz to 5000 Hz in the receiving room than the background noise measured in step 2. In case this is not possible, then the MS Excel calculation form will automatically apply corrections in accordance with IEC 16283-1.



Position the test signal for the sound level measurements

Measure Levels L1 and L2 at Speaker Position 1

Preparation

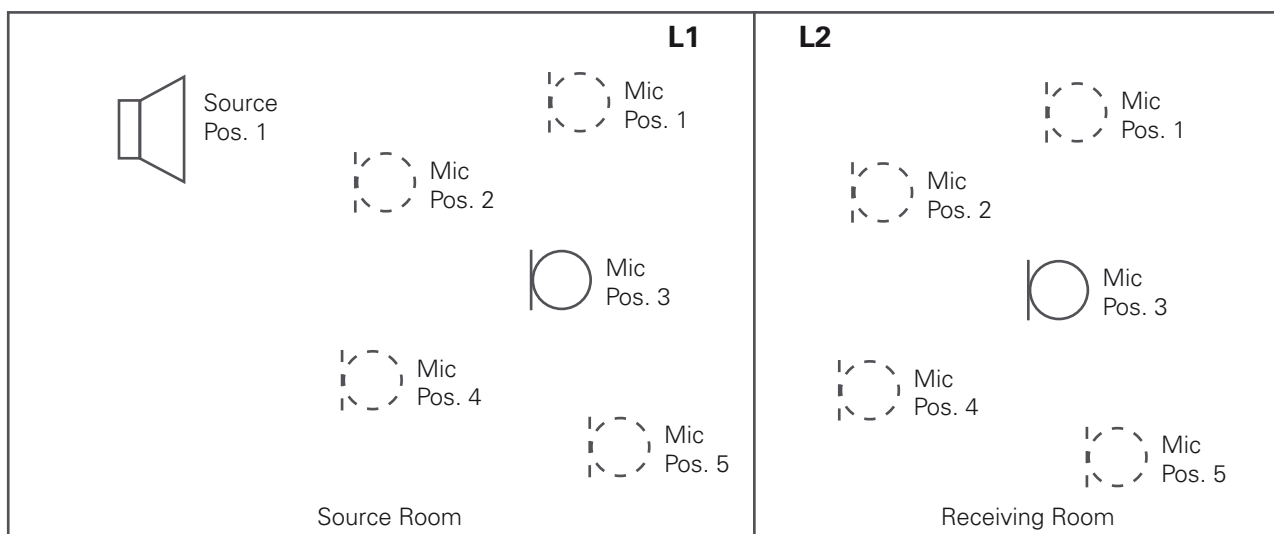
- Define five microphone positions in the source- and receiving room distributed within the maximum permitted space throughout the room. The positions shall be in a different plane relative to the room boundaries and shall not form a regular grid. For example mark the positions on the floor with a tape. The following minimum distances apply:
 - 0.7 m between microphone positions
 - 0.5 m between any microphone position and any room boundary
 - 1.0 m between any microphone position and the loudspeaker
- It's recommended to leave the room for the level measurement as the operator introduces additional absorption.

Measurements in Source Room

- Measure the sound level spectrum LZeq in the source room at each position for a measurement period of 15 seconds.
- Store the individual readings in the XL2 for post calculation of the sound insulation.

Measurements in Receiving Room

- Measure the sound level spectrum LZeq in the source room at each position for a measurement period of 15 seconds.
- Store the individual readings in the XL2 for post calculation of the sound insulation.



Measure the sound levels in source and receiving room at speaker position 1

Measure Levels L1 and L2 at Speaker Position 2

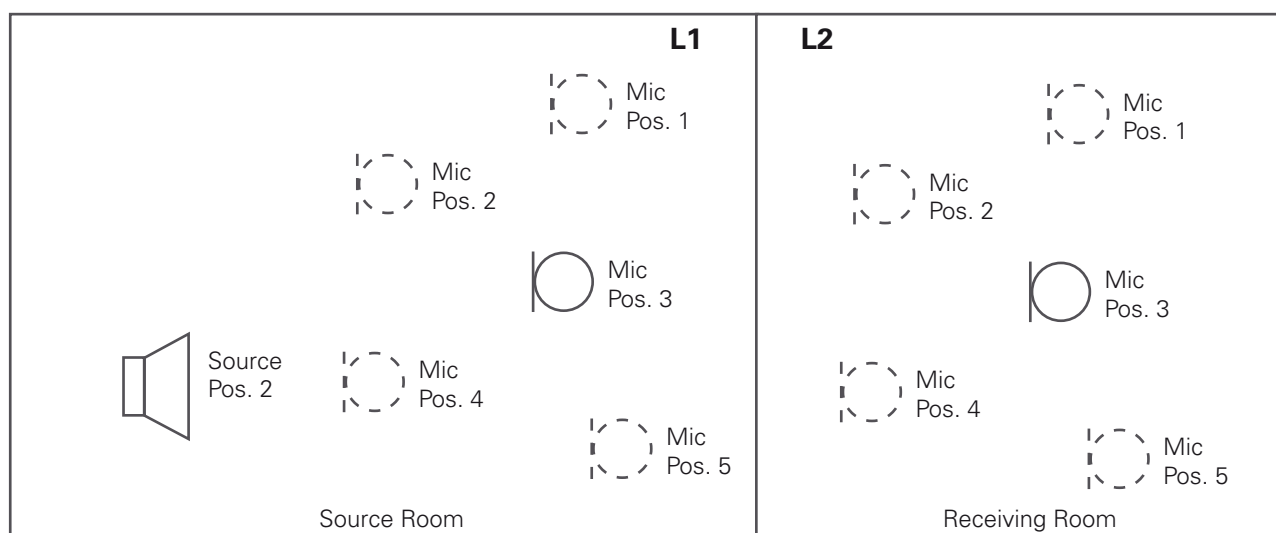
- Move the loudspeaker to position 2 in the source room.

Measurements in Source Room

- Measure the sound level spectrum LZeq in the source room at each position for a measurement period of 15 seconds.
- Store the individual readings in the XL2 for post calculation of the sound insulation.

Measurements in Receiving Room

- Measure the sound level spectrum LZeq in the source room at each position for a measurement period of 15 seconds.
- Store the individual readings in the XL2 for post calculation of the sound insulation.



Measure the sound levels in source and receiving room at speaker position 2

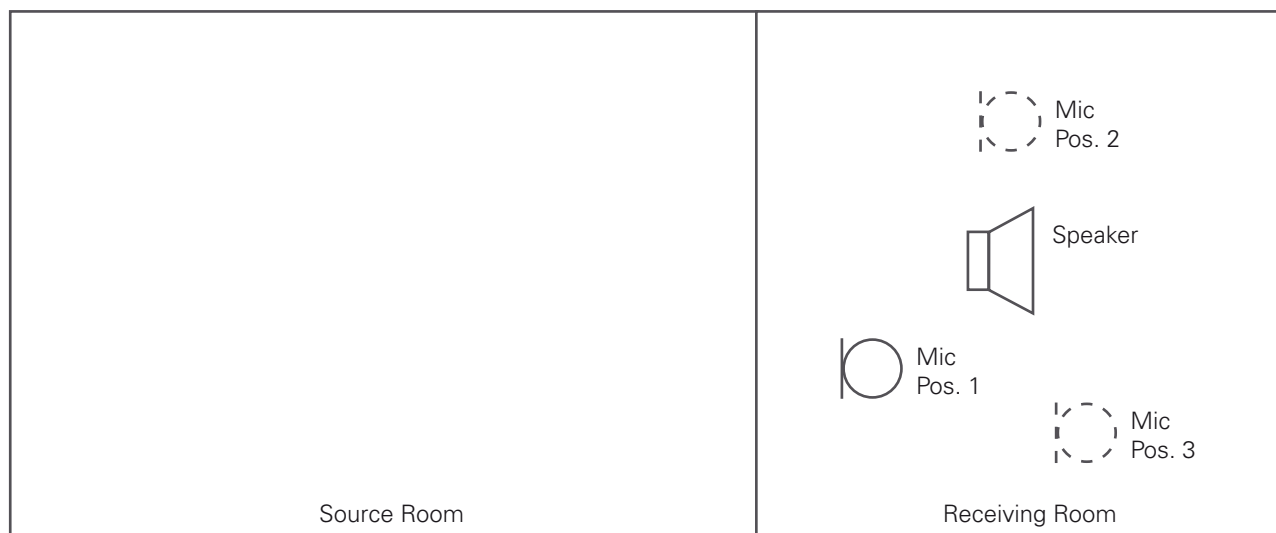
Measure Reverberation Time T in Receiving Room

Preparation

- Move the loudspeaker to center of the receiving room.
- Select three microphone positions from the positions used at the level measurements in the receiving room.
- Select the RT60 measurement function on XL2 Sound Level Meter.
- Select the 1/3 octave resolution.
- Use the Minirator MR-PRO and select the test signal gated pink noise. Guideline: The on/off-cycle time shall be longer than the expected reverberation time.

Measure T in Receiving Room

- Perform the RT60 measurement twice at each microphone position. In total you will get 6 readings.
- Store the individual readings on the XL2 for post calculation of the sound insulation.



Measure the reverberation time T in receiving room

Sound Insulation Reporter

Verify and document all readings by using the Sound Insulation Reporter software.

You may load all measurement records into the software and generate the Airborne Sound Insulation report. The form calculates the level difference D_w , the standardized level difference $D_{nT,w}$, the normalized level difference $D_{n,w}$ and the apparent sound reduction index R'_w based on the reference curve shifting method in accordance with the standard ISO 717-1.

The following calculations are used:

- $D = L1 - L2$
- $D_{nT} = D + 10 \lg (T/0.5)$
- $R' = D + 10 \lg (S/A)$
- $A = 0.16 * V / T$

with

A	Equivalent absorption area of the receiving room in m ²
D	Level difference between source and receiving room
D_{nT}	Standardized level difference (the level difference D is standardized to the 0.5 seconds reference value of the reverberation time in the receiving room)
$D_{nT,w}$	Weighted standardized level difference (is the value of the reference curve at 500 Hz after shifting the reference curve)
L1	Sound pressure level in the source room in dB
L2	Sound pressure level in the receiving room in dB
R'	Apparent sound reduction index of field measurement
R'_w	Weighted apparent sound reduction index (is the value of the reference curve at 500 Hz after shifting the reference curve)
S	Partition area in m ² of the wall between source and receiving room
T	Reverberations time RT60 in receiving room
V	Volume of receiving room in m ³